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[Hook]

Hello, everyone. Welcome to XJ's history channel. This is Xiaofan. This is Jonathan. Today we are going to talk about algorithm.

Jonathan: Wait, algorithm? I thought we are going to talk about history.

Xiaofan: Well, Algorithm can shape history! Have you heard of the story that one algorithm killed the whole Wall Street and led to the 2008 Financial Crisis?

Jonathan: What? I thought it's evil bankers' fault.

Xiaofan: It is the bankers' faults. The story is that this one guy, a math genius, designed an algorithm to figure out a way to calculate the correlation between two, quote and quote, independent events, such as how the rise of the housing price in California will correlate with the housing price in Taxes. The whole Wall Street adopted this algorithm to calculate risks for mortgages and failed miserably. The reason is that when this guy designed the algorithm, he only used data in the boom time. Of course, the algorithm will fail to predict the bubble bust. Every time when he was called into a Wall Street office, he will explain the limitations of his algorithm, but no one seemed to care, until 2008[1].

Jonathan: Wow, algorithm can also be biased!

Xiaofan: Exactly! Today, we are going to use two historical anecdotes to show everyone: algorithm is really just a container for people who created and used them to carry out their worldviews. By examining the human biases behind the algorithms, we will see how the same global processes of colonization and industrialization have both shaped the creation of algorithms and in return, been shaped by it.[2] Before going into the stories, let's first define the algorithm. What are some algorithms in your daily life Jonathan?

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[1] [1:11] Salmon, Felix. 2009. "Recipe For Disaster: The Formula That Killed Wall Street". *WIRED*. http://archive.wired.com/techbiz/it/magazine/17-03/wp_quant?currentPage=all.

[2] [1:39] #Historicalargument: This is my thesis. I separate it into two sentence to emphasizes the agency of human behind the algorithm and its relationship with #globalpast. To keep the sentences simple, I didn't go into details to talk about the anecdotes that I am going to introduce.

Jonathan: Does recipes count?

Xiaofan: They do! Algorithms are essentially cookbooks. They takes in a bunch of inputs, after a set of procedures, you get an output. By nature, it's structured, ordered and automated. Here I have a recipe on my hand. It's called Old Eel Pie.[3]

(Excerpted from John Murrell: A New Booke of Cookerie. London: London Cookerie, 1615.)

OLD EEL PIE

Englishman John Murrell published a cookbook in 1615 that included this recipe for eel pie. While we don't know for sure that any colonists owned a copy of A New Booke for Cookerie, *food historians believe that housewives and cooks might have used this type of recipe or "receipt."*

"Coffin" simply means box here; it does not refer to a place for a corpse, so don't worry. (Though in a sick sense, it is a coffin for the eels.) In the 1600s, a coffin was a deep pie shell, often made of whole-wheat flour pastry, which could be a little tough. The pastry would line a 3- or 4-inch deep pan that could be covered and set among the coals to bake. The coffin was more important for cooking than for eating, unless you were an Old World beggar. In that case, you were lucky to get the coffin crust.

TO BAKE EELES.

Cut your Eeles about the length of your finger: season them with Pepper, Salt, and Ginger, and so put them into a Coffin, with a good piece of sweet Butter. Put into your Pye great Razins of the Sunne, and an Onyon minst small, and so close it and bake it.

Jonathan, how do you feel about it?

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[3] [2:36] Murrell, John. 1615. *A Nevv Booke Of Cookerie*. 1st ed. London: Printed for Iohn Browne, and are to be solde at his shop in S. Dunstanes Church-yard. http://www.staff.uni-giessen.de/gloning/tx/1615murr.htm

Jonathan: This sounds so…...old-fashioned! Who eats eels in pies today?

Xiaofan: Well, British people in 1600s did. This is a recipe taken from a cookbook published by John Murrell in 1615 England. West Europeans loved eel so much back then. England's King Henry I even died from eating a "surfeit of lampreys".[4] Now think about the seasoning mentioned in the recipe. Pepper, Salt, and Ginger. At that time, Pepper can only be shipped from India and thus considered a luxury in Europe. It's also the reason that Columbus sailed to the Americans because the turks blocked the spice trade routes. Ginger is another eastern spice that Britain mainly imported from China or India. From the way British designed this recipe, the ingredients they used, I can feel the elegance and proudness behind: it's meant for the upper class British to demonstrate their power. However, when the British colonists brought this recipe to America, the usage scenario for the recipe changed. Imagined you were one of the English colonists in New England in the 17th century, an eel pie was most likely served on a spring dinner with some winter savory from the garden[5].

