REPORT ON CATTLE DIPPING AND THE USE OF DIPPING VATS

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I. CAUSE OF CATTLE TICK FEVER

Florida was one of the first places in North America where settlers introduced cattle into the new world. Cattle imported from Spain and Portugal mostly likely introduced the first cattle fever tick into this county. The elimination of the cattle fever tick proved to be one of the most difficult eradication campaigns undertaken in this county. In any discussion of cattle fever tick eradication it is necessary to understand the history of the disease and its cause. Cattle Tick Fever, or "Texas Cattle Fever" as it is also known, is a disease of cattle caused by an infection of microbes carried by the cattle fever tick. The cattle fever tick is a parasite that feeds on the blood of animals such as cattle. Although cattle are their normal hosts, the ticks may infest other animals such as deer, mules and horses. Cattle, with the possible exception of deer, seem to be the only host infected with the disease. Cattle Tick Fever is an infectious disease caused by microbes (germs) which multiply in the cattle's blood and destroy the red blood corpuscles.

The cattle fever tick is a parasite that draws blood from its host. The tick may get the germ for the disease from the blood of infected cattle that it feeds on. The germ stays in the body of the tick and passes on into the tick's eggs. The female cattle tick engorges on the blood of its host animal. Her size increases until she is fully engorged. At this point she "falls" off and drops to the ground where she lays her eggs on dead leaves or other ground rubbish. The female tick may lay anywhere from a few hundred to several thousand eggs. After laying all of her eggs, the female tick will die.

Weather affects the egg laying process. Cold weather may retard or arrest egg laying. During the spring, summer and fall months, egg laying begins 2 to 20 days after female ticks drop off the cattle. It begins after 13 to 98 days in the winter months. The laying process is complete in about 4 days in the summer as opposed to fall when it may take as long as 151 days. The seasonal conditions were a consideration when developing a plan for eradication of the cattle fever tick. It was necessary to understand how the conditions could affect the life cycle of the tick. This knowledge can determine the appropriate eradication methods to use.

After laid, the eggs undergo an incubation period until they hatch. This incubation period may be as short as 19 days in the summer, or as long as 200 days in the fall and winter months. A small six-legged baby tick, or seed tick emerges after the incubation period. The seed tick climbs upward on grass stalks

or other vegetation. When the cattle pass by, the seed tick will reach out and climb onto the animal. The seed tick would eventually starve to death if it did not find a host. Once the seed tick reaches a host, it will attach itself to the animal where it will feed on the animal's blood. It is at this point that the germs for Cattle Tick Fever pass from the tick to the animal. The seed tick bores into the cattle's hide. The bite of the tick transmits the germs for the disease to the host. The germs get into the animal's blood stream and infect the animal with the disease. The disease can cause a high fever, the destruction of red corpuscles, an enlarged spleen, emaciation and even death. After the tick has attached itself to the animal, it will molt twice before it becomes sexually mature. After mating, the female tick will become fully engorged with the blood of the animal. The time period from the time when the seed tick attaches to the animal until the adult female tick drops off the animal may be as short as 20 days or as long as 66 days.

Live adult ticks do not pass from one cow to another. The disease is carried from a sick animal to a healthy animal by the offspring of a tick which feeds on the blood of an infected animal. The "infected" tick reproduces. Its offspring carries the disease to healthy animals. Dipping the host animal in some form of "tickicide" interrupts the life cycle of the tick. Dipping kills any adult ticks which could reproduce. Subsequent dipping will take care of any young ticks that attached to the host animal after a prior dipping. The disease can not pass to other animals without the presence of the tick (i.e., it can not exist without the tick).

Some cattle will eventually die from the disease. The loss of blood or the disease may weaken other animals. These weakened animals may later die from exposure or may fail to care for their calves. Cattle that do not die from the disease may be weak and sickly for the rest of their lives. Understanding the life cycle of the fever tick and the conditions that affect its development are useful in the development of methods for the eradication of the cattle fever tick.

In Florida, the same climatic conditions that allow the cattle tick to propagate also allow for systemic dipping at virtually all seasons of the year. A decrease in the outside temperature may slow the development of the tick. Even if no ticks are found on an animal, there may be engorged females, eggs or seed ticks on the ground that could continue the cycle. Any eradication plan must consider these facts.

II. HISTORY OF CATTLE TICK FEVER

In 1796, an outbreak of what now is believed to be Cattle Tick Fever was reported in Lancaster County, Pennsylvania. Apparently healthy cattle brought in from South Carolina mingled with northern cattle resulting in the northern cattle becoming infected with a mysterious disease. In one instance, the disease is believed to have been caused by merely placing northern cattle on ground where southern cattle had previously been penned. This strange disease seemed to occur in the summer months and disappear with the first heavy frost. This was an indication that seasonal conditions could play some role in the onset of the disease.

The disease continued to be a problem in the nineteenth century. Reports of the disease occurred in Colorado, Wyoming and Nebraska in 1844. Virginia reported the death of 300 cows in 1848. The great northern cattle drives from Texas occurred during the 1850's. Cattle losses in Arkansas, Missouri, Kansas, and some western States were as high as 50 to 90 percent. Increasing losses of cattle in northern states caused great concern. The introduction of southern cattle and the outbreak of the disease seemed linked. The disease now known as "Texas Cattle Fever," had begun to spread throughout the country. The disease was reported from coast to coast and every place southern cattle were moved to.

In 1883, the United States Department of Agriculture began work to investigate the extent of the disease and thus inaugurated the "Texas Fever Line". The line gradually extended along the 35th parallel. The line stretched from a point near Norfolk, Virginia, to a little south of San Francisco, California. The quarantine line in essence separated the tick infested areas from the tick free areas. The first national quarantine order was issued in 1889 to control the movement of southern cattle.

The relationship of the disease to a specific species of tick was discovered during this time. In 1890, the Bureau of Animal Industry established that microorganisms carried by the cattle fever tick, Boophilus annulatus, caused the disease in cattle. The first recorded observation of the southern variety, B. microplus, occurred in Key West, Florida, in 1912. Further studies determined the life cycle of the cattle fever tick, and that dipping the host animal in a arsenical dipping solution killed the tick. Cattle fever ticks found in Florida were generally B. microplus, which had a wider host range, including deer, than B. annulatus.

Southern cattle were slow to mature. As a result of tick infestation, the weight, quality and value of the beef was lowered. Hides from ticky cattle were

considered less valuable. The dairy industry also suffered losses due to tick infestation. Tick infested cows produced approximately 50 per cent less milk than if they were tick free. In 1906, it was estimated that cattle fever ticks caused economic losses, direct and indirect, of $130,500 per year. Attempts to improve cattle herds in Florida by importing high quality breeding stock resulted in a high number of cattle deaths. Tick infested cattle were considered inferior. Florida was forced to buy beef and dairy products from outside states to meet some of its needs.

