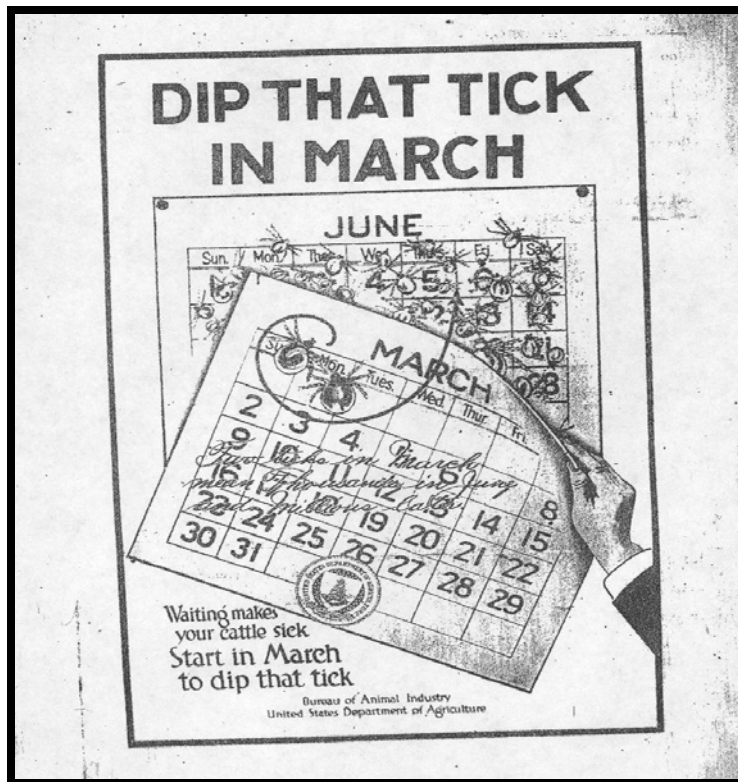


Dip That Tick: Texas Tick Fever Eradication in Arkansas, 1907-1943

By Holly Hope



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A Historic Context Written and Researched
By Holly Hope

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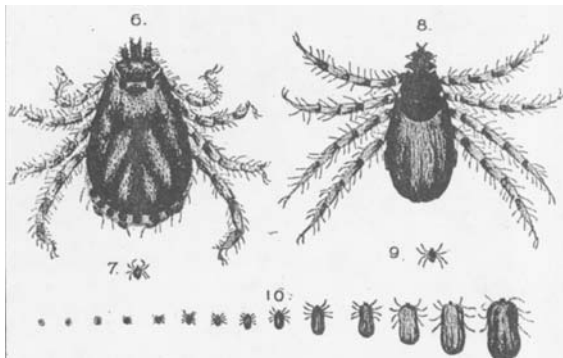
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**DIP THAT TICK:
TEXAS TICK FEVER ERADICATION IN ARKANSAS, 1907-1943**

INTRODUCTION

Tiny pests officially known as *Boophilus annulatus* insinuated themselves into Arkansas’s agricultural society in the nineteenth century, detrimentally impacting cattle markets in Arkansas and across the United States. Otherwise known as ticks, these one-host arachnids launched “Texas fever” in cattle herds, leading to weight loss, infertility, reduced milk production and death. This prompted the implementation of federal



Cattle ticks

eradication programs that sparked ill will and sometimes violent or destructive resistance among independent Arkansas farmers despite ultimately preventing those same farmers from losing their livelihoods. Although these programs were beneficial to the agricultural economy, it was difficult for cattlemen to abandon long-held traditions of free

range herding and burning of pastures for pest elimination. The federal program introduced sweeping changes in rural lifeways but offered agriculturalists an opportunity to improve their lives, which they eventually accepted, however grudgingly.

The architectural evidence of the federal tick eradication program consists of cattle dipping vats. Examples of these simple structures may be found on private farmland or within the current boundaries of National Forests throughout Arkansas. The concrete vats and associated dripping pads are usually the only remnants of such operations as other elements like loading chutes, pens and vat cover supports would have been primarily wooden.

