**Endowing the Resources: Technology and Changing Prices in the US South**
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The price of labor is the appropriate wage rate; the price of capital is the interest rate; the price of land is the rent it commands. These definitions may be anachronistic – the price of labor when it is a long-term capital investment, the purchase of a person with both productive and reproductive capabilities – is calculated differently, of course. But nonetheless my reading usually indicates that the basic factors of economic activity, the land labor (and maybe even capital) endowments that form the basis for understanding the economics of any specific situation in historical time and place, are bedrock natural, essential and unchanging, as the quantity of oil beneath our feet can be measured, or the characteristics of the soil itself. Land—they're not making any more of it (say the real estate professionals).

But economic factors are also a deep font of relativism, as the values placed on them varies so widely in different times and places, within different technological systems producing different goods or services. In other words, I am for once going to indulge in talking about prices, but if you hoped this would bring my work to hardcore positivistic proof of something, you will be disappointed. Instead I am going to conjure with prices in a way more reminiscent of the great twentieth-century economist, at one time US Secretary of Agriculture and at another the US Secretary of Commerce, also serving a stint as Vice President, I am going to channel Henry Wallace at his most mystical-statistical, in which an outbreak of foot-and-mouth disease was functionally equivalent to changes in foreign exchange rates, and

both essentially doing the same thing as unscheduled interruptions in predicted railroad service, say flooding along the rail lines into and out of Chicago: each could raise the price of corn and of hogs. Viewing all these disparate events through the lens of their impact on the price of corn made them essentially the same thing in the actor-network that produced that price.[1]

Twenty years ago, my dissertation research into tobacco led me to the Tenth U.S. Census, produced in 1880, with its marvelous multi-volume essays on not only population but also agricultural and manufacturing sectors, including those for tobacco. Earlier censuses had tracked agricultural and industrial production, but with less amplitude and considerably less system. For tobacco, the agriculture section was written by J. B. Killebrew, an agricultural statistician out of Tennessee long active in tobacco cultivation and marketing.

The 1880 Census was a fulcrum point in my first book, *Making Tobacco Bright,* because it marked a period of experimentation and shifting methods of growing tobacco, especially harvesting curing and marketing it. It is these changes, their content, their causes and effects, that were the subject of both dissertation and book, which argued that tobacco's varietal types are distinguished from one another not by genetics but by the purposes and technological methods of their production, which changed in different political economics of the colonial, antebellum, postbellum, New Deal, and twentieth centuries.[2] HOWEVER, today I'm going to talk about these changes through the lens of land prices.

In his essay on North Carolina for the 1880 Census, Killebrew wrote sections similar to those he had covered in other states: the types of tobacco, the markets for

those types, the cultivation methods employed in the production of those specific types. It was in the 1880 Census that Killebrew put forward the first official US taxonomy of tobacco types, distinguishing varietals based on where they were grown, what they were for, and what had been done to produce them: the Connecticut Shade-Grown Cuban-Seed Cigar Leaf, for example (oh it's such a long time since I rolled these names around on my tongue in a conference panel) – or my main interest at the time, the North Carolina and Virginia Bright Flue-Cured Cigarette Tobacco that fed the Cigarette Century that would soon develop under the aegis of Buck Duke and the American Tobacco Company "monopoly." So I spent a long time parsing the way that Killebrew's taxonomy made use of existing trade designations and cultivation systems, and regularized them to the point that they could be confused with nature – the products of specific seed in particular soil. *Making Tobacco Bright* ended with a bit of an O Henry twist, with a USDA publication on tobacco types that was put out in 1936-37, because this was the taxonomy that had a few decades of genetic analysis on which to rely. The USDA scientists were predictably surprised to discover that the tobacco varietals were not so much genetic distinctions as they were long associations of particular seeds grown in particular soils according to particular cultivation methods. So the period between 1880 and 1937 was my real bailiwick for the emergence of tobacco types.

But in this essay Killebrew wrote about North Carolina's tobacco agriculture for the 1880 Census, he undertook the following disquisition about land values, and this has always caught my attention: [quote] "Lands worth $1 to $3 per acre [twenty years ago~~—"in 1860"~~] now bring from $20 to $100, and old fields, worn out fifty

years ago and grown up in pines – fields which would scarcely produce a bush of corn to the acre – are now often sold for $50 per acre."[3] [end quote] A new type of tobacco cultivated and cured in the region, "Bright Tobacco," had made [quote] "most profitable, the poorest soils in the state… until they actually sell for more than the most fertile bottom lands…breaking down the ordinary economic distinctions between sterile and fertile lands."[4] [end quote]. Sterile soils were growing more valuable than rich dark loam, full of nutrients. In fact, dark soil was great for producing the dark heavy tobaccos preferred in colonial times, which Killebrew classified as "shipping tobaccos," while the old sand hills and pine barrens (think the setting of the National Humanities Center, in the midst of Duke Forest) these sandy soils grew leaf that was light and bright and mild, inhalable as it turned out, perfectly suited for the production of cigarettes, that was then (1880) still a kind of a feminized, paper-wrapped cigar, a novelty from Spain.