Nathan Mayo, Commissioner of Agriculture, stated, in a 1926 article published in the Florida Review, that cattle ticks were costing Florida Ten Million Dollars per year. As a result of ticks, he said citizens of Florida had to purchase $14,000.00 worth of beef and $24,000.00 worth of dairy products per year. Since Florida shippers could not use cheap hay, pine needles or other packing once used, they were forced to buy wood shaving or other shipping materials. This cost the shippers the sum of $40,000.00 per year.

A national campaign to eradicate the cattle fever tick began in 1906. Dipping was chosen as the most suitable method for accomplishing the goal of eradication. Approximately 985 counties in 15 southern and southwestern states were placed under federal quarantine. The Bureau of Animal Industry, United States Department of Agriculture, had approximately 97 veterinarians in the field by the end of 1906. Only 7 of the 15 States had laws that allowed the Bureau of Animal Industry to enter into cooperative eradication programs with them.

The quarantine area consisted of approximately 729,000 square miles infested with cattle fever ticks. (Figure 1) Fifty-eight counties in Florida were under federal quarantine. Under federal quarantine, cattle could not be moved from a quarantined area across state lines unless they had been dipped in an arsenical solution and then passed an inspection procedure to be sure that no ticks were present. This policy placed a heavy burden on cattle owners by placing restriction on the sale of cattle from quarantined areas. It forced southern cattle owners to dip their herds if they wished to sell them in northern markets.

Federal personnel provided overall tick surveillance, planning, and coordination of eradication work on a national basis. The Federal personnel supervised quality control of the pesticides used by the States and set quarantine regulations for interstate movement of cattle.

State and local governments also contributed to the tick surveillance and eradication planning. Initially, the people of a county helped pay for the dipping

vats, the dipping solution, and for the dipping inspectors. The United States Department of Agriculture, without cost to the county, would send trained men to help the county build vats, mix the dipping solution, and dip the cattle.

The States purchased the chemicals used for the eradication work. They enacted quarantine regulations for the intrastate movement of livestock and other tick-infested materials. The U.S. Department of Agriculture and State regulatory agencies employed tick inspectors. Federal and State agencies provided supervisory personnel, mostly veterinarians. State and Federal regulations related to tick eradication had similar language. The Federal government provided some funding for construction of vats and for other materials. All levels of government cooperated with each other in the eradication efforts.

The top Federal official at the start of the eradication program was Dr. E. M. Nighbelt. He was followed by Dr. T. W. Cole, who was followed by Dr. Thomas Applewhite. The top State official in Florida at the start of the program was Dr. J. W. DeMilly, State Veterinarian. Dr. J. V. Knapp, who succeeded him, was responsible for coordinating the Florida's eradication program with the federal one.

Prior to May 1, 1928, southern cattle could be moved across state lines after they had been dipped once. After this date, the interstate movement of tick infested cattle was prohibited.

Approximately 80% of the original area under quarantine in 1906 was tick-free by 1929. By the end of 1936, only about 34,000 square miles remained under federal quarantine, all in Florida and Texas. The counties in Florida were Orange, Osceola, Charlotte, Hendry and parts of Collier and Polk. Deer were causing problems in Florida's eradication efforts. Florida passed legislation in 1937 to remove the deer. This legislation met with great resistance from the public. The Florida Supreme Court addressed the matter and the program to remove the deer eventually resumed.

As a result of the cooperative efforts between State and Federal agencies, the area under federal quarantine in 1942 consisted of two quarantined counties in Florida, where the presence of tick-infested deer delayed the completion of the work, and parts of eight counties adjacent to the Rio Grande in Texas, where infestation continued due to infected animals crossing over from Mexico. These counties constituted about 1% of the original quarantine area.

Florida was found to be "tick-free" by 1961. Texas continued to have reinfestations into the 60's and 70's.

III. HISTORY OF CATTLE FEVER TICK ERADICATION IN FLORIDA

Tick eradication work did not start in Florida until 1915. Aid in eliminating the tick from Dade County was requested in a letter written by Dr. J. G. DuPuis and M. A. Milan of Miami in the latter part of 1914, to the Bureau of Animal Industry, United States Department of Agriculture. A veterinarian representing the Bureau of Animal Industry was stationed in Dade County. In the absence of any specific state law, authority to deal with this issue was vested in the State Board of Health. Under their official support, an eradication campaign started in Dade and Broward Counties, and that portion of Palm Beach County south and west of the Hillsboro canal during April of 1915. These areas were released from federal quarantine March 10, 1916. Monroe County quickly followed their example and eradication work started in that county by the end of 1916. It was released from federal quarantine December 1, 1917. The remaining area in Palm Beach County began eradication work in 1917 and was released from federal quarantine December 1, 1918. By the end of 1918, these four counties were tick-free and remained the only tick-free area in Florida until 1925.

There were approximately 800 head of cattle in Dade and Broward Counties in 1915. As a result of eradication efforts, the number of dairy cattle in these two counties grew to approximately 10,000.

Tick eradication was accomplished in Dade, Broward and part of Palm Beach County without the aid of any state law on the subject. Dade and Broward Counties funded the construction of dipping vats, employed the inspectors and furnished the dipping solution. The State Board of Health furnished one supervising inspector.

From the Annual Report of 1916, Florida Cooperative Extension, District Agent A. P. Spencer reported that "...as the general supervision of all tick eradication work is directed from the Bureau of Animal Industry, the agents have not attempted systemic tick eradication. Thru their influence, however, dipping vats have been built in nearly every county. The agents are called upon to pick out a location for the vat and supervise its construction, secure materials for making the dip, and fill the vat for the first time to see that it is properly done." The dipping vats were community vats. This meant that the cattle owners in a community joined together in constructing a vat by providing either money or labor for the construction.

In 1917, the Florida legislature enacted the first state law that created a means for the initiation of eradication work. The Act of 1917 provided for a local option method for tick eradication work and created the first State Live Stock Sanitary Board. The legislation allowed each county to vote on whether they wanted to exercise their option to initiate tick eradication work in their county. In order for dipping to occur in a county, a referendum had to be passed, by a majority of the voters, in favor of compulsory systemic dipping of cattle. All authority for animal health matters transferred from the State Board of Health to the newly formed State Live Stock Sanitary Board. Records of the Florida Department of Agriculture begin with the formation of the State Live Stock Sanitary Board. The minutes of July 24, 1917, show an appropriation of $35,000 for tick eradication work.

According to an article by Dr. J.V. Knapp entitled History of Tick Eradication in Florida (Exhibit A), under the provisions of the 1917 Act, the following counties voted to initiate systemic tick eradication work: Duval, Escambia, Gadsden, Jackson, Lake, Leon, Orange, Osceola, Seminole, and Washington. The work failed. Lack of public support, sufficient funding and no means to protect an area once it was tick free, were all factors that contributed to the failure. Florida conducted no active tick eradication work from 1920 to 1923. The legislature realized that a state-wide tick eradication law was needed if eradication of the cattle fever tick was to be accomplished.