EARLY EVIDENCE OF CATTLE TICKS

The high mortality rates and overall physical inferiority of Southern cattle had drawn attention before the Civil War. Frederick Law Olmsted was struck by the “poor cattle” he observed in Louisiana while Old South historian Frank Owsley noted that the standard cow in the south could be considered “lean” despite the availability of adequate

forage in southern forests.ⁱ A commercial cattle industry was a presence in Arkansas before the Civil War alongside the cotton culture and a hunter-trapper culture that dated from the eighteenth century. Graziers did not contain their cattle within pens or barns but permitted them to range free on prairie remnants or in forests. In addition to the overwhelmingly free range policy of the state's farmers no controlled breeding program was practiced, resulting in small cows that yielded little milk and assessed at a low value.ⁱⁱ

Uneducated assertions for the pitiful state of cows in pre-Civil War Southern history were the laissez faire methods of grazing and breeding as well as mistreatment at the hands of keepers. A frequent supposition in early farmers' bulletins was that the tick was brought to North America during colonization by Spanish cattle; however, it has been suggested by author Tamara Haygood that the "runty" appearance of southern cattle could be attributed to the colonial coexistence of the cow and the tick prior to the well-known infection of northern herds via nineteenth century cattle drives. Haygood states that colonial literature contained many accounts of inferior cattle in the South, as did journalism of the late nineteenth and early twentieth centuries. Haygood proposes that the true reason for their poor quality was that they suffered from parasitic blood diseases, babesiosis and anaplasmosis as a result of tick infestation.ⁱⁱⁱ



"Runty" cow

DISPERSION OF DISEASE

After the Civil War cattle drives brought Texas herds into contact with Midwestern and eastern cattle. Agriculturalists in those areas noted that their previously healthy cows began to suffer from disease and a high rate of mortality. This led to the designation of the affliction as "Texas fever." Autopsies revealed that the cows suffered from erosions of the fourth stomach, distended livers and gallbladders and enlarged spleens. It was noted that the appearance of those internal injuries did not necessarily require physical contact and could result from the placement of disease-free cows in

pastures occupied by Texas cattle as late as days or weeks after they had inhabited them.^{iv}

Obviously, this resulted in the rejection of southern cattle in northern markets and the establishment of laws in many eastern states barring cattle drives. Texas farmers were understandably angered by these actions and argued that despite the poor appearance of their cattle, they were not dying at the same levels. Late nineteenth century experiments by Theobald Smith of the Department of Agriculture on disease transmission by the pests, revealed the reason for this disparity in morbidity. Smith discovered that southern calves possessed a natural immunity to infection for one or two months after their birth. In the South, where the ticks were prevalent, the calves would be susceptible to attacks but their natural immunity allowed them to survive. By adulthood they were considered carriers but continuous re-infection through exposure on infested native soil allowed them to remain immune.^v

Climactic conditions in the South seemed to contribute to the prolific tick population. Experiments conducted in 1869 suggested that there was a correlation



Engorged cattle tick

between the Texas cattle as carriers and their primary environment, which was swampy and warm. During the parasitic period of the tick it would take up position on the cow in areas like the inside of the thighs and flanks where it was insulated. After engorged female ticks fell from the cow they sought out protection in the moist undersurfaces of leaves or stones to begin the next function; egg laying. Cold weather had a distinct effect on the deposit of

eggs as it sometimes prevented the female from laying altogether. The variable winter weather and humid conditions of Arkansas were thus most conducive to the survival and proliferation of adult, egg-laying ticks, sometimes allowing them to subsist through the winter and pose a significant threat of infection into the next summer.^{vi}

The traditional methods of animal husbandry in Arkansas would also allow for this extensive infestation. Wooded hills and valleys within grassy pastures in the state would allow the occupation of large numbers of cattle for up to ten months. Shade trees

in these pastures would offer inviting cool spots for escape from flies and subsequently, several daily resting areas throughout the grazing field would become wholly infested with seed ticks. An estimate by Shreveport, Louisiana, farmer August Mayer in 1906 placed the number of ticks on a single animal at several hundred thousand and calculated that approximately two million female ticks could engorge on the blood of one cow within a single season.^{vii}

Detrimental effects of the tick on the cattle industry were numerous. First was the acute suffering of the animal from resultant internal injuries and the loss of two hundred pounds of blood during the engorgement period coupled with lack of sleep due to irritation from sores. The breeder experienced monetary losses through the failure of the infested cows to produce calves and the reduction of milk production in dairy cattle. Death rates in states suffering from tick infestation were twice as high at the turn of the twentieth century as Northern and Midwestern states and the value of beef cattle per head in Arkansas was placed at three times below that of cattle in Iowa. The physical debilitation of the cow during tick seasons increased costs to the farmer in the provision of extra feed, dips and for additional supervision. The diminished growth experienced by infested calves in the South also translated to extra cost for food and care because the farmer would have to carry them for two or more years longer than tick-free cattle.^{viii}