Jonathan: why a spring dinner?

Xiaofan: Because back then, food availability was bounded by season! Eels usually swim toward the coast and enter the freshwater rivers in the spring from the cold Atlantic Ocean, which makes it perfect for harvest in Spring.[6] British colonists were elated to discover the abundance of eels in New England area and eel pie soon become a family food, a classic dish on the colonists' dinner table.[7] Going through the steps of cooking an eel pie is less about elegance or proudness anymore, it's a cultural lingering through which the New England immigrants can exercise their remaining British identities one more time. Interestingly, eel pie seems to lost its favor when America became independent because it people considered it as a colonial legacy, a symbol that is practiced by the "other."[8] However, what's absence from this story is really how native Americans consume eels. All we have heard so far is the British

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[4] [3:05] O'Connell, Libby Haight. 2015. *The American Plate: A Culinary History In 100 Bites*. 1st ed. Illinois: Sourcebooks, Inc.

[5] [4:14] #primarysource: A close read of the primary source: old eel pie by looking at its ingredients, its time, the people who use it, the way different people use it, and even the context of how it could be used back then.

[6] [4:27] Prosek, James. 2010. "Opinion | Give Thanks For ... Eel?". *Nytimes.Com*. http://www.nytimes.com/2010/11/25/opinion/25prosek.html.

[7] [4:44] ibid

[8] [5:10] Stavely, Keith W. F, and Kathleen Fitzgerald. 2004. *America's Founding Food*. 1st ed. Chapel Hill: University of North Carolina Press.

recipe, a colonial story, but what about the cultural significance of eels to the natives? We never know.[9]

Jonathan: Wow, I am amazed by how a simple recipe in colonial time can carry so much human intentionality and interpretation.

[HISTORICAL SOURCE 2]

Xiaofan: Right. Here I am going to present you a second algorithm that lasts for centuries and impacts millions of people's lives. It's called Fordism. Have you heard of the car company Ford? Yes, Fordism refers to the company's practice in early 20th century to creatively divide people's labors into the smallest units and reassemble them again with the help of assembly line machines to improve efficiency. Scholars later appropriate this word to imply broadly about the capitalist thinking and social ordering behind this practice.

Jonathan: So how is this related to algorithms?

Xiaofan: This is basically a nested algorithm! You see, Ford gave all workers a standardized cookbook so that even the unskilled workers can carry out the work easily. Then Ford created another algorithm that takes human as input and the automated machines parsed and combined their work to output cars. Traditionally, workers need to move from car to car to carry out their work. In 1914, Ford developed an "endless chain-driven" conveyor that can move chassis around while the workers stay at the same workstation. Three months later, it invented a "man high" line with all the car parts at waist level so that workers can sit at one place and complete all the work! This invention dramatically improved the production efficiency and all firms in the country started to imitate, but this model also caused a high turnover rate. Why? Here is a letter to Henry Ford from a wife of assembly line worker in 1914[10][11]:

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[9] [5:30] #historicalbias: using the recipe as an example to illustrate the human bias behind the algorithm (aka this specific recipe): it's created and used by the European and thus biased to convey colonizers' worldview and discourse.

[10] [8:20] Dornbush, Krista. 2017. *AP U.S. History 2017-2018*. 1st ed. Kaplan. (The handwriting on the original manuscript is too hard to read, so I found the printed text of the letter here)

[11] [8:20] "Letter To Henry Ford From The Wife Of An Assembly Line Worker". 1914. Henry Ford: Assembly Lines Collection. Benson Ford Research Center.

My Dear Mr. Ford ….. I am the wife of one of the final assemblers in your institution and neither one of us want to be agitators and thus do not want to say anything to make anyone else more aggravated, but Mr. Ford you do not know the conditions in your factory we are all sure or you would not allow it. Are you aware that a man cannot "buck nature" when he has to go to the toilet and yet he is not allowed to go at his work. The chain system you have is a slave driver! My God! Mr. Ford. My husband has come home and thrown himself down and won't eat his supper-so done out. Can't it be remedied? … That $5 a day is a blessing - a far bigger one than you know but ok they earn it… Please investigate.

Jonathan: so how did Henry Ford deal with it?