According to the United States Department of Agriculture, the number of cattle in Florida in 1920 was 880,000. Their numbers had increased to 1,195,000 by 1939.

The 1923 session of the Legislature passed a state-wide law based on the creation of the State Live Stock Sanitary Board. The Legislature provided funds for the Board to carry out the tick eradication work in cooperation with the Bureau of Animal Industry, United States Department of Agriculture. The law allowed for partial compensation to owners for dipping their cattle and created a one-half mill levy to carry out the provisions of the law. Florida was divided into sixteen Zones, each consisting of one or more counties. A natural boundary such as a river might be a boundary for a zone thus separating a county between more than one zone. Areas chosen for quarantine were bounded, if possible, by rivers, double-fenced railroads and other barriers, to maintain the quarantine. The work of tick eradication began in two widely separated portions of the state and gradually converged. Each eradication campaign was to start in March and end in

December. The eradication work was to include periodic dipping. The State employed range riders to check for undipped cattle. Dipped cattle were marked with a blot of paint on a certain part of their body. Any cow could be checked at a glance to determine whether it had been dipped. The range rider collected any undipped cattle for dipping.

At the start of the eradication program, Florida was an open range state. It was necessary to divide the open ranges into workable sized areas. By this action, livestock that had once been allowed to roam freely was confined behind fences. Dipping vats were constructed in a centralized area to accommodate the livestock owners.

In the spring of 1924, tick eradication work began in Gadsden County and Zone 13, which comprised Jackson, Washington, Bay, Calhoun, Gulf and that part of Holmes and Franklin Counties east of the Choctawhatachee River. They were released from state and federal quarantine on December 10, 1925. Exhibit B is a copy from the minutes of the State Live Stock Sanitary Board of the notice and resolution given on April 10, 1924, for Holmes County. The resolution gave the name of each dipping vat in Holmes County, and the days and dates of regular systemic dipping of cattle. Exhibit C is a copy from the minutes of the State Live Stock Sanitary Board of the notice and resolution given on April 10, 1924, for Washington County.

Systemic tick eradication work was inaugurated in Liberty and Franklin Counties in the spring of 1925. The work was completed and Liberty County was released from quarantine on December 10, 1925, and Franklin County on December 1, 1926.

Zones 14 and 16, comprising Escambia, Santa Rosa, Okaloosa, Walton and the balance of Holmes County, undertook the work of tick eradication in the spring of 1926 and were released from state and federal quarantine on December 1, 1927. The Milton Tribune reported in 1926 that the price of cattle shipped from West Florida had jumped one hundred per cent since the dipping of cattle started in March of 1926. Cattlemen began to see a potential for a profitable cattle industry in their county. Once a county was tick free, cattle owners could initiate steps to improve their herds with purebred beef bulls.

Zones 11, 12, and 15, comprising the counties of Wakulla, Leon, Jefferson, Madison, Hamilton, Taylor, Lafayette and Dixie, started the work of tick eradication in the spring of 1927. These areas were released from state and federal quarantine on December 1, 1928.

The Lake City Reporter reported in February of 1928 that inspectors for tick eradication work had been placed in Columbia County, Florida. Each inspector had a district with 12 vats. The duties of each inspector included counting cattle as the they were driven through vats and to mark the cattle with paint so all dipped cattle were identified. The State paid the salaries of inspectors and local range riders. Where the Federal government furnished part of the finances for any given project, it insisted on supervising the work.

Beginning August 1, 1928, livestock inspectors in charge of dipping vats in Florida were paid by the Federal government instead of the State. The Federal government assumed these expenses so the State could use its remaining funds for the year to build vats and make preparations for carrying on eradication work in other counties.

Systemic eradication work began in 1928, in Suwannee, Baker, Columbia and Union Counties. On November 9, 1929, Zone 10 comprising Suwannee, Columbia, Baker, and Union Counties was released from quarantine effective December 1, 1929. Systemic eradication work was conducted in Alachua, Bradford, Clay, Duval, Flagler, Gilchrist, Levy, Marion, Nassau, Putnam, St. Johns and Volusia Counties, and a part of Lake in 1930. During April of 1930, approximately 238,267 cattle were dipped or inspected in these thirteen counties. In the spring of 1931, eradication work began in Citrus, Sumter, Lake, Orange, Seminole, Brevard, Indian River, St. Lucie and portions of Osceola and Okeechobee Counties.

Mandatory dipping was initiated in Manatee County in 1932. Counties under quarantine in December of 1934 included Pasco, Manatee, Desoto, Hardee, Charlotte, Hillsborough, Pinellas, Hendry, and part of Polk and Collier. As of December of 1935, the quarantine area included Desoto, Charlotte, Hendry, Seminole, Orange, Osceola and part of Polk and Collier Counties. Between 1923 and 1935, the number of counties quarantined went from 58 to 11 counties. This progress of the eradication program is seen in Chart 1.

Eradication efforts halted in the mid-30s when the work reached the middle of the state. Systemic eradication work was failing to completely eradicate the tick. It was discovered that deer were serving as hosts for the ticks and reinfestations were occurring in areas where deer were present. This fact complicated the eradication work. State legislation passed in 1937 allowed for the removal of the deer. Many opposed the slaughter of deer and the State was enjoined from proceeding. After a legal battle was fought, the program to remove

the deer was allowed to proceed after the Florida Supreme Court upheld the validity of the State's authority. Organized deer hunting was allowed to remove as many deer as possible.

A major problem to removing the deer occurred in Hendry County in 1941. The Office of Indian Affairs, U.S. Department of Interior, refused to permit the killing of deer on the Seminole Indian Reservations. The Secretary of the Interior refused a request to permit hunting on the Reservation. The State Live Stock Board, which was a state authority, had no jurisdiction in the matter which concerned federal land. To proceed it was necessary to get the permission of the Federal government. The Audubon Society performed an independent study to determine if it was necessary to kill deer on the Seminole Reservation. Cattle were introduced within the Reservation during this time. Repeated examination of animals on the Reservation showed no evidence of ticks. The Seminole Reservation in Hendry County was released from quarantine in 1943.

Between 1939 and 1941, thousands of deer were eliminated in Collier, Hendry, Orange, Osceola, Highlands, Glades, Polk, Okeechobee, Charlotte and Hernando Counties. Many people did not believe that eliminating the deer was necessary. Some believed that the migration of ticks from the less preferred deer to the more preferred cattle allowed the dipping of the cattle to lead to the ultimate eradication of the tick. Others believed the deer to be the preferred host of the ticks. Although most evidence tends to show that the first theory was correct, the eradication program proceeded successfully after the deer were no longer present.

By December 15, 1942, the systemic tick eradication work had reduced the quarantine area in Florida to 2 quarantined counties. Systemic tick eradication progressed until Hendry and Collier Counties became tick-free and the entire state of Florida was released from quarantine in 1944. The following year ticks were discovered in counties along the Kissimmee River. Systemic dipping was inaugurated in Highlands, Glades, Okeechobee and in parts of Polk and Osceola counties in an effort to once again free Florida from the cattle fever tick. The sum of $9,000.00 was appropriated for the construction of new vats and for whatever salary funds were needed.

