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Diabetes in Indian Territory: Revisiting Kelly M. West's Theory of 1940

Devon A. Mihesuah

The late Kelly M. West (1925–1980), also known as the “father of diabetes epidemiology,” asserted in his 1974 article “Diabetes in American Indians and Other Native Populations of the New World” that diabetes was “extremely rare” among Oklahoma tribes prior to 1940.¹ This particular essay has been cited at least 261 times and quite recently in 2016. His conclusions and methods have not been challenged. Some scholars interpret his commentary to mean that tribes did not have diabetes at all until 1940.²

Type 2 diabetes is epidemic among tribes. American Indians are 2.2 times more likely to develop diabetes than non-Indians. The American Diabetes Association estimates that 16 percent of Native Americans have Type 2 diabetes and 42.3 percent are obese with accompanying complications.³ Some tribes have been hit especially hard: half the adult Tohono O’odham population⁴ and 75 percent of Pimas in Arizona have Type 2 diabetes.⁵ The rate of diabetes on the Osage reservation is 20.7 percent, double the percentage in the United States as a whole, with tribespeople living in a 2,251 square-mile “super food desert” where fresh produce and meats are scarce.⁶ At least 66 percent of the Oklahoma Cherokee Nation citizenry is overweight or obese.⁷ In an effort to combat high rates of obesity, impoverishment, and a dearth of nourishing foods, in January 2014 President Obama designated the Choctaw Nation one of five “Promise Zones.”⁸ The problem continues to grow; in March 2016 the Indian Health Service provided \$138 million to tribes and various organizations for diabetes prevention and treatment.⁹

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Diabetes mellitus is the result of the pancreas slowing or stopping production of the hormone insulin that enables cells to utilize glucose for energy. Glucose is derived from the foods we consume and insulin is needed for cellular absorption. If glucose is not used it is normally expelled into the bloodstream and into urine, but sustained, excessive glucose results in hyperglycemia and can eventually cause organ and tissue damage. Diabetics suffer from excessive urination, thirst, blurry vision, fatigue, and numbness, pain, or tingling in their hands and feet. Humans have suffered from Type 1 diabetes at least since the mid-sixteenth century, but Type 1—when the pancreas does not produce any insulin—is probably a hereditary disease. In contrast, obesity increases the chances of developing Type 2.

Among American Indians Type 2 diabetes is the result of decreasing consumption of traditional foods such as wild game, garden produce, and seasonal fruits, vegetables, tubers, and herbs, and favoring instead sugary, starchy, and fatty foods and adopting a sedentary way of life.¹⁰ When and how American Indians developed diabetes are complex questions: at different points in time they altered their diets either by choice or by force, while economics, environmental changes, loss of resources, culinary preferences, loss of traditional indigenous cultural knowledge, removal from homelands, and confinement to reservations also all factor into lifestyle changes. Regardless of when diabetes developed, however, today it is a major health threat for tribes.

West's benchmark of 1940 in his 1974 article suggests that all was well among Oklahoma Indians until World War II. Yet to the contrary, Indians have been suffering from the effects of colonization since 1492, including food-related maladies. Eighteenth-century reports abound from Euro-Americans who observed the leanness, muscularity, and physical fitness of tribespeople,¹¹ and indeed, diabetes, obesity, and related issues did not appear in great numbers until around World War II. During the latter part of the eighteenth century, however, some Indians in the Southeast also began using store-bought sugar, flour, salt, and other processed items, and those dietary choices continued into the nineteenth century. A plethora of historical records—including trading-post and store inventories, boarding school grocery receipts, medical superintendents' reports, tribal languages, medicinal plant descriptions, and reports of resource depletion from environmental destruction—reveal that many Southeastern tribespeople moved away from their traditional foods prior to their 1830s removals to Indian Territory, or began to add nontraditional items such as sugar and flour to their diets and began feeling the repercussions of their diets before the Civil War, probably including pre-diabetes or Type 2 diabetes.¹² Oklahoma resident Wilburn Hill summed up tribes' food-related health problems by stating, "The greatest enemy to the Indians was in the use of salt, fat, flour, sugar or anything else sweet."¹³ This is true, but Hill did not make his statement in 2017: he said it in 1938.

PHYSICIANS' RECORDS

Of the 202 sources West cites, all but three are from medical, diabetes, and nutrition publications. He used no ethnohistorical data, instead basing his conclusions on the absence of the word "diabetes" in medical records and in interviews he claims

to have conducted with Oklahoma Indians. West also stated that he conducted an “extensive review” of the medical reports of civilian and military physicians who treated Oklahoma Indians between 1832 and 1939, asserting that “Oklahoma tribes had, for the most part, considerable medical attention in the 19th and early 20th centuries, often by the same physicians who were finding diabetes common in their white patients.”¹⁴ He found no evidence of diabetic Indians within those records. He does not identify the physicians whose records he reviewed, however, nor the tribes they treated, and there are no citations in his paper regarding the nineteenth century.

It is doubtful that he found many reports dated prior to the 1930s. There are many biographies about the lives of Indian Territory physicians, but their accounts of how and why they treated patients are scarce. Data given by military physicians assigned to reservations often lack detail, offering short discussions about the state of sanitary conditions (or lack thereof), statistics about outbreaks such as smallpox, and descriptions of inadequate government rations.¹⁵ Also, among the Five Tribes (Cherokees, Chickasaws, Choctaws, Creeks and Seminoles), medical records are scarce. In 1890, for example, the special agent in charge of the Choctaw census commented on inadequate record keeping among Choctaws. He stated that many of their census, legal, and health reports had been lost to insects, fire, or to unnamed individuals who took them home. The National Records of the Five Tribes at the Oklahoma Historical Society mainly list registers of physicians and license and permit records.¹⁶ In 1926, the Institute for Government Research authorized a detailed study of conditions on Indian lands. The lengthy “Meriam Report” revealed serious problems such as poverty, poor health care, housing, education, and lack of self-determination. The report also found that reservation, school, and hospital physicians did not keep adequate documentation.¹⁷

West’s claim that tribes had “considerable medical attention,” at least by white physicians, is also dubious. In the nineteenth century, qualified doctors were scarce throughout Indian Territory.¹⁸ In 1874, for example, Agent Breiner stated that within a sixty-mile perimeter of the Seminole Agency at Wewoka there was no physician at all.¹⁹ And a woman born in 1889 who lived near Fort Sill and Tishomingo stated that she “never knew there were such things as doctors” until she was eighteen.²⁰ On the other hand, when aspiring physician E. O. Barker arrived in Guthrie in 1889, hoping that it would be a good place to start his practice, he found seventy-five men claiming to be physicians were already there. He stated that if anyone in a crowd should call “doctor” that “one third of the audience would answer.”²¹ However, many who referred to themselves as physicians had only a modicum of training and may not have had the wherewithal to recognize symptoms of diabetes.²²

Throughout Indian Territory the problem of quacks was so extensive that tribes enacted laws regarding any nontribal citizen who desired to practice medicine in their nations. In 1879, the Chickasaws passed a law requiring that aspiring physicians provide to the governor of the nation three citizen recommendations testifying to his moral character and a five-dollar fee, as well as “a recommendation that he is a practicing physician from the board of the county and state from which he came.”²³ In 1881, the Cherokees passed a similar law, and required a twenty-five-dollar fee.²⁴ The Choctaw and Muskogee-Creek Nations passed comparable laws in 1884

and 1892, respectively.²⁵ Dr. E. N. Wright, who served as president of the Indian Territory Medical Association, found that “the ignorance discovered in those exams was appalling” and that many who claimed to be doctors had never even attended college.²⁶ By 1888, noncitizen physicians in the Choctaw Nation refused to take the medical exam.²⁷ In 1904 Congress became so concerned that it reiterated tribal laws in a further effort to regulate the influx of pseudo-physicians in the Territory.²⁸

West makes no mention of tribal medicine, but not every Indian wanted to be treated by someone other than their tribal doctor (that is, medicine man or woman). Numerous Indian agents note tribal medicine’s popularity, such as the Cherokee Agency agent who wrote in 1853 that full-bloods “prefer the roots and herbs of their own native doctors.”²⁹ In 1884, the agent at Osage Agency stated that the Osages “seem wholly under the influence of the medicine men.”³⁰ The Commissioner in 1889 expressed annoyance with tribes’ “superstitious regard for the grotesque rites of the ‘medicine men.’”³¹ Creek Chief Isparhecher made the news in 1896 after refusing to be treated by a white physician and would only allow a Creek medicine man to heal him.³² In 1924 the commissioner stated that members of the Five Tribes tended not to seek out medical help when needed, so field matrons and nurses, not doctors, would come to their homes.³³ In 1968 a Cherokee woman commented, “I’ve known of some white doctors that kind of make fun of the Indians, their Indian medicine.”³⁴ Today, some Indians will consult with white physicians, but only in conjunction with medicine men or women, some prefer tribal doctors exclusively, and some refuse to see any doctor or dentist. Although some Indians agreed to accept medical treatment at the Lawton, Oklahoma hospital where West conducted some research, he does not explore the possibility that many Natives in the early-twentieth century may not have wanted to be treated there, or at any other facility he mentions.