So: it won't surprise the economic historians in the room to learn that the price of land changed when the land was found to produce a new and valuable product with an elastic demand market. But here we are at the fulcrum point between the essentialism of saying "the land was valuable because of its internal characteristics, its sandy sterility" and "the land was valued relative to the value of what it produced." And this is my spot, the place I want to explore, to "unpack" to use pretentious postmodern jargon, or just general metaphor, I want to unpack what actually changed the value of the land.

The sandy sterile soils of the Virginia-Carolina Piedmont suited the production of Bright Tobacco for cigarettes because the soil starved the plant,

attenuated it into mildness. But the plant needed more nutrients at certain phases of its growing cycle, especially in order to ripen for human purposes. To make tobacco that will cure bright, says the plant scientist, means "partial nitrogen starvation" during growth and maturation, with the application of fertilizer at other moments of the growing cycle, to control the nitrogen the plant took up from the soil.[5] Fertilizer was a crucial part of making Bright Tobacco grow on poor lands, and was one of the principal inputs that made that land spike in value.

Fertilizer had been available to American farmers since the South American guano discoveries of the 1830s, but it had not been used much in the antebellum southern tobacco fields. In *Making Tobacco Bright,* I argue that tobacco became more attractive when the costs of its finicky production could be shared with the workers: that enslavers had less incentive to shell out for bags of bone and birdshit than did landlords who could charge half the guano bill to the sharecroppers. Plus interest for the storekeeper who supplied them both, of course.[6]

So the soil was valuable because its nitrogen content could be controlled, and the costs of that control could be shared—but fertilizer was just one part of very specific methods of cultivation, harvesting, curing, and marketing that made tobacco leaf bright. Some of these methods dated from colonial times: the sequence of cultivation tasks and groups of tasks that resulted in first-growth leaf to satisfy Virginia's inspection laws and qualify for export included seeding and transplanting, building up hills to transplant the seedlings into, hoeing them down to get after the weeds, and hilling again, and suckering and topping (these are of especial interest, consisting of removing the little suckers or second-growth leaves, think of your basil

plant, and removing the flowering top or topping). In the colonial period, harvesting consisted of chopping down the plant (remember it's a big bugger, tall as I am), sometimes splitting the stalk so it could be suspended over a fence rail or a rope, letting it cure out first in the sun, then in the barn. When curing was done, the leaf stayed on its stalk while the planter set his workers to the rest of the winter's work and the labor of raising and harvesting his other crops.[7]

This story of colonial cultivation methods persists through the antebellum period, when seasonal sailing cycles meant markets for shipping tobacco sent ships starting each spring. Barns full of tobacco, or leaf taken from curing barns and laid in heaps in a dry barn or cellar, would usually be prepared for sale in the spring and summer, a rainy-day occupation for the plain or enslaved family when the rest of the work of the plantation could wait. That work consisted of stripping the big tobacco leaves from the stalk, sometimes stemming it or removing the central stem from each leaf to make strips, but that was more typical of Kentucky tobaccos, and could frankly be considered semi-manufacturing. But certainly Virginia merchants and inspection officials expected tobacco leaves stripped from the stalk, and sorted for quality and type and purpose, and brought into proper order – made moist enough to not crumble but not so wet as to mold and funk on the trip across the sea.[8]

So harvest was simple: chop down the tobacco, and marketing was slow, and required separating leaf from stalk and fussing with it a lot. By 1880, however, according to Killebrew in the 1880 census, the new methods of making tobacco leaf for sale on these newly valuable lands had changed considerably. Cultivation processes stayed the same, but the tasks (and timing) of harvest, curing, and

marketing were dramatically different. Priming became the principal means of harvesting in the Bright Tobacco belts. Priming meant taking one leaf at a time from the stalk. In the colonial/antebellum cultivation discussions, "priming" refers to a practice of taking off the bottom leaves, old and big and floppy, torn up by cultivation (all that hoeing and hilling), in order to let the plant nourish the valuable first growth leaves above them. But as Bright Tobacco methods spread, priming meant taking the bottommost leaves again and again, cycling through the fields of extended family members, taking say the third and fourth leaf from the bottom of every plant in that field, then going to do Uncle Dewey's fields, get those leaves barned and curing, the Uncle Montgomery, then back to your own to take the fifth and sixth leaf – this postbellum Bright Tobacco harvest practice meant that every leaf in a barn came from about the same place on the plant, was about the same size and shape and, once cured all in the same barn at the same time, came out to a similar color and quality of odor, flavor, nicotine content. Harvesting by priming meant tying individual leaves onto sticks to hang them in the curing barn, women's work called "looping," and it's not hard to see that a lot of work that used to go on during rainy spring days—the stemming of leaf from stalk, the sorting into piles based on similar qualities—was now accomplished as part of the harvest itself, and reconfigured to fit the labor force of extended southern families, each with its own farm. This consolidation of tasks from marketing into the weeks of harvest facilitated getting the crop sold by the end of the year, so sharecroppers, storekeepers, and land-owners could all fulfill their contracts and start over again at the turn of the new year.[9]