From 1945-1950, a total of 126 infested herds was reported in 20 counties. When dipping was deemed necessary, a dipping program was conducted and continued for 12 months after the last tick was found. State and Federal quarantines were lifted in 1950 when the eradication program was considered a success. Cattle fever ticks were discovered in Okeechobee County in 1957 after

almost a ten year absence. In the end more than 100 ranches in 10 counties were place under State quarantine. Systemic eradication work ended in September of 1958 after no cattle fever ticks had been reported since September of 1957. A total of 497 herds in 18 counties were inspected and found to be tick-free.

The last reinfestation of cattle fever ticks in Florida occurred in 1960. Cattle from Palm Beach County inspected at an Okeechobee auction were found to be carrying cattle fever ticks. A State quarantine was established. Infested herds were found in Palm Beach, Martin, Indian River and Hillsborough Counties. In October of 1961, the eradication program reached a successful conclusion. No cattle fever ticks have been found in Florida since that time.

Presently, regulations concerning the cattle tick exist but are not necessary. State law applicable to the eradication of the fever tick includes Chapter 5C-9, Division of Animal Industry, Florida Department of Agriculture and Consumer Services, which deals specifically with the cattle fever tick, and Chapter 585, Part II, Florida Statutes, which deals with animal disease inspection, control and eradication.

IV. BUREAU OF ANIMAL INDUSTRY

The Bureau of Animal Industry (BAI) was established within the United States Department of Agriculture in 1884 to prevent the exportation of diseased cattle, and to provide means for the suppression and eradication of contagious diseases among domestic animals. During the nineteenth century, there were outbreaks of a mysterious disease of cattle. A correlation between the movement of cattle from Texas into northern states and the outbreak of the mysterious disease in northern cattle was established. The problem soon took on national importance. If the cattle industry of the North was to be protected, it would be necessary to separate the infected areas of the South from the uninfected areas of the North.

In July of 1889, the Secretary of Agriculture issued the first national quarantine order establishing a federal quarantine line and controlling the movement of southern cattle. The quarantine restrictions and the enforcement of regulations, to permit the shipment of southern cattle to northern markets for immediate slaughter only, resulted in preventing the spread of the disease but did not prove beneficial in improving the condition of the cattle in the quarantine areas.

Chapter 1496, Acts of Congress 1905, empowered the Secretary of Agriculture to establish and maintain quarantine districts, and to permit and regulate the interstate movement of cattle and other livestock.

After investigating the cause of the mysterious disease, federal work to eliminate the cattle fever tick, began in 1906. Congress appropriated $82,000 for cooperative state-federal tick eradication programs. Federal Appropriations increased to $150,000 in 1908. State officials, cattle owners and the Bureau of Animal Industry cooperated in the eradication work. The standard dipping vat was found to be the simplest and fastest method for use in the eradication work. Large number of animals could be economically and efficiently treated. In 1910, the BAI chose arsenic as its recommended tick control agent. The "self-boiled" preparation was the most popular. Thousands of vats were constructed in the southern United States. Some of the vats were built by private owners but most by local, state, and federal regulatory agencies.

Not long after the use of arsenic for dipping solution began, the starch-iodine test was developed to determine the strength of the solution. It was necessary to know the strength of the dipping solution prior to dipping the animals. The solution needed to be strong enough to kill the ticks but not strong enough to hurt the

animals. As the result of testing, adjustments to the dipping solution could be made, when necessary. The Bureau provided field-test outfits to test the adequacy of the arsenical solutions being used. Systemic bi-weekly dipping of cattle in arsenical solution was required during the period from April to October.

In 1918, Chapter 212, Acts of Congress, provided for the prevention, control, and eradication of diseases of live stock. For this purpose, Congress appropriated the sum of $61,610.00 for inspection and quarantine work, including all necessary expenses for the eradication of southern cattle ticks.

Chapter 266, 1924 Acts of Congress appropriated $660,000.00 for all necessary expenses for the eradication of the cattle tick; provided that no part of the appropriation was to be used for the purchase of animals or in the purchase of materials for or in the construction of dipping vats upon land not owned solely by the United States, except at fairs or expositions where the Department of Agriculture made exhibitions or demonstrations. No part could be used in the purchase of materials or mixtures for use in dipping vats except in experimental or demonstration work carried on by the officials or agents of the Bureau of Animal Industry.

In 1935, President Roosevelt approved a work program allotment in the amount of $1,454,000.00. This sum went to the Bureau of Animal Industry for eradication of cattle fever ticks in Florida, Texas, and Louisiana.

For all necessary expenses for the eradication of southern cattle ticks, the following federal appropriations were also made:

YEAR	AMOUNT
1925	$699,451.00
1930	$747,000.00, together with $23,000.00 of the unexpended balance of the appropriation for this purpose for the fiscal year 1929.
1935	$613,940.00
1939	$504,940.00
1940	$475,000.00
1942	$276,000.00

The appropriations were used cooperatively for the payment of salaries and office expenses of veterinarians and agents in several states in the eradication of the cattle fever tick. The federal money was used for supervision, thus insuring that all requirements of the eradication program were carried out as to warrant release of areas from quarantine. A Federal Inspector was in charge of a district, which could be composed of four to six counties.

The Bureau of Animal Industry reported that Collier, Hendry, Orange, and parts of Glades, Highlands, and Osceola Counties were under quarantine in 1938. The interstate movement of cattle from the quarantined areas could only be conducted in accordance with the regulations of the Bureau. Cattle in quarantined areas where eradication work was being conducted in cooperation with State authorities, which were found to be free of ticks, could, after one dipping in an approved arsenical solution, be moved across state lines upon compliance with federal certification and dipping requirements.

According to Section 72.13, Title 9, 1938 Code of Federal Regulations, the dipping of cattle for interstate movement could only be performed in a permitted dip and at proper facilities to prevent infection after the final dipping. The permitted dip in 1938 was an arsenical solution showing a minimum of twenty-two hundredths percent of arsenious oxide in solution, as indicated by the Bureau field test. Furthermore, a proprietary brand of arsenical solution could be used if the USDA gave its specific permission. No dip would be given permission unless the Bureau was satisfied that the strength of the solution could be satisfactorily determined in the field by testing equipment, and that the dipping of cattle in a solution of known strength would eradicate the ticks without harming the animals dipped.

Certain specifications for determining the suitability of arsenical cattle dips for use included:

> "(a) The product must remain a uniform liquid when held at the temperature of 0 ° C. (32 ° F.) for 3 hours (chill test).
>
> (b) The product must be readily and completely miscible with water when added thereto in the proportion and in the manner employed for the preparation of dipping baths (solubility test).
>
> (c) The product must contain arsenious oxide within the limits of 28.2 and 30.7 grams per 100 cubic centimeter measured at 25 ° C. (77 ° F.)." (Exhibit D).