TESTIMONIES OF INDIANS WITH DIABETES

Medical care is exponentially better today than in 1940 and certainly prior to that time also. Information about diabetes is readily available, yet more than 8 million Americans with diabetes were undiagnosed in 2012.³⁵ If undiagnosed diabetes is common now, quite possibly there were Indians whose diabetes went unrecognized prior to 1940. West interviewed Indians frequenting the Lawton, Oklahoma clinic in 1973, who stated that they did not have diabetes prior to 1936. He also writes that in the twenty-five years prior to the publication of his 1974 essay he interviewed “several hundred” Oklahoma Indians older than the age of seventy from more than twenty tribes. Unfortunately, West does not provide information about their tribal affiliations, their state of health, the dates of the interviews, or where he spoke to them, nor does he say if he needed translators or whether the elderly subjects were leery of him. In a later 1978 study he again discusses these informants and reveals that he offered one dollar for “any account of diabetes prior to 1940.”³⁶ As a result, depending on how he framed his questions, the interviewees may have simply told him what he wanted to hear. Oral testimonies can be valuable sources of information, but only if one takes into account all of those factors. It could be that the informants

did indeed know people with diabetes, but they were not diagnosed, or perhaps they categorized their ailment(s) as something else. For example, one diabetic unfamiliar with the word diabetes stated she had a “thirst” and wanted to “drink and drink.”³⁷ As late as 1969 another Cherokee woman commented that she had never heard the term “sugar diabetes” until 1958, so even though she knew of people who probably had it, she described their problem as an “ache.”³⁸

MORE EVIDENCE OF DIABETES

Citing West, Dennis Wiedman, a medical anthropologist, also states that Cherokees did not have significant diabetes prior to 1940, and, attempting to find out why, asks, “Why the Cherokee, after over two hundred years of interaction with EuroAmericans, started to have this increase of diabetes only in the 1940s?”³⁹ Studying a group of Cherokees who lived around the Lee’s Creek area, he determined that between 1936 and 1946 a major cultural and health change came about because, while transitioning from subsistence agriculture to a cash economy, Cherokees began to consume store-bought foods and also abandoned household physical activities such as hauling water after acquiring plumbing. Wiedman therefore claims it was after that time that they developed diabetes, but because Wiedman’s supporting data was drawn from only one segment of a large and complex tribe and used as a representative example of the entire population, this theory bears further examination.

Having intermarried with whites since the 1700s, there were, and still are, vast differences among various members of the Cherokee Nation. Then and now, religious adherence, language use, political affiliation, wealth and value of landholdings, and skin and hair color are just some of the possible differences. John Ross, who served as Cherokee chief from 1828 to 1866, was one-eighth Cherokee, while students at the Cherokee Female and Male Seminaries in the 1880s ranged from full-blood to just 1/128 degree of Cherokee heritage. Even preceding their removal from the Southeast to Indian Territory in the 1830s many full-blood and mixed-blood Cherokees behaved like well-off whites, including having similar diets. Some individuals in the late nineteenth and early twentieth centuries became attorneys, dentists, physicians, and teachers, while others farmed or labored.⁴⁰ Furthermore, in 1890 the Cherokee Nation’s population was scattered over 7,800 square miles of terrain that included forests, rivers, creeks, rolling hills and valleys, and prairies—not all of it suited for farming. In other words, not everyone had access to the same resources.⁴¹

Relevant data from a primary source located in Wiedman’s study area appears in the account of army officer Ethan Allen Hitchcock, who in 1841 traveled through the Cherokee Nation and dined at Cherokee High Sheriff George Lowery’s sturdy log home at the juncture of Skin Bayou and the military road. The meal consisted of bacon, fresh-churned butter, cornbread, chicken eggs, venison, and coffee with sugar and milk.⁴² Less-affluent Cherokees stayed active by hunting, gardening, farming, hauling water, and chopping wood. By contrast, the wealthier residents did little daily work around their homes because they often hired workers to tend to their commercial farms and stock animals. By the late 1830s some tribespeople had started growing

corn on a large scale for profit, and in 1856, residents stated that they raised mainly crops of corn, oats, rye, and wheat, followed by peas and potatoes, in addition to large orchards of apples, peach, pears, and plums.⁴³ Wiedman also writes that television and radio also influenced food choices when they began advertising industrially produced foods after World War II,⁴⁴ although Indian Territory newspapers, including those published in the Cherokee Nation, had been publishing ads for mercantile stores since 1880.⁴⁵ Moreover, many residents frequented well-stocked stores such as J. W. Stapler and Sons in Tahlequah or other trading posts such as the one in Wauhillau.⁴⁶ Not every Cherokee could afford to purchase canned salmon, but many saved their money to purchase sugar, flour, and canned goods.

Schools were also an influence in changing Cherokee diet in the second half of the nineteenth century. Between 1851 and 1909, thousands of young Cherokees were educated at the Cherokee Female and Male Seminaries: tribally created and managed boarding schools that, similar to colleges in the east, offered courses such as French, Latin, chemistry, and Shakespeare (the first teachers were from Mount Holyoke and Yale).⁴⁷ Ironically, unlike federal boarding schools that forcibly indoctrinated Native children to the ways of white society,⁴⁸ Cherokees themselves established these seminaries in order to acculturate their children. In fact, the curriculum eschewed lessons on traditional ceremonies associated with planting, cultivating, and harvesting, and teachers taught nothing about Cherokee culture except for lessons on the structure of the tribal government.⁴⁹ The schools provided small gardens for the students to supplement meals. Some parents traded wild game and unprocessed garden items for tuition, but produce was only available after harvesting and, if dried, into the fall and winter. Because students often came from families who normally consumed fruits, vegetables, and game meats, their systems had to quickly adapt to the vast array of seminary food items, including sugar, canned salted meats, eggs, butter, cheese, cream, table salt, lard, molasses, buttermilk, pies, cakes, and coffee, as well as candy and sugar cookies bought during field trips to Tahlequah, the Cherokee capital.⁵⁰

Wheat flour and sugar were major ingredients in dishes three times a day. In 1879, seminary officials ordered 7,500 pounds of flour, sixty bushels of corn meal, 4,000 pounds of beef, 2,500 pounds of bacon, and seventy-five bushels of potatoes. For a one-month period in 1882, the food for eighty-three students, teachers, workmen, and washers at the seminary consisted of 1,600 pounds of flour and beef and hundreds of pounds of sugar, lard, coffee, rice, and pickles. In one 1887 order, in addition to rice, coffee, prunes, and molasses, school officials ordered 5,000 pounds each of flour and meat and hundreds of pounds of lard and cheese. Another listed 10,000 pounds of flour for 153 people for three months, with receipts for other years revealing similar food amounts.⁵¹ By 1900, seminary officials regularly ordered “barrels” of sugar.⁵² After 1901, both schools added to their lists chocolate, butterine (animal fat mixed with other ingredients), Eagle sweetened milk, and flour-based cereals Ralston Breakfast Food and Egg-O-See.⁵³

Correspondingly, ailments among the seminarians proliferated in the 1870s as students faced the consequences of a calorie-dense diet featuring fatty, salty, and sugary foods: constipation, hemorrhoids, headaches, diarrhea, rheumatism, jaundice,

colic, ulcers, and acne, while the physician became concerned about the girls' weight gain. Dozens of cases of "bowel complaint" appear on every medical report and the frequencies increased each year. In addition, many girls experienced irregular menstrual periods, one symptom of pre-diabetes.⁵⁴ In his 1899 annual report the Female Seminary physician stated that he believed part of their physical problems were due to lack of physical exercise.⁵⁵

Some Cherokees continued their childhood diets into adulthood. One woman in 1969 stated that she had struggled with diabetes, high blood pressure, and "heart trouble" for at least thirty years. She also used tobacco her entire life ("I could chew it, smoke it, and twist it"). Her home meals consisted mainly of corn, but also pumpkins, crawdads, squirrels, hog's head, fried pies, cakes, onions and eggs fried in grease, and sugared grape and plum jelly. As she did not attend the Female Seminary she had to pack her school lunches and filled her pail with biscuit and gravy sandwiches, or a biscuit and meat with fried potatoes, or fried eggs.⁵⁶

Yet Choctaws had been consuming similar foods even earlier, before their removal from Mississippi and Kentucky. In the 1820s, for example, the Choctaw Academy in Kentucky served students apple dumplings, pies, bacon, butter, beef, coffee, milk, molasses, mutton, and rice.⁵⁷ When French military officer Marquis de Lafayette visited Johnson's Indian School at Blue Springs in 1825, the local women made a five-hundred-pound cheese wheel.⁵⁸ In the 1840s, children at Armstrong Academy learned to make butter and cheese and consistently consumed these food items.⁵⁹ A visiting missionary to that academy in 1847 stated that during a dinner they were served plenty of cakes, pies, coffee, beef, and pork.⁶⁰ A white woman born in 1881 in the Choctaw Nation often dined with tribal members and enjoyed various corn dishes along with "great stacks of fried pies,"⁶¹ and another attended Choctaw dinners consisting of pit-roasted hogs, corn covered in gravy, and sugar-filled egg custards and green apple pies.⁶²

Indians of other tribes likewise moved away from their traditional diets before Oklahoma statehood. A Quapaw woman born in 1892 in Devil's Promenade grew up on a diet of beef, flour, and coffee. Her sister was grossly obese and could not play childhood games, while the tribe's sweat houses would serve those suffering from rheumatism and dropsy.⁶³ In 1937 a Shawnee man stated that he grew up in Big Timber Hill in Craig County first living in a tipi, and later a small cabin, and ate bison and venison, sugar from maple trees, pumpkins, corn, wild fruit, black-eyed peas, and goat milk. He prepared dried corn with "plenty of grease" or "plenty of lard." He does not state what he ate after adulthood, but by the time of the interview diabetes had caused him to lose an eye as well as part of a foot.⁶⁴ An eighty-eight-year-old Creek woman interviewed in 1970 had lost both of her legs due to diabetes. She regularly consumed fried pork and she recalled her father purchasing flour six hundred pounds at a time.⁶⁵ Many residents of Oklahoma consumed (and still do consume) grape dumplings, a dish made of wheat flour, sugar, and opossum grape juice, but today most use commercially processed grape juice.