The Texas fever quarantine line for the prevention of contact between southern and northern cattle was established in 1891 by Dr. Daniel Elmer Salmon, founder of the National Veterinary College, who worked closely with Theobald Smith. From east to west, this line bisected the United States from the lower half of Virginia through southern Tennessee and into the southeast sectors of Oklahoma and Texas, and encompassed all of Arkansas. The line excluded New Mexico and Arizona but the southern portion of California was included within the boundaries. Regulations regarding the quarantine line stipulated that cattle transported north of the line could not travel overland but via rail or boat during the months between January 15 and November 15. Slaughtering was to take place immediately and no cattle were to be held.^{ix}

A state quarantine law was enacted in Arkansas in 1899 to protect the northern tier of counties in the state from infection. Washington and Benton counties in the northwest were initially tick-free; however, they suffered from short periods of infection in the summers due to migrant berry pickers who brought cattle with them, and from the

occasional infested herd held in local stock pens. Ticky cows shipped in on the railroad were sometimes detrained and driven through town to another area for re-shipment, which resulted in the disbursement of ticks among local cattle that were allowed to range along railroad rights-of-way. The range itself was also responsible in that undeveloped, unfenced areas such as those the state's cattle traditionally roamed were shown to be rife with infestation. Despite the overwhelming evidence of damage wrought by the cattle tick, it was difficult for Arkansas farmers to depart from the agricultural traditions they had followed for generations, and indifference on the part of resistant stock owners was cited as one reason for the re-infection of cattle in the state. Such negligence could be the cause of tick introduction by allowing contact with western and southern cattle along herding routes.^x

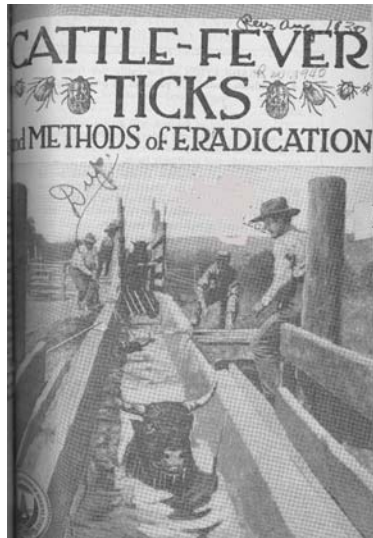


Tick eradication quarantine line

ERADICATION CAMPAIGN

In 1906 the Bureau of Animal Industry (BAI) of the U.S. Department of Agriculture (USDA) and state and county authorities in quarantined areas began a cooperative campaign to eradicate the cattle tick. A federal appropriation allowed experimentation into various methods of elimination. Pasture rotation of herds was important in that temporary evacuation of grazing land coupled with chemical treatments would accomplish the twofold result of killing engorged females and starving the seed ticks on the ground in empty pastures. Initially, the burning of large pastures to improve grass yields and destroy tick eggs, a traditional agricultural practice, was advocated by the BAI, but by the early twentieth century the U.S. Forest Service commenced a fire suppression campaign to improve forest stands and passed laws forbidding the use of fire on forest land where many herds were located. Other techniques involved picking or

brushing with a knife or currycomb, coating the cows with a disinfecting solution like crude petroleum to block the path of the ticks, immunization with infected blood and dipping cattle in a vat filled with a solution poisonous to the tick.^{xi}



Agricultural Journal

1907 the Arkansas Agricultural Experiment Station in Fayetteville played an important part in this process by publishing numerous farmers' bulletins on tick fever diffusion, the passage of laws regarding quarantines and new techniques of extermination. Cattle growers' associations, farmers' institutes, agricultural journals and stock inspectors in the field helped to disperse the "fundamental truths concerning the cattle tick," and to conduct experiments in eradication. Cattle clubs comprised of stockmen were formed in some states

for the purpose of distributing information on infection and legislation. The BAI used pithy slogans like, "Waiting makes your cattle sick, start in March to dip that tick." The great import of this movement was even impressed upon rural children through picture books that told the story of the cattle tick and cattle dipping. The seriousness of the campaign could be divined from *Farmers' Bulletin 261*, which stated, "To eradicate the cattle tick from the Southern States of the Union means, therefore, to a large extent, the preservation of the supremacy of American agriculture. Above all, it means increased welfare and happiness to millions of our people."^{xii}