Upon the recommendation of State authorities, dipping stations in a State could be approved by the Chief of Bureau as places at which cattle of a quarantined area of that State could be inspected, dipped, and certified for interstate movement. Prior to dipping his cattle, the owner of the cattle offered for shipment, or his agent, had to execute and deliver to a Bureau inspector an application for inspection and supervised dipping. By this action the owner agreed to waive all claims against the United States for any loss or damage to the cattle as a result of the dipping.

Parts of Hillsborough, Indian River, Martin, Osceola, and Palm Beach Counties were regulated, as opposed to quarantined, in 1961. The interstate movement of cattle could only be conducted according to the provisions of Part 71 and Part 72, Title 9, Code of Federal Regulation.

In 1961, the dips permitted by the USDA for use relative to interstate movement were "(a) an arsenical dip showing a minimum of twenty-two hundredths percent of arsenious oxide in solution, as indicated by the field test for the arsenical dipping bath, and (b) a Delnav emulsifiable concentrate which must contain sufficient Delnav so that when diluted at the rate of 1 part to 200 parts water the resulting emulsion will contain 0.15 percent Delnav, as indicated by testing." No dip would be given Departmental permission for official use in cattle dipping unless it proved satisfactory to the USDA. Arsenical dipping solutions had to meet the same requirements for determination of suitability as they did in 1938.

V. LAWS OF FLORIDA

Chapter 7345, Act of 1917, created the first State Live Stock Sanitary Board (SLSSB). The Board was composed of the Commissioner of Agriculture; the Superintendent of Public Instruction; the State Treasurer; and two other members appointed by the Governor. The purpose of the SLSSB was to "collect and preserve information as to infectious, contagious, and communicable diseases of cattle, hogs and other domestic animals and their origin, locality, nature, appearance, manner of dissemination or communication and methods for treatment, prevention, suppression, eradication, quarantine and control, and to take such measures as in the judgment of the Board were necessary for the control, suppression, eradication and prevention of the spread, and to quarantine all animals they had reason to believe were affected with or exposed to any such disease".

The SLSSB had the authority to make and enforce rules and regulations to carry out the provisions of Chapter 7345. The SLSSB was to cooperate with the Bureau of Animal Industry, United States Department of Agriculture, in the enforcement of provisions of the Acts of Congress relating to diseases affecting livestock. The SLSSB could appoint inspectors of the Bureau of Animal Industry, as temporary assistant State Veterinarians and as temporary livestock inspectors. The Board was empowered to select and employ persons in any county or counties, to be known as State Live Stock Inspectors.

No compulsory systemic tick eradication work was to be carried out in any county or district of Florida before, an election was held in the county or district in which the work was to be performed, and a majority of the qualified electors voting in the election had voted in favor of the eradication work. This local option did not give the counties the power to declare what the law should be or how it would work when it became effective. It enabled each county to determine by election whether certain provisions of a statute would become operational in their county.

People could not knowingly conceal infested animals nor could infested animals be moved such that they came into contact with other animals. Section 16 of this Act empowered the Board, its agents and employees, to enter any premises in the State for the purpose of inspection, quarantine or disinfection.

Penalties were imposed for violation of this Act. Section 18 of this Act stated that "any person, who shall knowingly and willfully violate any of the provisions of this Act shall be guilty of a misdemeanor, and upon conviction thereof

shall be punished by fine not exceeding One Thousand Dollars ($1,000.00) or by imprisonment not exceeding one year or by both such fine and imprisonment".

Section 23 of this Act appropriated the sum of $150,000. It stated that "the sum of One Hundred and Fifty Thousand Dollars ($150,000) is hereby appropriated from any funds in the Treasury not otherwise appropriated for carrying out the provisions of this Act provided, however, that so much of this appropriation of One Hundred and Fifty Thousand Dollars ($150,000) as may be necessary shall be used in defraying the general expenses of the State Live Stock Sanitary Board, including the salary of the State Veterinarian".

Pursuant to Chapter 9201, Act of 1923, the legislature created and established the State Live Stock Sanitary Board. This Board was composed of seven practical livestock men who were citizens of Florida and actively engaged in the livestock industry. The members were appointed by the Governor. The Board had the authority to make and enforce rules and regulations for carrying out the provisions of this Act of 1923.

The Act declared the territory and the cattle of Florida to be infested with the cattle fever tick and divided the State of Florida into sixteen zones. The purpose of the zones was to give some order to the monumental task of a state-wide tick eradication plan. State-wide systemic tick eradication work was to begin in Zones 2 and 13, and in Gadsden County, and that part of Duval County lying west and north of St. John's river. When any zone or part of a zone was placed under quarantine, due notice was to be given by publishing the intention of the Board in a newspaper published in each county in said zone once each week for two successive weeks before the work started.

After a zone or any part of a zone was placed under quarantine, and dipping vats, fences, corrals and pens had been constructed, the Board by resolution fixed the date when regular systemic dipping of cattle would begin. The resolution contained a schedule showing each dipping vat by name or number and showed the date on which the first regular dipping was to occur at each vat, and the date of each subsequent dipping at each vat. Notice of adoption of the resolution and schedule was to be published in a newspaper published in each county in said zone once a week for two successive weeks. Every cattle owner became responsible for dipping all of his cattle at a convenient vat on the date specified by the resolution and schedule. Dipping was to be performed every fourteen (14) days until such time as the SLSSB discontinued dipping in the zone. The Board could

employ the pasture rotation method of tick eradication in conjunction with the systemic dipping method.

According to Section 11 of this Act, the Board was to pay one-half the actual, necessary and reasonable costs incurred in collecting and driving the cattle to and from dipping vats.

Section 15 of this Act imposed a special levy of one half mill on each dollar of the assessed valuation of all taxable property within the State of Florida for the year 1923. It would be a continuing appropriation.

Section 18 of this Act of 1923 stated that "the systemic dipping of cattle and the enforcement of this law shall not be in any way dependent upon the holding or result of any election".

Over the time period when tick eradication work was being conducted in Florida, the legislature appropriated funds to cover the expenses of the eradication work. There was an ongoing levy of one-half mill on each dollar of assessed valuation of all taxable property. In 1929, the legislature appropriated funds for expenses including vat construction and repair, and cattle dip and marking fluid.

APPROPRIATIONS FOR TICK ERADICATION

	1929	1930	1931
Vat Construction and Repair	$25,000	$25,000	$27,500
Cattle Dip and Marking Fluid	$19,000	$19,000	$19,000

The Statement of Receipts and Disbursements, beginning July 1, 1930, and ending June 30 ,1931, shows receipts in the amount of $227,387.64 for the Tick Eradication Tax Fund.

For the purpose of carrying out the provisions of Florida law and for paying all expenses of the State Live Stock Sanitary Board, including compensation and expenses of all employees of the Board, together with the cost of tick eradication work, a special levy of one-half (1/2) mill on each dollar of assessed value of all taxable property within Florida was levied for 1933.