LINGUISTIC EVIDENCE OF DIABETES PRIOR TO 1940

One can look at tribal languages and traditional medicinal plants to see that members of the Five Tribes suffered from diabetes in mid-nineteenth-century Indian Territory. Cyrus Byington's Choctaw Language Dictionary, the first draft of which was completed in 1849, includes the entry "*hoshunwa shali*" for "diabetes" in *Chahta anumpa* (Choctaw language).⁶⁶ Foreman's *The Cherokee Physician, or Indian Guide to Health*, published in 1849, includes discussion about the symptoms and cures for diabetes.⁶⁷ As defined by Foreman—almost one hundred years prior to West's benchmark date of 1940—diabetes is "an immoderate flow of urine" with excretion rate almost "double the quantity of liquid taken in both food and drink." The urine has "a sweetish taste like sugar" and a smell reminiscent of rosemary leaves. Those afflicted are tired with little energy, feel pain in the lower back and in their "privates," and suffer from constipation, irregular heartbeat, and swollen feet. He prescribed an emetic and a purge as treatment. Patients were told to eat only a "nourishing" diet, to increase "flesh" foods, and to avoid vegetables, although he does not state why he viewed the latter as the culprits. Foreman does not use the terms "starch" or "carbohydrates," but he does recommend sugar mixed with various other components for everything from diabetes to worms.

Foreman's prescription is particularly interesting because today it is recommended that diabetics choose high-fiber, low-carbohydrate vegetables such as leafy greens and green beans. In contrast, corn is starchy and can cause blood sugar to rise. If diabetics eat corn they are advised to limit their consumption to one-half cup and to include protein and fat. In 1849 Indian Territory the main backyard-garden item was corn; tribespeople planted, cultivated, and harvested corn with great ceremony, including the annual green corn ceremony that tribes still practice to celebrate the harvest.⁶⁸ The Five Tribes consumed it almost daily, either in season or dried, prepared in a variety of corn dishes (Cherokees refer to corn as *kanahena*; Choctaws and Chickasaws, *tanchi*; Creeks and Seminoles, *uche*). Notably, the corn they consumed was undegermed corn soaked in lye ash water that ensured no vitamin B3 deficiency, and it was usually eaten in combination with other nutritious items. Among Choctaws, for example, *tamfula* (sometimes referred to as "Tom Fuller") is a corn mush traditionally made with hickory oil and other ingredients such as beans, sweet potatoes, nutmeats, and animal meats, usually squirrel, venison, or turkey. Choctaw *banaha* (or shuckbread) looks similar to tamales, with corn meal, nut oil, and perhaps beans used to fill a shuck, which is then tied and boiled.

Unfortunately, Foreman did not also address how much sugar, wheat flour, animal fat, and milk products some Indians—Cherokees especially—consumed. However, diabetic Indians recall that they did not eat corn prepared in traditional ways growing up in late-nineteenth-century and early-twentieth-century Indian Territory. They stated that instead they often ate bowls of dried and ground corn sweetened with equal parts sugar and added animal grease rather than nut oil. Some bought buckets of lard from trading posts for that purpose and many soaked their corn in cow's milk.⁶⁹

MEDICINAL PLANTS AND DUBIOUS CURES

A partial list of complications from diabetes can include cardiovascular disease, nephropathy (kidney disease), edema (swelling), and retinopathy (eye disease). Prior to the nineteenth century tribes used numerous medicinal plants for “heart trouble,” “kidney trouble,” “gravel” in the urine (kidney stones), dropsy (edema), and as a “urinary aid.” These plants were not only used in Indian Territory, but also in the 1830s prior to removal. To list just a few examples: a Cherokee “urinary aid” is *Ampelopsis cordata* Michx. (“Heartleaf Peppervine”);⁷⁰ two Creek “suppressors of urine” are *Ipomoea pandurata* (“Man of the Earth”) and *Mentha piperita* (“water mint”);⁷¹ two Cherokee “urine suppressors” are *Aruncus dioicus* (Walter Fernald) (“goatsbeard”) and *Clematis virginiana* (“Virgin’s Bower”);⁷² two Cherokee “sugar diabetes” medicinal plants are *Yucca filamentosa* (“Adam’s Needle”) and *Cypripedium acaule* (“Pink Lady’s Slipper”);⁷³ a plant used for Cherokee “gravel” is *Acorus calamus* L. (“calamus”);⁷⁴ a Creek edema treatment is *Populus* (“cottonwood”);⁷⁵ for dropsy both Creeks and Choctaws use *Bignonia capreolata* (“crossvine”);⁷⁶ and a Choctaw dropsy medicine is *Galium asprellum* Michx. (“rough bedstraw”).⁷⁷

Indian Territory newspapers advertised thousands of “cures” for diabetes from 1880 to Oklahoma statehood in 1907, publishing thousands more to 1940. At least three thousand advertisements for dentists appeared during the same time period. Because these papers were edited by Native Americans, published by tribes, or were owned by non-Natives and published within the tribal nations, the ads were directed at the entire populace, including hundreds of intermarried citizens as well as non-Indian settlers in Indian Territory and Oklahoma who read them also. In addition to the conditions previously noted, many ailments in these ads suggest that shortly after the Civil War some foods were causing both general and specific health issues, including piles (hemorrhoids), “bowel problems,” “liver complaint,” appendicitis, sour stomach, indigestion, “wind on the stomach,” bloating, colic, stomachaches, diarrhea, “diseases of the kidneys, bladder and urinary organs,” and biliousness (“bad digestion”).⁷⁸ What the ads did not mention were the causes of these maladies. As the “Cherokee doctor” Foreman had done over a hundred years prior, the woman who had not heard the term *diabetes* until the late 1950s too speculated on dietary reasons for why she developed diabetes and wondered about the role of nonlocal foods:

Say you got a big Head of cabbage. You don't know where it come from. Might be south or west, you know, different climate, see. And you eat that cabbage or water-melon or tater or something like this and later you're going to get sick. You don't know what ailment you got. You might be eating California cabbage or lettuce. Different climate over here. You eat that, I'll say a grapefruit or orange, it come from a different climate. It might have something to do with the sickness today.⁷⁹

Indeed, many sick people remained unaware that the overabundance of fat, sugar, salt, and flour in their meals may have contributed to their afflictions.

AGRICULTURALISTS VERSUS HUNTERS

In 1974, West conducted a blood glucose-tolerance study of 124 Cherokee and eighty Kiowa and Comanche subjects and found that Cherokees had a higher plasma glucose reading. He commented that Plains tribes had been on a “low carbohydrate diet” for centuries, while “starches” made up the majority of the Cherokees’ diets.⁸⁰ One might take that to mean agricultural groups have higher frequencies of the diabetic genotype than those tribes deemed hunters and gatherers, but these categorizations may not be as clearly defined as some researchers have asserted.⁸¹ In fact, prior to Cherokees’ removal in the 1830s, they did not consume only starches. Families cultivated backyard gardens of corn, squashes, green beans, and the European and African-introduced watermelons, black-eyed peas, turnips, and fruit trees, at least, but they supplemented that produce with nut meats (acorn, pecan, walnut, and hickory) and oils as well as deer, squirrels, rabbits, bears, waterfowl, turkeys, quail, pigeons, turtles, fish, and hogs brought by the Spanish. Segments of the Cherokee population had been eating beef since at least the 1820s. They continued to consume meats after removal. “There were all kinds of game in the woods,” one Indian Territory resident stated in 1937. “It was a man’s laziness if he did not have any meat.”⁸²

Second, there were (and still are) physiological differences between members of the Cherokee Nation. Because of racial mixing since the 1700s among Cherokees, whites, and African slaves, as well as Freedmen after the Civil War, one cannot generalize Cherokee genetic backgrounds. Third, since the early twentieth century, Comanches have been eating much of the same foods items as everyone else.⁸³ Both because of the demise of bison and the men’s inability to roam to find game, after their semi-confinement to their reservation in the 1870s they sporadically hunted for only a few decades. Some took to farming and were able to supplement the poor government rations of stringy beef, flour, coffee, and sugar, in addition to occasionally foraging for plants. By the time that West conducted his test in the early 1970s, with few exceptions Comanches and Kiowas had not been hunting bison or other large game animals for over eighty years—about three generations.