RESISTANCE

Despite the independent nature of Arkansas's farmers, most recognized that the intervention of the government in this case posed a direct benefit and they offered little resistance to inspectors and agents. Positive feedback found in newspapers and farmers' bulletins from agriculturalists like P.T. Harrison of Newton County declared, "We had some trouble here at first, as many refused to dip cattle, but these were overcome and now the people are more than satisfied...." Such personal testimony from neighbors and friends seemed to be the most persuasive avenue to holdouts but there were still those

stockmen who resented the implication that they were not the experts in these areas and that tried and true methods were no longer effective. The process of dipping sometimes resulted in death or injury to the cow, which seemed to further vindicate the beliefs of those who did not subscribe to the “tick theory.”^{xiii}

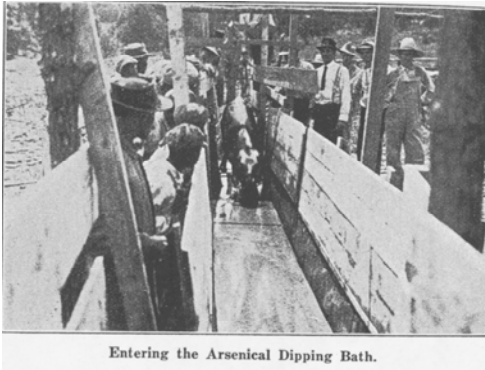
The expense of the treatment through financial outlay and the potential loss of animals during the eradication process often meant a hardship to small-scale farmers and sometimes fomented rebellion. A Clark County newspaper subscriber stated in an editorial regarding the finances involved in vat construction and dipping, “If we have to take medicine let us know what it costs.” Early twentieth century eradication methods like pasture or crop rotation and immunization required the holding of large amounts of land and money to purchase medicine and hire laborers, resources not available to the yeoman farmer who was raising cattle for subsistence and using most land for a cash crop. The enactment of fence laws introduced an expense that was opposed by these small farmers because the market for their cattle was usually local and they enjoyed free grazing by turning cattle out in winter after the crops had been gathered, which provided them with an important economic benefit. Changes in rural ways of life soon mounted against them and they had to confront new circumstances that favored the recent laws. Increasing numbers of tenants and freedmen who were operating under huge debts within the sharecropping system posed a considerable threat to livestock allowed to range free with no supervision or boundaries as they could be easily stolen. Railroad corporations supported fence laws after the Civil War to avoid reimbursement for cows struck by trains. So the small farmer did not stand a chance against the support of such laws from larger ranchers who could afford meeting the requirements of such restrictions and the monolithic railway corporations with their political influence.^{xiv}

Dissidents in Arkansas, known as “kickers,” usually hailed from a yeoman group that actively asserted their resistance to change in agricultural practices in the only way available to them, through violence. Opposition was noted in several publicized incidences, most of them resulting in a court case and fine for refusal to dip, which was a relatively tame act of defiance compared to more aggressive actions in the form of destroying vats, damage to property and murder. Several counties reported the use of dynamite to demolish dipping vats - a common occurrence throughout the quarantined areas of the South - and Independence County cattle inspector Charles Jeffery was shot to

death in 1922 by a posse of dipping opponents. The barn of another federal inspector in the county was destroyed by fire and he reported that he had previously received death threats, as had an inspector in Rosie, whose barn was also burned.^{xv}

METHODS OF ERADICATION

Eventually, the proven benefit of dipping was communicated to most cattle farmers through the education program and dipping day came to be an accepted



Entering the Arsenical Dipping Bath.

Dipping day

communal event. A 1906 account of the methods of eradication in Washington and Benton Counties stated that dipping was not an accepted practice in those initial areas of governmental intervention. However, by 1907 *Farmers' Bulletin 90* stated that the most widespread approach to elimination of ticks in Arkansas was through the application of crude petroleum. Vats could be constructed to dip the

cow in oil but this cost so much as to be prohibitive in much of the state and could really only be justified in open range areas containing large herds, so most farmers utilized a snubbing post and rope or, more frequently, a chute.^{xvi}

Arsenical dips using white arsenic had been discovered during 1910 experiments to be the most efficient, least expensive and easily prepared technique of tick eradication leading to the USDA advocacy of dipping in arsenical solution. Besides ridding the cow and other stock of ticks, it destroyed lice, deterred flies and provided a glossy texture to the hide. As of 1914 it was declared by the Arkansas Agricultural Experiment Station that, "The system of constructing dipping vats and systematically dipping cattle has passed beyond the experimental stage." At that time dipping vats had been constructed in three-fourths of Arkansas counties by individuals or by groups of farmers.^{xvii}