The Statement of Receipts and Disbursements for the fiscal year ending, June 30, 1935, shows a treasury balance on June 30, 1935, in the amount of

$11,753.56. This amount included a balance of $725.65 and outstanding warrants in the amount of $11,027.91.

The eradication of cattle fever ticks by dipping or otherwise, in counties with a population not less than 4,500 or more than 5,000, was provided for in Chapter 17761, Act of 1937. After determining that deer, cattle or other animals were spreading cattle tick fever, or were hosts of the cattle fever tick, and that it was impractical for the ticks to be eradicated according to the usual program of dipping or other methods, the State Live Stock Sanitary Board or its cooperating bureaus, departments, or agencies, either of Florida or the United States, were to dip the cattle in the recommended solution as set by standards of the United States Department of Agriculture for dipping solutions and related matters, not in excess of six times within any calendar year and at intervals of not closer than 60 days.

Chapter 19184, Act of 1939, addressed eradication of the cattle fever tick by dipping or otherwise, in counties having a population of not less than 15,550 nor more than 16,800 persons, according to the 1935 State Census. If the results of an investigation found that deer, cattle, or other animals were spreading cattle tick fever, or were hosts of the cattle fever tick, in counties with a population of not more than 16, 800 and not less than 15,550, this Act required the State Live Stock Sanitary Board to dip cattle in accordance with the recommended standards of the United States Department of Agriculture as to dipping solutions and related matters, not in excess of six times in any one calendar year, and at intervals of not closer than sixty days.

Chapter 585, Florida Statutes, 1941, provided that when cattle owners fail or refuse to dip their cattle in accordance with the law, the State Live Stock Sanitary Board may seize and dip those cattle. The owner could redeem the cattle by paying the costs and expenses. If the owner failed to pay, the Board could sell the cattle. The Board recovered its costs and expenses from the proceeds of the sale.

In response to a question concerning the authority of the State Live Stock Sanitary Board to fix costs of dipping in the absence of any legislative appropriation for tick eradication, the Attorney General issued an opinion May 23, 1946, that included the following passage:

> "Chapter 22827, Laws of Florida, 1945, being the general appropriation act, provides $108,600.00 to cover the items of expense. Reimbursement to the cattle owners as

contemplated by Chapter 585, the construction of dipping vats, etc., are certainly proper items to be charged against expense."

According to Chapter 23775, Act of 1947, the State Veterinarian was to be an experienced expert in infectious and contagious diseases of cattle and other domestic animals. The State Veterinarian was to be the technical advisor to the SLSSB and to the Supervisor of Tick Eradication. The Board was to employ a practical live stock man in the position of Supervisor of Tick Eradication. The duties of this position were to include direct responsibility for the tick eradication work as outlined by the Board. He had the authority to adopt rules and regulations as needed in emergencies that arose between meetings of the Board.

The Supervisor could select and employ persons to be known as Live Stock Inspectors. The inspector in charge of an area had to count and mark the cows as they emerged from the vats. He had to check the strength of the dipping solution and make any necessary adjustments. It was further stated that the Board could purchase all materials, fix compensation, and incur all other expenses of whatsoever nature in connection with and required for the eradication work; provided, that any and all Live Stock Inspectors selected would be required to give a bond in the sum of $1,000.00.

Section 11 of Chapter 23375, read that whenever the Board imposed a quarantine, the Board was required to construct, or cause to be constructed, or procure all necessary vats, corals, pens and equipment. They were empowered to purchase or lease land, facilities and equipment as were needed to effectively and systematically eradicate the spread of the cattle fever tick.

A 1957 State appropriation was made in the amount of 785,000.00. The funding came from the general revenue fund of the State for the purpose of instituting and maintaining a program for the eradication of cattle fever ticks within Florida.

It is generally accepted that it is a proper exercise of police power to enact laws to prevent the spread of infectious or contagious disease among domestic animals. Authority may be delegated to governmental agencies to promulgate rules and regulations to accomplish this goal. As long as the statutes and regulations are reasonable under the circumstances, they will be construed to effectuate the purpose for which they were intended.

VI. STATE LIVE STOCK SANITARY BOARD

The first State Live Stock Sanitary Board was created by Chapter 7345, Act of 1917. The Board adopted the existing rules of the State Board of Health relating to tick eradication work. The State Live Stock Sanitary Board consisting of five members was empowered to propagate rules and regulations to carry out the provisions of the Act. This Act allowed each county to hold an election to decide whether to conduct eradication efforts in that county. When an affirmative election resulted, tick eradication work was initiated in that county.

On July 24, 1917, the State Live Stock Sanitary Board (SLSSB) appropriated $35,000 for tick eradication work. New regulations were adopted in August of 1917. Under Regulation 2, Section 4, cattle were required to be dipped every fourteen (14) days under official supervision until it was determined by inspection that the cattle and premises were tick free. The Board was required to employ an experienced expert in diseases of livestock. This person, known as the State Veterinarian. would be the chief executive officer of the Board.

Under Regulation 7 of the Rules and Regulations propagated by the Board, cattle from counties where systemic tick eradication work had not been established could be moved into counties released from quarantine if the cattle were inspected and found to be tick free, and dipped at a recognized official dipping station under the supervision of the State Veterinarian or live stock inspector before entering such released counties. Anyone who violated the regulations was subject to prosecution for each offense.

Under Regulation 14, section 3, it stated that the only recognized materials and methods to be used in systemic tick eradication work were as follows:

> "Standard arsenical solution or other approved arsenical preparation, which are recognized and conform to the arsenical test adopted by the United States Bureau of Animal Industry when used in an approved dipping vat.
>
> (a) Standard Arsenical Boiled Dip: the stock solution being diluted with nine (9) times it bulk of cold water.
>
> (b) Standard Arsenical Self-Boiled Dip (known as the S-B Dip): the stock solution to be diluted with not more than one hundred twenty-four (124) or less than ninety-nine (99) times its bulk of cold water.

(c) Proprietary Arsenical Dips recognized by the United States Bureau of Animal Industry, used in dilution prescribed on the labels."

The minutes from August 9, 1917, show an important notice concerning cattle dipping. The notice states that

"The dipping of cattle in the recognized standard arsenical solution to eradicate the tick is simple, safe and practical; however, CERTAIN PRECAUTIONS MUST AT ALL TIMES BE OBSERVED AND CLOSELY FOLLOWED." ..... "ARSENIC IS A DANGEROUS POISON and must at all times be handled and used with great care and caution. The dipping bath must be prepared as provided in these Regulations and before dipping cattle the bath must be at all times tested for the arsenic content to see that it is not too weak or too strong to injure cattle. Accordingly to effectively conduct systemic dipping of all cattle regularly every fourteen (14) days, the bath must show not more nor less than eighteen hundredths of one percent (.18%) arsons oxide by the recognized chemical test."