Further, the Comanches West studied were not just one group. They initially were part of the Shoshones who lived in the Great Basin, then Idaho and Wyoming, and some moved to parts of the Great Plains. They hunted, but also gathered foods nuts, seeds, and roots. Those who became known as Comanches broke from the main group around 1700. Numerous bands roamed on horseback over Comancheria, that is, a vast area with various resources including eastern New Mexico, north and west Texas, western Indian Territory, southeastern Colorado, and southwestern Kansas.⁸⁴ Their diets depended on the environments and resources available. Comanches were not known as “Lords of the Plains” for nothing: they stole corn, squashes, and other food resources from Pueblo tribes and Wichitas, and also raided Navajos, Apaches, and Utes.⁸⁵ During this time they followed game onto the plains, and after settling at Fort Sill, Comanches gathered a number of plant foods, including camas, wild grapes, hackberries, juniper berries, mulberries, onions, persimmons, plums, prickly pear cactus fruit, sumac fruit, nuts, sunchokes, mesquite beans, and lotus.⁸⁶ They also have

a long history of racial mixing with captives, most notably Mexicans, but also Spanish, whites, and members of other tribes. Significantly, therefore, their mixed-heritage offspring carry a variety of genetic backgrounds—not only those stemming from hunter-gatherer ancestors.⁸⁷

Weidman continued West's line of inquiry and has suggested that Navajos' comparatively low rate of diabetes in 1979 was because they were "non-agriculturalists."⁸⁸ Actually, Navajos were cultivating crops in the 1600s and like Comanches and Kiowas, they raided or traded with the farming Pueblo tribes.⁸⁹ And, while it could be that, as West asserts, few Navajos were diagnosed with diabetes prior to 1940, nonetheless many Navajos ate non-traditional foods in the late nineteenth century, which set the stage for a diabetes eruption. Indeed, trading posts were established by 1870 and their numbers increased for the next six decades. The posts provided sugar, flour, candy, sugary canned fruits, cookies, as well as a variety of staples.⁹⁰ In the early twentieth century Navajo were baking flour goods such as donuts, biscuits, bread, and layer cakes for the annual Navajo Fairs,⁹¹ and during the same time period they regularly consumed sausages, mutton sandwiches, and bacon.⁹²

Currently the concern is that the diets of Navajos, Tohono O'Odhams, and other Southwest tribes changed from vegetables, fruits, and game meats to nontraditional foods of flour, sugar, beef, pork, and mutton fat. They did not, however, start consuming deep-fried flour (fry bread) in notable quantities until the 1960s, and now many consider fry bread to be a "traditional" food and eat it three times a day.⁹³ One in three Navajos are prediabetic or diabetic.⁹⁴ Regardless of their ancestors' foodways, among Indians the likely culprits of obesity and diabetes are overindulgence in sugar, flour, and fats in combination with a sedentary lifestyle. Apparently not only a hunter-gatherer diet and lifestyle prevented diabetes, but also a diet consisting mainly of unprocessed agricultural products, wild game, and fish.⁹⁵

SLENDER, THEN FAT?

West states that prior to 1940, "All tribes were previously slender."⁹⁶ Yet because he does not tell us at what point in time they were trim or how he came to that conclusion, but only that they became fat in 1940, his claims require further investigation. I have already noted the concern of the Cherokee Seminaries physician about the female students' weight in the late 1870s, and the army officer Hitchcock, who remarked in 1841 that the Cherokee wife of Sheriff Lowery who served him butter, bacon, sugar, and milk was "large"; a year later his journal also describes a "fat, chubby Choctaw girl" whom he met at a Doaksville school.⁹⁷ Other accounts also suggest the onset of diabetes well prior to 1940: Finney stated about Osages in 1872 that they were "lithe and muscular" because of active life, but between the time he wrote his memoirs and his death in 1933, they had become sedentary and "portly."⁹⁸ Joel B. Mayes (d. 1891), Cherokee chief from 1887 to 1891, stood 5'11 and was a "heavyset" 200 pounds.⁹⁹ Green McCurtain (d. 1910), Choctaw chief from 1896 to 1900, weighed 220 at 6'2.¹⁰⁰ Gilbert Dukes (d. 1919), the Choctaw chief from 1900 to 1902, stood six feet tall and weighed over 250 pounds.¹⁰¹ W. C. Rogers (d. 1917), Cherokee chief from 1903 to

1907, stood six feet tall and weighed 218.¹⁰² This is not to suggest that these affluent men were diabetic or even obese, but it is clear that they, as well as many other Indian Territory Indians, had access to more foods than just vegetables.

In addition to store-bought flour, sugar, and lard, dairy consumption played a role in caloric increase. Although he does not say where he found this information, West wrote, "The Cherokee, in general, have never had a taste for milk and dairy products."¹⁰³ Countering his statement are a plethora of oral testimonies given by Cherokees who grew up in the nineteenth century raising milk cows and utilizing dairy products. According to Cherokee Jesse Adair (b. 1868), "Not everybody raised cattle in the Cherokee Nation although everybody owned a milch cow."¹⁰⁴ A Cherokee woman raised in the early twentieth century stated that her family consumed gallons of milk, butter, and cream.¹⁰⁵ Another man admitted that his preferred diet consisted of meats, bread, milk, and butter.¹⁰⁶ The Cherokee Seminarians consumed butter and milk at least three times a day.¹⁰⁷ Other Indians also used milk. The Chickasaw Bloomfield Seminary served milk every day along with dishes of ham, bacon, and sausage.¹⁰⁸ Numerous Choctaws stated they regularly ate corn with milk and sugar.¹⁰⁹

WHY DOES IT MATTER WHEN TRIBES DEVELOPED DIABETES?

West's claims about the appearance of diabetes in the mid-twentieth century matter because the causes of high rates of diabetes, obesity, and related maladies among tribes cannot be easily explained. In order to understand health problems in 1974 and today, one must look carefully to the past. There were forces at work besides Indians just eating the wrong things and not exercising. Food-related illnesses and diseases are inexorably interrelated with historical and modern politics, economics, culture, environmental issues, and genetics.

After invaders arrived, diseases decimated indigenous populations, their lands were systematically reduced, and tribes were removed from their homelands and resources. Children at federal boarding schools lost connections to their languages and religious traditions, including ceremonies associated with foods. Environmental damage in Oklahoma began before the Civil War. The Five Tribes passed numerous laws in efforts to protect their dwindling assets from deforestation, mining, overgrazing, overhunting, mining, and damming. Oklahoma tribes lost even more land through the Dawes Severalty Act.¹¹⁰ Today, many tribal members are educated about nutrition and can afford to eat nourishing foods and to exercise, but they choose not to. Conversely, others want to eat properly but cannot because they are impoverished and lack access to adequate sustenance, or they must contend with pollution, lack of water, climate change, resource depletion, corporate-owned plant pollen that drifts onto tribal crops, and seed-ownership issues that imperil their efforts at seed-saving.¹¹¹

Although West's overall claim is inaccurate, he is correct in that Oklahoma Indians in the mid-twentieth century did experience an explosion of Type 2 diabetes. Their health has not improved. Lack of resources and poverty among many tribespeople in Oklahoma results in their dependency on unhealthy government commodities. Disconnection to their cultural knowledges is also a major factor. Indeed, in a 1973

paper investigating why diet therapies for diabetics fail, West identifies that the prescribed diet may not “fit the diabetic’s cultural, sociologic, or economic status” as problems.¹¹² West’s research papers, however, did not address these issues, nor connect modern health problems and the loss of tribal traditions that included abandoning traditional foods in favor of sugary, starchy, salty, and fatty foods. He perhaps might have proposed possible solutions, especially in light of his other publications that discuss the correlation between diabetes, fat, and sugar, had he meshed medical, humanities, and social science research with an understanding of past and present indigenous cultures.¹¹³ However, he did note in regard to diet therapies that the “dimensions of this failure and particularly its persistence justify a more thorough study of its causes.”¹¹⁴ Fortunately, since West’s last article there have been publications and tribal food sovereignty initiatives that link the loss of traditional foodways and cultural adherence with poor health.¹¹⁵ Many people cannot afford to purchase organic produce, cultivate a garden, or hunt bison, deer, and wild turkeys. Still, traditional diets, deeply rooted in tribal cultures and a part of indigenous identity, are what prevented diabetes. Hopefully more strategies will be offered.

NOTES

1. Kelly M. West, “Diabetes in American Indians and Other Native Populations of the New World,” *Diabetes* 23, no. 10 (October 1974): 841–55, <https://doi.org/10.2337/diab.23.10.841>. He reiterates this information in “Diabetes in American Indians,” *Advances in Metabolic Disorders* 9 (1978): 29–48, <https://doi.org/10.1016/B978-0-12-027309-6.50008-2>. The impact of West’s work is apparent in Oklahoma as well as nationally: the Kelly West Society was created in his honor at the Harold Hamm Diabetes Center at the University of Oklahoma and each year the American Diabetes Association presents a diabetes researcher with the “Kelly M. West Award.”