Two federal eradication districts were established in Arkansas in 1915; the Northeast district east of the White River and the Northwest district west of the river. Eradication work began in the northern area, specifically Benton and Washington counties in the northwest. Initial government funds were being depleted at a rapid rate, causing the withdrawal of inspectors and agents from the field so the two districts were

placed in the northern area of the state because it seemed that the process would be most effective if begun there. These counties were two of five that were originally above the federal quarantine line but they experienced periods of moderate seasonal infestation and it made more sense to work south from the line, creating a clean route for importation of tick-free cattle. County municipalities wishing to join these districts were required to petition their senators and representatives as were residents of the counties who wanted to form a separate district. All stockmen in those areas helped finance the program by paying a five cent per head annual tax. Once a county was accepted into a district, 25 to 40 dipping vats would be situated in such a way that no farmer would have to travel over three miles to get to them. The free range practice was allowed in districts but beginning in March, cattle were put on a strict schedule of dipping every three weeks. After the government shortfall, state appropriations were split among the counties on the basis of square miles and funds were used to hire men to purchase the solution, supervise the construction of vats and oversee the dipping process.^{xviii}

DIPPING VAT ARCHITECTURE

Federal agents were meticulous in site selection for vats and primary consideration was taken in locating them close to water (although not every vat was next to a water source) and close to the farmers within the boundaries of an established population center. The Forest Service objected to placing vats on public land as the impact of large herds of livestock could disrupt tree growth so agents would collaborate with private landowners for placement. *Arkansas Agricultural Experiment Station Bulletin 119* contained specific measurements for vat construction but in the field vats actually came in a variety of sizes because of the use of local labor so they could be found in many depths and widths.^{xix}

On dipping day the cattle would be driven from a holding pen through a curving wooden chute to a concrete sliding chute, which would prevent them from backing up. With such persuasions as being “prodded, pulled, dragged, punched, or kicked,” the cow would slip into the arsenical mixture. If the vat was built to the required depth the cow would be totally submerged in the solution and sticks would be used to plunge its head beneath the surface. An exit incline composed of short steps would lead the animal to a

concrete dripping pad within a divided, gated wooden pen where it would receive a spot of green paint as an indication it had been dipped. A hinged shelter to prevent evaporation could also be utilized as splash guards during the dipping process.^{xx}

Fifteen counties in the northwest and northeast tier of Arkansas managed to rid themselves of the ticks by 1907 and obtain disease-free status. A financial expenditure on the part of area farmers was still required in order to receive the sanction of the federal government and be officially released from quarantine. Funds were raised from individuals, cattle growers' associations and the Bureau of Mines, Manufactures and Agriculture to pay and appoint line riders to guard against re-infection in the free zones. Most of the remainder of the state was placed above the quarantine line by 1928. The cattle tick was considered to be eradicated from Arkansas and the United States by circa 1943 but voluntary dipping continued, some vats being used in south Arkansas up to 1960.^{xxi}



Dipping a cow

Physical remains of cattle dipping vats in Arkansas present a toxic legacy of the federal eradication campaign. Many of the local men who handled and mixed the solution were unaware of the danger in the ingredients as were residents who later utilized abandoned vats for various uses. *Farmers' Bulletin 119* offered that farmers could neutralize the solution for vat cleaning by adding air slacked lime and copperas and allowing it to stand for twelve hours; however, a prescribed method of removal was not overwhelmingly adhered to. Many times the arsenical formula was drained into nearby water sources or leached into the ground through percolation or flooding. Sometimes solids from the vats would be removed and deposited on the ground in the immediate area. Dispersion was also achieved through the cattle themselves. If they were not allowed the proper period to dry they could release solution into water sources on the range, leaving a path of dead fish in their wake. Abandoned vat structures also posed a danger of chemical retention, which people exposed themselves to by using them as

swimming pools, bathtubs and septic tanks. The presence of contaminated soil and water continues to pose a threat to modern farmers and archeologists who study vats.^{xxii}

Dipping vats may still be found on National Forest land and private property in Arkansas. The integrity of many examples has been compromised through erosion,



Compromised dipping vat

disruption by farm equipment or deliberate destruction to prevent modern livestock and humans from falling into them.

Wooden elements are rarely present thus far but they can be detected through archeological investigations. Archeologists

in the Ouachita National Forest and historians with the Arkansas Historic Preservation Program have located and

surveyed several vats and investigations are ongoing. Despite the initial reluctance to wholly embrace the program rural Arkansans became part of a cooperative nationwide movement that altered inefficient traditional agricultural practices and enabled the state to take its place as a key agricultural player in national markets. Cattle dipping vats provide a humble symbol of a major governmental program that impacted Arkansas's agricultural society in essential and life-changing ways.

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