Xiaofan: Well, he came up with another brilliant algorithm that solved the problem! Perceived that an increase in wage will give his workers more power to consume the products they produce and facilitate the cycle of production, he doubled workers' salaries to $5 a day with many strings attached. Workers need to spend half of the $5 in restricted manners that will ultimately benefit the company.[12] In 1913, Ford company established a sociological department to oversee its employee's spending practices and lives, including even the cleanliness and safety of their household! What a vision! Now he can program his workers' day to day life and control the directions of production input and consumption output of the whole society. This creation speeded up the cycle of mass production and mass consumptions in the society and brought a boom time for capitalism and development.

Jonathan: But this letter was sent to Ford in 1914. So the problem was not solved?

Xiaofan: Of course working condition problem is not solved. But the turnover rate for Henry Ford is solved.[13] $5 a day is almost the highest pay in the countries for unskilled workers. Poor people still rush to be recruited by Ford company. No one cared about that poor woman's husband until 1927, the year Karl Marx published his famous work Economic and Philosophic

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[12] [8:59] Arnesen, Eric. 2007. *Encyclopedia Of U.S. Labor And Working-Class History, Volume 1.* 1st ed. CRC Press.

[13] [9:49] #worldview: Henry Ford, who designed and created the "problem solving" algorithm is biased to solve his own problem rather than the worker's problem. His hegemonic worldview of prioritizing efficiency and profits rather than people is conveyed through this algorithm.

Manuscripts of 1844[14]. In his work, he elaborated the state that woman described for her husband as the result of the alienation of labor. In easy words, he argued that when people used to work before industrialization, they can see how their labors turn into stuffs they produce. This process has certain mental fulfillment in it. However, the division of labor in modern factories (such as Ford) deprive this fulfillment of workers by alienating their labors and their work. Marx criticized this pattern of divisions and alienation heavily as the source of the "evil" of capitalism. With his work went famous in the 20th century, Fordism, the ways of managing the social and economic system through standardization, mass production, and mass consumptions were accepted as the pillars that form the critical narratives of capitalism.[15]

Jonathan: Now I see. It's really about people behind the algorithms, the people who created, designed and used them. It's amazing that this one business model/algorithm has shaped the way we perceive and define capitalism today.

Xiaofan: Yes. With the more and more advanced technology today, algorithms hide everywhere in every product we use. Machines and algorithms help people carry out tasks easily, but also externalize people's responsibility[16]. Remember the article I mentioned above with the title that Recipe for Disaster: The Formula that Killed Wall Street? People blame the algorithm! Bankers try to develop better and more accurate models to predict the next bubble bust instead of reflecting on their greed. So if there's one thing I want the audience to take away from this radio is that: it's always about people.[17][18][19]

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[14] [10:10] Marx, Karl. 1959. "Economic And Philosophic Manuscripts Of 1844.". *Economica* 26 (104): 379. doi:10.2307/2550890. (I might misinterpreted the time of publishment of Marx's work. 1927 is what is indicated on the Wikipedia, but 1959 is on the this source that I find for citation).

[15] [11:11] #globalpast: I used the pie recipe example to illustrate how the global forces of colonization can manifest in a recipe and used the fordism example to illustrate how the Ford's creation of industrial production can be discussed and later forged to be the foundational characteristics of capitalism.

[16] [12:17] #globaltechandscience: Using algorithm as the analytical len, I reveal the relationship between human and the algorithms they designed and how the science of algorithm invention can be aided by technology (e.g. machines) to shape the global forces (e.g. industrialization).

[17] [12:25]#historicalagency: Despite focusing on using algorithm as the analytical len, I really emphasize on the agency of human who designed, created and used the algorithm on exercising their hegemonic worldviews and shaping the global processes (e.g. industrialization).

[18] [12:25]#algorithm: Throughout the whole essay, using history as an analytical len to evaluate the human biases behind and discuss how we should analyze an algorithm (through its inputs, procedures, output, who designs it, in what contexts, how it was used etc.)

[19] [12:25]#historiography: In the whole paper, using three examples, recipe, fordism ways of labor control and actual computational/mathematically algorithm to help the author conceptualize algorithm from a historical standpoint, rather than technical standpoints. These examples jump from different disciplines and thus make themselves

Alright, thanks for listening

to XJ's history channel.

We will see you next week.

Reference:

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accessible to non-technical audience, while at the same time, create a sense of wonderment for people to broaden their thinkings about algorithms.