2. Scholars include Dennis Wiedman, “Native American Embodiment of the Chronicities of Modernity: Reservation Food, Diabetes and the Metabolic Syndrome among the Kiowa, Comanche and Apache,” *Medical Anthropology Quarterly* 26, no. 4 (2012): 597, <https://doi.org/10.1111/maq.12009>; Jennie R. Joe and Robert S. Young, eds., *Diabetes as a Disease of Civilization: The Impact of Culture Change on Indigenous Peoples* (Berlin and New York: Walter de Gruyter, 1994), 28; Gary Taubes, *The Case Against Sugar* (New York: Knopf, 2016), 12.

3. American Diabetes Association, “Treatment and Care for American Indians/Alaska Natives,” <http://www.diabetes.org/living-with-diabetes/treatment-and-care/high-risk-populations/treatment-american-indians.html?referrer=https://www.google.com/>; and “Overall Numbers, Diabetes and Prediabetes,” <http://www.diabetes.org/diabetes-basics/statistics/>. Reporting recently on a diabetes grant for the Confederated Salish and Kootenai Tribes, a local newspaper states that Natives suffer “nearly three times the rate of the national average.” *The Lake County Leader* (Polson, MT), “Daines Announces Funding for CSKT Diabetes Programs,” December 15, 2016, <http://www.leaderadvertiser.com/article/20161215/ARTICLE/161219982>. See also Trust for America’s Health and Robert Wood Johnson Foundation, “The State of Obesity 2016: Better Policies for a Healthier America,” 22, <http://stateofobesity.org/files/stateofobesity2015.pdf>. I prefer to use the terms “indigenous” and “Natives,” but use West’s and the ADA’s terminology (“American Indians” and “Indians”) to avoid confusion between tribes and anyone born in Indian Territory and Oklahoma (“Natives”).

4. Robert Bazell and Linda Carroll, “Indian Tribe Turns to Tradition to Fight Diabetes,” <http://www.nbcnews.com/id/43257536/ns/health-diabetes/t/indian-tribe-turns-tradition-fight-diabetes/#.WII-81PythE>.

5. Andrew Curry, "Genetics, Environment, Lifestyle: Triple Diabetes Threat," *Diabetes Forecast: The Healthy Living Magazine* (January 2016), <http://www.diabetesforecast.org/2016/jan-feb/genetics-environment-lifestyle-triple-diabetes-threat.html?referrer=https://www.google.com/>.
6. Benny Polacca, "Health Survey: Reservation Osages Report 'Poorer Health' than Osages Living Elsewhere," *Osage News* (August 30, 2010), <http://www.osagenews.org/en/article/2010/08/30/health-survey-reservation-osages-report-poorer-health-osages-living-elsewhere/>; Gail Boe, "Gardening in the Osage," Corporation for National and Community Service, National Service, May 7, 2014, <http://www.nationalservice.gov/blogs/2014-03-07/gardening-osage>.
7. "Community Profile: The Cherokee Nation," Centers for Disease Control and Prevention, Division of Community Health: Making Healthy Living Easier, October 25, 2013, <http://www.cdc.gov/nccdphp/dch/programs/communitiesputtingpreventiontowork/communities/profiles/both-choerokee-nation.htm>.
8. David Osborne, "Poverty in America: Can Obama Bring an End to the Choctaw Nation's Trail of Tears?" *The Independent* (London, UK), January 30, 2014, <http://www.independent.co.uk/news/world/americas/poverty-in-america-can-obama-bring-an-end-to-the-choctaw-nations-trail-of-tears-9097463.html>.
9. "IHS Awards \$138 Million for Diabetes Prevention and Treatment for American Indians and Alaska Natives," US Department of Health and Human Services, Indian Health Service press release (March 16, 2016), <https://www.ihs.gov/newsroom/pressreleases/2016pressreleases/ihs-awards-138-million-for-diabetes-prevention-and-treatment-for-american-indians-and-alaska-natives/>.
10. This is discussed throughout Joe and Young, *Diabetes as a Disease of Civilization*. On the Five Tribes specifically, see Devon Mihesuah, "Sustenance and Health among the Five Tribes in Indian Territory, Postremoval to Statehood," *Ethnohistory* 62, no. 2 (2015): 263–84, <https://doi.org/10.1215/00141801-2854317>.
11. For discussions of Europeans' observations about physiques, see Devon Mihesuah, *Recovering Our Ancestors' Gardens* (Urbana: University of Nebraska Press, 2005), 38–46; Edward Kimber, *A Relation or Journal of a Late Expedition, &c.: The Oglethorpe Expedition of 1744 into Florida* (Gainesville: The University Press of Florida, 1976), 16; Peter Kalm, *The America of 1750: Travels in North America*, vol. II, The English Version of 1770, ed. Adolph B. Benson (New York: Dover Publications, 1966), 561; Alden T. Vaughan, ed., *William Wood, New England's Prospect* (Amherst: University of Massachusetts Press, 1977), 81–82; James Adair, *The History of the American Indians, Particularly Those Nations Adjoining to the Mississippi, East and West Florida, Georgia, South and North Carolina, and Virginia* (London: Edward and Charles Dilly, 1775), 2; and George Catlin, *Letters and Notes on the Manners, Customs and Conditions of North American Indians* [1844], Letter No. 38, <http://www.xmission.com/~drudy/mtman/html/catlin/letter38.html>.
12. This is explored in Mihesuah, "Sustenance and Health among the Five Tribes."
13. Wilburn Hill interview, March 28, 1938, Indian-Pioneer Papers vol. 42, Western History Collections, University of Oklahoma, Norman, OK, 403. Hereafter transcriptions of oral interviews from the Indian-Pioneer Papers will be cited as *IPP* by volume number; see <https://digital.libraries.ou.edu/cdm/search/collection/indianpp>.
14. West, "Diabetes in American Indians," 841.
15. Dozens of articles published in the *Chronicles of Oklahoma* recount biographies of Indian Territory and Oklahoma physicians which contain plenty of personal information but include little about how they treated patients. For examples see Basil A. Hayes, "Leroy Long-Teacher of Medicine," *Chronicles of Oklahoma* 20, no. 2 (June 1942): 107–19, and Robert L. Williams, "Dr. Daniel Morris Hailey, 1841–1919," *Chronicles of Oklahoma* 18, no. 3 (September 1940): 170–77. Digitized annual reports of the commissioner of Indian Affairs cited in this article can be accessed online, <http://digital.library.wisc.edu/1711.dl/History>.

16. Extra Census Bulletin, *The Five Civilized Tribes in Indian Territory: The Cherokee, Chickasaw, Choctaw, Creek and Seminole Nations* (Washington, DC: Department of the Interior, US Census Office, 1894), 57; see also the National Records of the Five Tribes, Oklahoma Historical Society, Archives and Manuscripts.

17. *The Problem of Indian Administration Report of a Survey made at the request of Honorable Hubert Work, Secretary of the Interior, and submitted to him, February 21, 1928* (Baltimore: Johns Hopkins Press, 1928), 191, 234.

18. Muriel H. Wright, "A Brief Review of the Life of Doctor Eliphalet Nott Wright," *Chronicles of Oklahoma* 10, no. 2 (June 1932): 270.

19. US Office of Indian Affairs, *Annual Report of the Commissioner of Indian Affairs for the year 1872* (Washington, DC: US Government Printing Office, 1872), 242.

20. Mollie Beaver, December 9, 1937, IPP 6, 293.

21. Dr. E. O. Barker, September 17, 1937, IPP 5, 216.

22. Grady F. Mathews, "History of the Oklahoma State Department of Health, 1890–1907," *Chronicles of Oklahoma* 28, no. 2 (1950): 134. The exam administered in the Choctaw Nation was not particularly arduous. My great-grandfather worked as "physician" for numerous mining towns in the Choctaw Nation. He attended medical school at Paducah, Kentucky for one year, then "apprenticed" with two German doctors. He passed the modest tribal medical test and then served as physician for hundreds of miners who worked for the Bolen-Dornell, Dan Edwards, McEvers, and Galveston coal companies around what is today McAlester. Many of those miners were tribal members. See *Pittsburg County, Oklahoma: People and Places* (McAlester, OK: Pittsburg County Genealogical and Historical Society, nd, 1–2; Clyde Wooldridge, *McAlester, The Capital of Little Dixie: A History of McAlester, Krebs and South McAlester* (Krebs, OK: Bell Books), 35, 48, 63, 65, 204; "Dr. William Elliott Abbott," typewritten ms at the Pittsburg County Genealogical and Historical Society; Fred S. Clinton, "The First Hospital and Training School for Nurses in the Indian Territory," *Chronicles of Oklahoma* 25, no. 3 (1947): 223.