There are other parts to the technological changes involved in growing Bright Tobacco belts – marketing, for example, the warehouses and their opening days for regional sales, so typical of most of the twentieth century—but of course it was really the curing process that defined Bright Tobacco. It's the North Carolina and Virginia Bright Flue-Cured Cigarette Tobacco, after all, and flue-curing was the process alleged to make tobacco bright. Flue-curing meant using a heated barn to cure the leaf—it was controlled variation in temperature across the several days of curing that produces the characteristic light, bright color, the same way that it was controlling and varying the nutrition received through the soil that prevented the leaves from growing heavy and dark like cigar or chewing tobacco—but the storied "flues" carried heat through the barns without exposing the leaves to smoke. The method has its own invention myths, one that I always called the myth of the sleeping slave, who let the fires die down but then built them back up to cover his mistake, and the variation in temperature was born—his master supposedly carried this curing method across the region, but that had to be a generation earlier than Bright Tobacco really began to take hold.[10]

But for today's purposes, the point is to recognize that the curing method produced a specific type of tobacco—if it had been grown and harvested the right way, in the right places, recognized for that product. And the tobacco taxonomy that appeared in the 1880 Census became the basis for later Censuses, and for USDA relationships with farmers, as the Department helped postbellum and twentieth-century tobacco farmers mediate their markets the way merchants had used to do in the antebellum South. Killebrew's taxonomy may have been responsive to market

relationships, but his oracular descriptions of the technological methods of making tobacco of the various types were the product of responses from a few farmers in each country, and they became definitional: if you cured up a barn of tobacco using the approved flue-curing methods and it came out a dark brown, you hadn't made a field of dark brown cigar wrappers, you had just made bad-quality Bright Tobacco.

So to sum up this list of qualitative considerations that contributed to the sudden increase in the value of some sterile farmlands, long-abandoned by commodity cultivators, in North Carolina and Virginia between 1860 and 1880: the soil was the reason the tobacco was Bright, mild, and suitable for cigarettes, but the production of Bright tobacco required new methods of harvest, curing, and marketing that considerably shortened the annual cultivation cycle and conveniently permitted the sale of leaf by the end of the calendar year, fitting and facilitating a sharecropping system that had emerged between capital, labor, and merchant in the immediate postbellum years. The methods, this technological system of Making Tobacco Bright, had changed the value of the soil that supposedly gave the leaf its desirable characteristics.

None of this is a surprise, of course, but it's worth remarking and remembering the extent to which the resources with which a place is indubitably endowed are actually priced in ways that are relative to the methods and techniques the people in that place have settled upon using; that a curing barn full of flues (or any other device or invention) is only an actor to the extent that it is adopted and used, which entails a host of complexity and contingency typical of historical analysis—and particularly of the methods of the history of technology which views

devices as a means for understanding the world as well as changing it. Thank you.

[1] John C. Black, *Oxford Dictionary of Economics,* 2nd ed. (Oxford and New York: Oxford University Press, 2002); Henry A. Wallace, *Agricultural Prices* (Des Moines: Wallace Publishing, 1920), 13.
[2] Barbara Hahn, *Making Tobacco Bright: Creating an American Commodity, 1617-1937* (Johns Hopkins University Press, 2011).
[3] Department of the Interior, Census Office, *Report on the Productions of Agriculture… Tenth Census (June 1, 1880)…*(Washington, D.C.: GPO, 1883), 705, (p. 111 of the report).
[4] Department of the Interior, Census Office, *Report on the Productions of Agriculture… Tenth Census (June 1, 1880)…*(Washington, D.C.: GPO, 1883), 705, (p. 111 of the report).
[5] W.K. Collins and S.N. Hawks, Jr., *Principles of Flue-Cured Tobacco Production* (Raleigh: North Carolina State University, 1993), vi, 53; North Carolina Agricultural Extension Service, "Outline of Project Plans, 1953," pp. 22-24, Folder 1, Box 21, North Carolina State University Cooperative Extension Service Annual Reports, Special Collections Research Center, North Carolina State University Libraries, Raleigh, N.C.
[6] Hahn, *Making Tobacco Bright,* 117-19.
[7] Hahn, *Making Tobacco Bright,* chapter 1.
[8] Hahn, *Making Tobacco Bright,* chapters 1 and 2.
[9] Hahn, *Making Tobacco Bright,* chapters 4 and 5.
[10] Hahn, *Making Tobacco Bright,* 13-14, 124, 138.