As a result of a local election conducted in February of 1918, the initiation of cattle dipping was adopted in Lake County. A quarantine of this county was declared effective April 1, 1918.

In March of 1918, a committee was appointed to deal with the matter of furnishing arsenic and other materials to the counties for the tick eradication work for the upcoming year.

An election was held in Palm Beach County and this county was placed under quarantine on April 17, 1918. Effective June 1, 1918, Escambia County was placed under quarantine as the result of an affirmative election on the subject of tick eradication work. Orange County was placed under quarantine on May 17, 1918.

Statistics relative to the progress of the tick eradication work are indicated in the minutes of July 10, 1918. The minutes indicate that as of July of 1917, there were 8 State and 11 County Live Stock Inspectors; and as of July of 1918, there were 32 State and 31 County Live Stock Inspectors. One hundred ninety-two

(192) dipping vats were constructed by July of 1917. This amount did not include any private vats. The number of vats constructed by July of 1918 was approximately 692.

In November of 1918, elections were conducted in Duval, Leon, Washington, Jackson, Brevard, Osceola and Seminole Counties relative to tick eradication work.

A letter from Dr. E.M. Nighbelt to Dr. J.W. DeMilly dated November 16, 1918, is contained in the minutes for November 22, 1918. Statistics for counties who voted favorably for compulsory dipping were given indicating the number of vats already established and the number of vats needed. Additional vats were to be constructed in these counties before systemic eradication work was initiated.

Counties	Vats Built	Vats Needed	Counties	Vats Built	Vats Needed
Alachua	37	50	Manatee	9	60
Bay	5	30	Marion	30	60
Brevard	12	50	Nassau	18	40
Desoto	20	100	Osceola	26	86
Duval	36	70	Pasco	10	35
Escambia	42	52	Pinellas	10	20
Gadsden	6	30	Polk	44	70
Hernando	5	30	Seminole	7	35
Hillsborough	49	70	St. Lucie	12	60
Jackson	30	50	Volusia	16	80
Leon	35	60	Washington	18	40

Total: 22 Counties, 477 Vats Built, 1178 Vats Needed

[NOTE: There is a discrepancy of 215 vats as between the 477 reported on 11/22/18 and the 692 reported on 7/10/18. Also there is a discrepancy of 12 between the 22 counties who voted favorably as reported here and the 10 counties as reported by Dr. Knapp in his article History of Tick Eradication in Florida.]

The following suggestions were found in the minutes of the meeting on August 12, 1919. These suggestions deal with the general policy of the SLSSB.

These suggestions were adopted by the Board as follows:

"(1) The efforts of the Board be confined to preliminary work, vat construction and dipping cattle, except in those counties now conducting systemic work or which have heretofore begun such work and for any reason discontinued the same.

(2) Press systemic work in the above-referred to counties to a successful completion, assigning all men (State) necessary to insure completion of the work.

(3) In the case of insistent local demand for the establishment of systemic work in any other counties to insist upon arrangements being made for local financing of the work to such amount that adequate money to complete the work may be in sight before it is commenced.

(4) To give full protection under the law to counties doing systemic work by enforcement of quarantine laws.

(5) In counties comprising contiguous territory where facilities are fully provided and where local sentiment seems to justify such action, to begin systemic work in the Spring of 1921, depending upon legislative permission for counties to provide the additional funds for the final financing of the work.

(6) In the assignment of men for preliminary work, vat construction and dipping cattle to the various counties, to take into consideration the amount of cooperation assured by the counties."

Under the authority conferred upon the State Live Stock Sanitary Board by the provisions of the Act of 1917, Chapter 7345 and Chapter 8508, Act of 1921, revised rules and regulations of the Board were approved. The recognized materials and method for disinfection of cattle in systemic tick eradication work were again set forth as before. The only recognized materials and methods for use in tick eradication work were a standard arsenical solution or other approved arsenical preparations as approved by the United States Bureau of Animal Industry. This included the standard arsenic boiled dip, the standard arsenic self-boiled dip and proprietary arsenical dips recognized by the Bureau. The movement of cattle was restricted. Cattle from counties in which no systemic work was being performed could be transported into counties in which systemic work had been

established; provided the cattle were officially inspected and found to be tick free, and dipped once.

With the legislation of 1923, the State Live Stock Sanitary Board had the power to establish and enforce quarantine lines. They could restrict, regulate, or prohibit the movement of cattle. The initiation of systemic tick eradication work did not depend on county election as it had beginning in 1917. Any land suspected of being infested with cattle fever ticks could either be entered with the landowner's permission or by force.

Section 9, Chapter 9201, Act of 1923, divided Florida into sixteen zones and granted the Board the authority to initiate and conduct systemic tick eradication work upon a program outlined by the legislature. Work was to start in two zones and progress throughout Florida until the entire state was freed of the cattle fever tick.

The Board was empowered to employ Live Stock Inspectors, and purchase all materials, and incur all expenses in connection with and required for tick eradication work.

Fines and penalties could be imposed against landowners or cattle owners who failed to cooperate with the authorities or who violated the rules and regulations adopted by the Board pursuant to this Act. Undipped cattle could be seized and sold. Section 12 of the Act of 1923 empowered the Board, its agents and employees, to enter any premises where cattle resided and take into custody any undipped cattle. The cattle were dipped, and if the cattle were not redeemed by the owner's payment to the Board for its costs in the action, the Board could sell the cattle. From the profits of the sale, the Board recovered its costs and expenses.

A Memorandum of Agreement was signed between the Florida State Live Stock Sanitary Board and the Bureau of Animal Industry, Department of Agriculture. The following is part of the Memorandum of Agreement, dated January 26, 1924.

"1. The SLSSB agreed:

(a) to designate the territory in which systemic tick eradication work was to be performed and to provide adequate facilities, equipment, inspection, and range rider forces to properly perform the work until it was completed.

(b) to enforce state regulations necessary for the protection of tick free areas, and to quarantine and prohibit

the intracounty movement of infested cattle, horses, and mules, within eradication areas.

2. The Bureau of Animal Industry, Department of Agriculture agreed:

(a) to furnish competent veterinary inspector to be known as Inspector in Charge, who would cooperate with the State Veterinarian in directing the eradication work.

(b) to furnish additional veterinary inspectors and agents to supervise the eradication work.

(c) to pay the salaries of Bureau employees and such expenses as are incurred under Bureau instructions and authorized by the United States Department of Agriculture."

The extent of the Board's power is apparent from the resolution contained in the minutes for the Board's meeting on November 9, 1929. The resolution states:

"BE IT RESOLVED, by the State Live Stock Sanitary Board of Florida that each and every 'Supervising Inspector,' agent and /or employee, who is now or may hereafter be actively engaged, enlisted or employed by the United States Department of Agriculture, in the Bureau of Animal Industry, or otherwise, in the eradication of cattle fever ticks in the State of Florida, be, and they are, each an every one, hereby made, designated, constituted, employed and appointed agents for the State Live Stock Board of Florida, to act for said Board, in its place and stead, fully and completely, in the taking into custody, dipping, penning, confining and/or quarantining cattle, not dipped by the owner, under the supervision of the State Live Stock Sanitary Board of Florida, and in accordance with the provisions of Chapter 9201, Laws of Florida Acts of 1923, and the rules and regulations adopted by said Board pursuant to said Act."