23. "An Act in Regard to Physicians and Mechanics Obtaining Permits," March 17, 1879, in *General and Special Laws of the Chickasaw Nation, Passed During the Sessions of the Legislature from the Years from 1878 to 1884, inclusive* (Muskogee: Indian Journal Steam Job Print, 1884), 9–10.

24. Article XXXII: "Relating to Physicians," *Complied Laws of the Cherokee Nation* (Tahlequah, Indian Territory: National Advocate Print, 1881), 305–06.

25. Section 4, Section 1, "The Practice of Medicine," Approved October 29, 1884, in *Acts and Resolutions of the Creek National Council of the Extra Session of April, 1894, and the Regular Session of October, 1894* (Muskogee, Indian Territory: F. C. Hubbard, 1893), 180–81; Chapter XXVI, "Act Regulating the Practice of Medicine in the Muskogee Nation," in *Constitution and Laws of the Muskogee Nation* (Muskogee, Indian Territory: F. C. Hubbard, 1893), 110–11.

26. Wright, "A Brief Review of the Life of Doctor Eliphalet Nott Wright," 270, 273.

27. R. L. Owen, Indian Agent, Union Agency to J. D. C. Atkins, Commissioner of Indian Affairs, May 17, 1888, *The Executive Documents of the Senate of the United States for the First Session of the Fifty-First Congress, 1889–90*, US Congressional serial set, Issue 2689, Ex. Doc. 219, 102.

28. "An Act Regulating the Practice of Medicine and Surgery in the Indian Territory," April 23, 1904, HR 11963, Public, No. 157, 33 Stat., 299, in Charles J. Kappler, *Indian Affairs: Laws and Treaties*, vol. 3 (Washington, DC: US Government Printing Office, 1913), 76–79.

29. US Office of Indian Affairs, *Annual Report of the Commissioner of Indian Affairs for the Year 1853* (Washington, DC: US Government Printing Office), 142. Hereafter all annual reports from the commissioner of Indian Affairs are cited *Annual Report of the Commissioner of Indian Affairs*.

30. US Office of Indian Affairs, *Annual Report of the Commissioner of Indian Affairs for the Year 1884*, 83.

31. US Office of Indian Affairs, *Annual Report of the Commissioner of Indian Affairs for the year 1889*; also see numerous comments about medicine men from individual agents that year.
32. *Oklahoma Champion* (Oklahoma City), October 16, 1896.
33. *Annual Report of the Commissioner of Indian Affairs for the year 1924*, 25. See also the annual reports for the years 1899, at 284, and 1902, at 208, 381, 519.
34. Ada Adair interview, April 16, 1969, Doris Duke Oral History Collection, T-481, Western History Collections, University of Oklahoma, Norman, OK (hereafter cited as Doris Duke Oral History Collection).
35. American Diabetes Association, "Statistics About Diabetes: Overall Numbers, Diabetes and Prediabetes," <http://www.diabetes.org/diabetes-basics/statistics/?referrer=https://www.google.com/>.
36. West, "Diabetes in American Indians," 841–42. Institutional Review Boards were not established until July 12, 1974—the year West's paper was published. Normally, medical researchers do not mention the names of their subjects to protect their privacy and this could be why West did not identify them. Regardless, in this case he still did not have enough subjects to present a convincing conclusion about no diabetes presenting in AI/AN populations prior to 1940.
37. Fannie Saswanokee Gann, November 8, 1969, Doris Duke Oral History Collection, T-538.
38. Lena Carey, October 5, 1969, Doris Duke Oral History Collection, T-514.
39. Dennis W. Weidman, "Diabetes Mellitus and Oklahoma Native Americans: A Case Study of Culture Change in Oklahoma Cherokee," Ph.D. diss., University of Oklahoma, 1979, 19. He reiterates his findings in "Native American Embodiment of the Chronicities of Modernity," in *Chronic Conditions, Fluid States: Chronicity and the Anthropology of Illness*, ed. Lenore Manderson and Carolyn Smith-Morris (New Brunswick, NJ: Rutgers University Press, 2010), 597.
40. See 1880 Cherokee Census and Index, Schedules 1–6, 7RA-07, rolls 1–4, and the 1890 Cherokee Census (no index), schedules 1–4, 7RA-08, rolls 1–4, and Index to the Five Civilized Tribes, the Final Dawes Roll, M1186, roll 1, and the Enrollment Cards for the Five Civilized Tribes, 1898–1914, M1186, rolls 2–15, cards 1-11132, at the Federal Archives, Fort Worth branch. Blood quantum of thousands of Cherokees are in Devon A. Mihesuah, *Cultivating the Rosebuds: The Education of Women at the Cherokee Female Seminary, 1851–1909* (Urbana: University of Illinois Press, 1993), 117, 170n1.
41. Thomas Donaldson, *Eleventh Census of the United States, Extra Census Bulletin. Indians. The Five Civilized Tribes of Indian Territory: Cherokee Nation, Creek Nation, Seminole Nation, Choctaw Nation, and Chickasaw Nation* (Washington, DC: US Government Printing Office, 1893), 10.
42. Ethan Allen Hitchcock, *A Traveler in Indian Territory: The Journal of Ethan Allen Hitchcock*, ed. Grant Foreman (Norman: University of Oklahoma Press, 1996), 23.
43. See annual reports of the commissioner of Indian Affairs: for 1838, 508; for 1839, 469; for 1840, 313; for 1841, 334, 335, 337, 340, 342; for 1842, 445, 449; for 1844, 418, 425; see also Pete W. Cole, September 29, 1937, IPP 104, 144.
44. Weidman, "Globalizing the Chronicities of Modernity"; Cherokees are discussed at 40–42.
45. For examples, see *The Cherokee Advocate*, *Indian Journal*, *Weekly Chieftain*, *Muskogee Phoenix*, *Our Brother in Red*, *The Branding Iron*, *Arrow Telephone*, and *Guthrie Daily News*. My great-great grandfather, who served as Choctaw lighthorseman and Sheriff of Sugar Loaf County in Moshulatubbee District, co-owned the mercantile store of Ryan and Wilson until his murder in 1884; see "Death of the Choctaw Merchant," *Indian Champion*, August 16, 1884.
46. Deborah L. Duvall, *The Cherokee Nation and Tablequah* (Chicago: Arcadia Publishing, 1999), 70; Lucinda Sanders Wilhite, April 24, 1969, Doris Duke Oral History Collection, T-422–3, 7.
47. See Mihesuah, *Cultivating the Rosebuds* and "Out of the 'Graves of the Polluted Debauches': The Boys of the Cherokee Male Seminary," *American Indian Quarterly* 15, no. 4 (1991): 503–21, <https://doi.org/10.2307/1185367>.

48. See David Wallace Adams, *Education for Extinction: American Indians and the Boarding School Experience, 1875–1928* (Lawrence: University Press of Kansas, 1995); Michael C. Coleman, *American Indian Children at School, 1850–1930* (Jackson: University Press of Mississippi, 1993).

49. The schools' populations were microcosms of the larger Cherokee Nation both physiologically and socioeconomically, with students in a range from mixed-blood to full-blood and from upper to lower class. Graduates of the Cherokee Female and Male Seminaries in the late nineteenth and early twentieth centuries often became attorneys, dentists, physicians, and teachers. Those Cherokee parents who disagreed with the schools' "white" pedagogy refused to send their children to the seminaries and in contrast, the youth from these families tended to become farmers, metal smiths, or laborers. See Mihesuah, *Cultivating the Rosebuds*, 95–112.

50. For detailed information on the health care at the Seminaries, see Devon Irene Abbott [Mihesuah], "Medicine for the Rosebuds: Health Care at the Cherokee Female Seminary, 1876–1909," *American Indian Culture and Research Journal* 12, no. 1 (1988): 59–71, <https://doi.org/10.17953/aicr.12.1.1v646135k51mhm2>.

51. See CHN 99: Cherokee (Tahlequah)-Schools: Female Seminary, Undated and December 5, 1874–January 16, 1909, Microfilm Publications, Archives and Manuscripts Division, Oklahoma Historical Society. All subsequent source citations with the prefix CHN similarly indicate microfilm rolls held at the Oklahoma Historical Society; see <http://www.okhistory.org/research/forms/microfilmarchives.pdf>.

52. CHN 97: Cherokee-Schools: Female Seminary, Documents 2735–2777, May 11, 1887–December 1902.

53. CHN 98: Cherokee-Schools: Female Seminary-Documents, December 31, 1902–June 29, 1905; CHN100: Cherokee-Schools: Male Seminary-Documents 2925–2984, January 1, 1904–July 3, 1905.

54. Annual Report, Medical Superintendent of Male and Female Seminaries, November 7, 1879, Cherokee Nation Papers, M 943-1-10, box 4, F876, Western History Collections, University of Oklahoma Library, Norman, Oklahoma; Abbott [Mihesuah], "Medicine for the Rosebuds"; CHN 100: Cherokee (Tahlequah)-Schools-Male Seminary, nd, and December 10, 1875–February 1, 1911; CHN 100: Cherokee (Tahlequah)-Schools: Medical Superintendent, Undated and November 22, 1876–January 12, 1901.

55. Annual Report of the Medical Superintendent of the Male and Female Seminaries, November 7, 1899, Cherokee Nation Papers, Education, M 943-1-10, Box 4, Folder 876, Western History Collections, University of Oklahoma Library, Norman, Oklahoma.

56. Lulu Hair interview, September 20, 1969, Doris Duke Oral History Collection, T-514.

57. Carolyn Thomas Foreman, "The Choctaw Academy," *Chronicles of Oklahoma* 6, no. 4 (1928), 463–64.

58. Kentucky Historical Society, *Dick Johnson's Indian School at White Sulphur, Scott County, Ky.* (Scott County and White Sulphur, Kentucky, Kentucky Historical Society, 1909), 5, <http://kyhistory.com/cdm/ref/collection/RB/id/89>.

59. *Annual Report of the Commissioner of Indian Affairs for the Year 1848*, 503.

60. *Indian Advocate*, July 1947; Grant Foreman, "Notes from the Indian Advocate," *Chronicles of Oklahoma* 14, no. 1 (March 1936): 67.

61. Edna Hunt Osborne, "How a Little White Girl Grew up among the Choctaw Indians," September 3, 1937, *IPP* 38, 309.

62. Billie Fullen, September 25, 1937, *IPP* 32, 414.

63. Ethel Brotherton, March 24, 1938, *IPP* 11, 432, 434, 435.

64. Edward J. McClain, May 14, 1937, *IPP* 50, 160–62.

65. Katie Wacachee, June 6, 1970, Doris Duke Oral History Collection, T-590.

66. Cyrus Byington, *A Dictionary of the Choctaw Language*, Smithsonian Institution Bureau of American Ethnology, Bulletin 46, ed. John R. Swanton and Henry S. Halbert (Washington, DC: Government Printing Office, 1916), 168, 429. *Hoshunwa shali* is similar to *hoshunwa* (noun: to urinate; verb: urine).

67. Richard Foreman, *The Cherokee Physician, or Indian Guide to Health, as given by Richard Foreman, a Cherokee Doctor; Comprising a Brief View of Anatomy, With General Rules for Preserving Health without the Use of Medicines* (Asheville, NC: James W. Mahoney, 1849), 115–16.

68. For discussion on the types of corn and how it was prepared, see Muriel Wright, "American Corn Dishes," *Chronicles of Oklahoma* 36, no. 2 (1958): 155–66, and numerous interviews in the Indian Pioneer History Collection microfilm rolls at the Oklahoma Historical Society, including that of Nannie Barcus, March 16, 1939, *IPP* 5, 205–08.

69. Bertha Provost interview, July 19, 1968, Doris Duke Oral History Collection, T-686. A Freedman reported that his Choctaw "Master" liked to pour grease over his meats. Jefferson L. Cole, March 17, 1938, *IPP* 19, 173. Note that he still called him Master after he was freed.

70. James Mooney, *The Swimmer Manuscript: Cherokee Sacred Formulas and Medicinal Prescriptions*. Smithsonian Institution Bureau of American Ethnology Bulletin 99 (Washington, DC: US Government Printing Office, 1932), 254, 283; Linda Averill Taylor, "Plants Used as Curatives by Certain Southeastern Tribes" (Cambridge: Botanical Museum of Harvard University, 1940), 41. Also see the spread sheet of medicinal plants used by the Five Civilized Tribes at: <http://www.aihd.ku.edu/health/MedicinalPlantsoftheFiveTribes.html>.

71. John R. Swanton, "Religious Beliefs and Medical Practices of the Creek Indians," in *Forty-second Annual Report of the Bureau of American Ethnology, 1924–1925* (Washington, DC: US Government Printing Office, 1928), 636–72.

72. William H. Banks, "Ethnobotany of the Cherokee Indians," MA thesis, University of Tennessee, 1953, 44–45, 60.

73. *Ibid.*, 19, 20, 22. Note that a Cherokee informant mentioned the sugar diabetes plants in 1952.

74. Mooney, *The Swimmer Manuscript*, 288.

75. Swanton, "Religious Beliefs," 660; Taylor, "Plants Used as Curatives by Certain Southeastern Tribes," 11. "Dropsy," the nineteenth-century term for edema, was a recognized malady among the Five Tribes prior to 1940. See for example, W. P. Williams, December 21, 1937, *IPP* 98, 399.

76. Taylor, "Plants Used," 23, 28, 57, 58.

77. T. N. Campbell, "Medicinal Plants Used by Choctaw, Chickasaw, and Creek Indians in the Early Nineteenth Century," *Journal of the Washington Academy of Sciences* 41, no. 9 (1951): 287.

78. See, for example, *Indian Journal*, *Cheyenne Transporter*, *Weekly Chieftain*, *Branding Iron*, *Cherokee Advocate*.

79. Lena Carey, October 5, 1969, Doris Duke Oral History Collection, T-514.

80. West, "Diabetes in American Indians," 847.

81. See Wiedman, "Diabetes Mellitus and Oklahoma Native Americans," 221–23.

82. Martin Blackwood, June 22, 1937, *IPP* 8, 335. This claim is repeated multiple times; see, for example, V. A. Camp, May 11, 1937, *IPP* 15, 177–8; Joseph Ammons, July 22, 1937, *IPP* 2, 255; Isaac Batt, May 24, 1937 *IPP* 6, 50; Susie Blackwood, July 12, 1937, *IPP* 8, 343; Richard Young Audd, October 11, 1937, *IPP* 3, 296; Jane Battiest, September 21, 1937, *IPP* 6, 69; Eliza Elapotubee, April 27, 1937, *IPP* 27, 308; B. M. Palmer, February 15, 1937, *IPP* 69, 58.

83. The topic of food on the reservation is discussed in detail in Devon Mehesuah, "Comanche Traditional Foodways and the Decline of Health," *Great Plains Journal* 50 (2016), forthcoming. See also Benjamin Kracht's "Diabetes among the Kiowa: An Ethnohistorical Perspective," in *Diabetes as a Disease of Civilization*, ed. Joe and Young, 147–67; B. Randolph Keim, *Sheridan's Troopers on the*

Borders: A Winter Campaign on the Plains (Philadelphia: David McKay, 1885), 295; Eugene E. White, *Service on the Indian Reservations. Being the Experiences of a Special Indian Agent while Inspecting Agencies and Serving as Agent for Various Tribes* (Little Rock: Diploma Press, 1893), 246–47; Tatum to CIA, July 24, 1869, Record Group 62: Letters Received by the Office of Indian Affairs, 1824–81, M234, roll 376, 291, National Archives. My full-blood Comanche father-in-law often spoke about his father, Joshaway (1874–1962), who farmed and raised a few dairy cows after being forced to boarding school at Fort Sill. Joshaway and his wife Carrie (1882–1932) churned their own butter and gave away or sold milk to other Comanches. Henry Mihesuah, *First to Fight*, ed. Devon Abbott Mihesuah (Lincoln: University of Nebraska Press, 2002): 17–18. The Mihesuahs have been hunting on the family allotment since 1901.

84. In addition to the works about Comanche history listed in subsequent notes, see Albert S. Gilles, Sr., *Comanche Days* (Dallas: Southern Methodist University Press, 1974); T. R. Fehrenbach, *The Comanches: The Destruction of a People* (New York: Alfred A. Knopf, 1974); William T. Hagan, *United States-Comanche Relations: The Reservation Years* (New Haven: Yale University Press, 1976); Elizabeth A. H. John, *Storms Brewed in Other Men's Worlds: The Confrontation of Indians, Spanish, and French in the Southwest, 1540–1795* (College Station, TX: Texas A&M University Press, 1975); *Comanche Ethnography: Field Notes of E. Adamson Hoebel, Waldo R. Wedel, Gustav G. Carlson, and Robert H. Lowie*, ed. Thomas A. Kavanagh (Lincoln: University of Nebraska Press, 2008); Thomas A. Kavanagh, *The Comanches: A History, 1706–1875* (Lincoln: University of Nebraska Press, 1999); Stanley Noyes, *Los Comanches: The Horse People, 1751–1845* (Albuquerque: University of New Mexico Press, 1993).

85. Elizabeth A. H. John, "Portrait of a Wichita Village, 1808," *Chronicles of Oklahoma* 60, no. 4 (1982): 416, 417, 418, 421–22; Pekka Hämäläinen, "The Western Comanche Trade Center: Rethinking the Plains Indian Trade System," *The Western Historical Quarterly* 29 (1998): 485–513, <https://doi.org/10.2307/970405>.

86. Gustav G. Carlson and Volney H. Jones, "Some Notes on Uses of Plants by the Comanche Indians," *Papers of the Michigan Academy of Science* 25 (1940): 526–27, <https://babel.hathitrust.org/cgi/pt?id=mdp.39015071693423;view=1up;seq=661>; David E. Jones, "Comanche Plant Medicine," *Papers in Anthropology* 9 (1968): 3; Nelson Lee, *Three Years Among the Comanches: The Narrative of Nelson Lee, the Texas Ranger* (Albany, NY: Baker Taylor Company, 1859), 114–15; Thomas C. Battey, *The Life and Adventures of a Quaker among the Indians* (Boston: Lee and Shepard, 1876), 283.

87. This is discussed in Mihesuah, "Comanche Traditional Foodways and the Decline of Health."

88. Wiedman, "Diabetes Mellitus and Oklahoma Native Americans," 222–23.

89. For discussions of Navajo trading for agricultural goods and cultivating crops, see Ruth Underhill, *The Navajos* (Norman: University of Oklahoma Press, 1956); Lynn Robison Bailey, *If You Take My Sheep—: The Evolution and Conflicts of Navajo Pastoralism, 1630–1868* (Tucson: Westernlore Press, 1980); Richard H. Wilshusen, "The Diné at the Edge of History: Navajo Ethnogenesis in the Northern Southwest, 1500–1750," in *Across a Great Divide: Continuity and Change in Native North American Societies, 1400–1900*, ed. Laura L. Scheiber and Mark D. Mitchell (Tucson: University of Arizona Press, 2010), 192–211.

90. Frank Mitchell, *Navajo Blessingway Singer: The Autobiography of Frank Mitchell, 1881–1967*, ed. Charlotte Frisbie and David P. McAllester (Tucson: University of Arizona Press, 1978), 32; William Y. Adams, "Shonto: A Study of the Role of the Trader in a Modern Navaho Community," *Bureau of American Ethnology Bulletin* 188 (Washington, DC: US Government Printing Office, 1963), 81, <http://www.biodiversitylibrary.org/item/85052#page/14/mode/1up>.

91. Peter Iverson, *Diné: A History of the Navajos* (Albuquerque: University of New Mexico Press, 2002), 126.

92. Carol Ballew, Linda L. White, Karen F. Strauss, Lois J. Benson, James M. Mendlein, and Ali H. Mokdad, "Intake of Nutrients and Food Sources of Nutrients among the Navajo: Findings from the Navajo Health and Nutrition Survey," *The Journal of Nutrition* 127, no. 10 (October 1997): 2085S–2093S, <http://jn.nutrition.org/content/127/10/2085S.full.pdf+html>.
93. For more information about the history of Navajo foodways, see Devon Mihesuah, "Indigenous Health Initiatives, Frybread, and the Marketing of Non-Traditional "Traditional" American Indian Foods," *Native American and Indigenous Studies* 3, no. 2 (Fall 2016): 45–69, <https://doi.org/10.5749/natiindistudj.3.2.0045>.
94. Tristan Ahtone and Jolee Yazzie, "Navajo Nation's Nutrition Crisis," Al Jazeera America, LLC, January 14, 2015, <http://projects.aljazeera.com/2015/12/navajo-malnutrition/>.
95. There are many discussions about hunter-gatherer diets and health. See, for example, Michael Gurven and Hillard Kaplan, "Longevity among Hunter-gatherers: A Cross-Cultural Examination," *Population and Development Review* 33 no. 2 (2007): 321–65, <https://doi.org/10.1111/j.1728-4457.2007.00171.x>; James H. O'Keefe Jr. and Loren Cordain, "Cardiovascular Disease Resulting from a Diet and Lifestyle at Odds with our Paleolithic Genome: How to Become a 21st-Century Hunter-Gatherer," *Mayo Clinic Proceedings* 79, no. 1 (January, 2004): 101–08, <https://doi.org/10.4065/79.1.101>; Katherine Milton, "Hunter-Gatherer Diets—a Different Perspective," *The American Journal of Clinical Nutrition* 71, no. 3 (March 2000): 665–67, <http://ajcn.nutrition.org/content/71/3/665.full>.
96. West, "Diabetes in American Indians," 847.
97. Hitchcock, *A Traveler in Indian Territory*, 23, 195.
98. James Edwin Finney, "Reminiscences of a Trader in the Osage Country," *Chronicles of Oklahoma* 33, no. 2 (1955): 150, 155.
99. Donald Ricky, *Indians of Louisiana: Past and Present* (St. Clair Shores, MI: Somerset Publishers, Inc., 1999), 177.
100. John Bartlett Meserve, "The McCurtains," *Chronicles of Oklahoma* 13, no. 3 (1935): 310.
101. A. D. Hefley, "A Choctaw Landmark," *Chronicles of Oklahoma* 12, no. 4 (1934): 477.
102. "Pen Pictures of the Chiefs of the Five Civilized Tribes," *The Indian School Journal* (November 1906): 33.
103. West, "Diabetes in American Indians," 180.
104. Jesse Adair, May 17, 1937, *IPP* 1, 123, 125.
105. Lulu Hair, September 20, 1969, Doris Duke Oral History Collection, T-514.
106. M. H. Holden, July 9, 1937, *IPP* 43, 221.
107. See the dozens of grocery receipts in CHN99 Cherokee (Tahlequah)-Schools: Female Seminary, undated, and December 5, 1874–January 16, 1909. See also late fall and winter 1901 receipts dated September 14, 16; October 5, 11, 23, 29; November 7, 13, 20, 27; December 4, 12, 1901. Each list reveals orders of at least 7 pounds of butter although many receipts list 15 pounds of butter and over 100 gallons of milk. CHN99 Cherokee-Schools: Male Seminary, Documents 2871–2924, August 29, 1887–December 1, 1903.
108. Frances "Fanny" Elizabeth Kemp Mead, April 2, 1937, *IPP* 61, 425.
109. See, for example, Frank Stewart, August 13, 1937, *IPP* 87, 340; Susan Bond Spring, nd, *IPP* 86, 275; Mary Jane Davis, September 13, 1937, *IPP* 23, 318.
110. See Craig H. Miner, *The Corporation and the Indian: Tribal Sovereignty and Industrial Civilization in Indian Territory, 1865–1907* (Columbia: University of Missouri Press, 1976). See also Devon Mihesuah, "Sustenance and Health among the Five Tribes in Indian Territory," 276–78, and Charles F. Meserve, *The Dawes Commission and the Five Civilized Tribes of Indian Territory* (Philadelphia: Office of the Indian Rights Association, 1896) about the changing environment of Indian Territory.

111. See discussions in Winona LaDuke, *All Our Relations: Native Struggles for Land and Life* (South End Press, 1999); Winona LaDuke and Sean Aaron Cruz, *The Militarization of Indian Country (Makwa Renewed)* (East Lansing: Michigan State University Press, 2012).
112. West, "Diet Therapy of Diabetes: An Analysis of Failure," *Annals of Internal Medicine* 79, no. 3 (1973): 427, <http://doi.org/10.7326/0003-4819-79-3-425>.
113. See Kelly M. West and John M. Kalbfleisch, "Influence of Nutritional Factors on Prevalence of Diabetes," *Diabetes* 20, no. 2 (February 1971): 99–108, <https://doi.org/10.2337/diab.20.2.99>.
114. West, "Diet Therapy of Diabetes," 425.
115. See, for example, Gideon Mailer and Nicola Hale, "Decolonizing the Diet: Synthesizing Native-American History, Immunology, and Nutritional Science," *Journal of Evolution and Health* 1, no. 1 (2013): <https://doi.org/10.15310/2334-3591.1014>; Enrique Salmón, *Eating the Landscape: American Indian Stories of Food, Identity, and Resilience* (Tucson: University of Arizona Press, 2012); Harriet V. Kuhnlein and Olivier Receveur, "Dietary Change and Traditional Food Systems of Indigenous Peoples," *Annual Review of Nutrition* 16, no. 1 (1996): 417–42, <https://doi.org/10.1146/annurev.nu.16.070196.002221>; Leanne R. Simpson, "Anticolonial Strategies for the Recovery and Maintenance of Indigenous Knowledge," *American Indian Quarterly* 28, nos. 3/4 (2004): 373–85, <https://doi.org/10.1353/aiq.2004.0107>; Tristan Ahtone, "Tribes Create Their Own Food Laws to Stop USDA from Killing Native Food Economies," *Yes! Magazine*, May 24, 2016, <http://www.truth-out.org/news/item/36197-tribes-create-their-own-food-laws-to-stop-usda-from-killing-native-food-economies>; Center for Disease Control and Prevention, "Traditional Foods in Native America: A Compendium of Traditional Foods Stories from American Indian and Alaska Native Communities," Part IV, <https://www.cdc.gov/diabetes/ndwp/pdf/part-iv---traditional-foods-in-native-america.pdf>; Devon A. Mihesuah, American Indian Health and Diet Project website, <http://www.aihd.ku.edu/>; Martin Reinhardt, Center for Native American Studies at Northern Michigan University, Decolonizing Diet Project weblog, <http://decolonizingdietproject.blogspot.com/>; Mvskoke Food Sovereignty Initiative, <http://www.mvskokefood.org/>; College of Menominee Nation Sustainable Development Institute, Garden and Food Sovereignty Initiatives, <http://sustainabledevelopmentinstitute.org/garden-and-food-sovereignty-initiatives/>; Diné Policy Institute, "Diné Food Sovereignty: A Report on the Navajo Nation Food System and the Case to Rebuild a Self-Sufficient Food System for the Diné People" (April 2014), <http://www.dinecollege.edu/institutes/DPI/Docs/dpi-food-sovereignty-report.pdf>.