According to Section 10 of Chapter 17274, Act of 1935, any person violating any provisions of that Act or any rule or regulation made by the State Live Stock Sanitary Board, was guilty of a misdemeanor and was to be punished accordingly.

At the November 1948 meeting of the Board, a motion was carried that the Board provide dipping vats at auction markets for the purpose of dipping, in a non-arsenical solution, all cattle going through such auction or market, except cattle purchased for immediate slaughter. In December of that year, the Board discussed and carried a motion that all domestic animals going through auction markets be dipped in DDT. The necessary vats were to be constructed.

The minutes of the March 1949 meeting show that the Board members amended the above regulations. It required animals going through auction markets to be dipped, where vats were available, and sprayed, where vat construction had not been completed.

In 1949, the Board revised and published all rules and regulations relative to conducting tick eradication work. Exhibit E is a copy of the State Live Stock Sanitary Board of Florida 1949 Regulations governing eradication of the cattle fever tick in Florida.

Regulation 3 stated that "all cattle, horses, mules or asses in quarantined areas in which systemic-tick-eradication is being conducted shall be dipped regularly every fourteen (14) days until such time as it is ascertained by regular official inspection and dipping that such cattle, horses, mules or asses are free of ticks and the area is released from quarantine".

Regulation 4 stated that "all cattle, horses, mules or asses in a tick-exposed area shall be dipped or sprayed for wet inspection regularly every twenty-eight (28) days, unless otherwise directed by the Board, until such time as it is ascertained by regular official inspection, dipping or spraying that such cattle, horses, mules or asses are free of ticks".

In May of 1950, an invitation was extended for Board members to attend a meeting in Gainesville, Florida. The conference was called to discuss the use of toxophene as cattle dip in Florida, and plans were discussed for conducting a study as to why the standard toxophene formulation failed in some instances in Florida. A research project was to be conducted in cooperation with the Hercules Powder Company, producers of toxophene, William Cooper & Nephews, producers of Copper-Tox, and the Standard Oil Company, producers and users of toxophene in certain formulation in Brazil. Six different vats were requested, at which each formulation would be tested, and cattle owners were to be compensated by the company whose formulation was used.

In the Board minutes for May 1950, Mr. E.O. Friday, Supervisor of Tick Eradication, requested it be noted that "in recent years it (the Board) had used as a

tickicide a combination of DDT and BHC, followed later by the approved use of Dip #30, produced by the Dupont Company" and he asked that "two tick eradication employees, R. A. Knight and Alvin Langford, afflicted from the use of DDT and BHC", be paid for time due them for annual leave or sick leave.

At the Florida Livestock Board meeting on September 12, 1958, Dr. Campbell, State Veterinarian, Tallahassee, reported that according to information received from Carl L. Langford, Supervisor of Tick Eradication, Okeechobee, that all systemic dipping had been completed and all previously tick infested premises could be released from quarantine. There had been not ticks found since September 6, 1957.

VII. DIPPING SOLUTION

The first dipping vat was constructed on the King Ranch in Texas in 1889. The use of dipping vats seemed to be a thorough method that was simple and cheap. This method soon became the preferred choice for eradication programs. It could be used whenever large number of animals needed treatment. Arsenic was the recommended tick control agent. Thousands of vats were built in the southern part of the United States. Many of these were built by private individuals but most were built by local, state and federal agencies.

Prior to the passage of any Florida law on the matter of tick eradication, some Florida counties had begun to initiate eradication programs. Dade, Broward, and part of Palm Beach County undertook eradication work in 1915. Monroe County would follow their lead in 1916. They provided the funding for the construction of dipping vats and furnished the dipping solution. The dipping vats were community vats. There were located in a centralized location accessible to as many cattle owners as possible.

Florida's Acting State Veterinarian, J.W. DeMilly, issued a notice in 1917 stating that arsenic was a simple, safe and practical method for use in tick eradication work. He emphasized that arsenic was a dangerous poison and that great caution should be used at all times when handling it. (Exhibit F).

With the passage of legislation in 1917, the counties were able to vote on the issue of whether to exercise their option to initiate an eradication program in their county. The regulating agency, the State Live Stock Sanitary Board, promulgated rules and regulation to be followed in the eradication work. These rules and regulations included what conditions had to be met for the movement cattle from one area to another and what types of dipping solutions could be used. Dipping vats had to be constructed before eradication work could begin. According to the minutes of the Board, at least 477 dipping vats had been constructed in 22 counties by the end of 1918.

Animals were generally dipped every 14 days over a year period or a little more until all animals were free of the ticks. The animals were inspected prior to discontinuation of dipping programs.

According to the Perry Herald in 1926, more than a dozen vats were built in 1919 in Taylor County, Florida, under the direction of the Board of County Commissioners. Additional vats were to be built before January 1, 1927, bringing

the total number of vats to about forty. J. R. Mathis had the contract for the additional vats and was one of the contractors for the vats built in 1919.

The Madison Enterprise-Recorder in 1926 stated that the Florida State Live Stock Sanitary Board reported the construction of a dipping vat to be built in Jefferson County near Lake Miccosukee.

In 1926, the tick eradication work, construction of vats and charging the vats was under the general supervision of Dr. J. J. Vara, with J. C. Peter in charge of Wakulla County; J.W. Carlton in charge of Jefferson County, and R. B. Thompson in charge of Madison and Hamilton Counties.

In January of 1927, a notice of bid on cattle dip was published in Florida papers. Bids were to be based on a minimum of 100,000 gallons of dip for the year. The dip had to be the standard arsenic based cattle dip as approved by the USDA, Bureau of Animal Industry.

The federal government required arsenical dips to be used when interstate movement of cattle was involved. Initially, arsenical solutions were prepared by dissolving white arsenic in water. Other preparations were used, but the most popular was the "self-boiled" method. A stock solution was prepared in 5-gallon batches and diluted to the desired concentration of arsenious oxide (0.18 to 0.22%). A test was developed to assay the strength of the solution. Adjustments to the solution could be made as a result of this simple test. Stock solutions containing cresol replaced "homemade preparations. The cresol helped to inhibit the growth of microorganisms, thus preventing the biochemical alteration of arsenic to a less toxic form. For about 60 years, arsenic was the only product officially approved by the USDA for tick eradication work. Dioxathion was officially permitted for tick eradication work in 1960, coumaphos in 1968, and toxaphene in 1972.

The Florida State Live Stock Sanitary Board took bids from firms to supply the State with the chemicals for the dipping solution. An example of this practice is shown by a notice published in the Florida State News on December 23 and 30, 1928. (Exhibit G) It was an invitation to all firms desiring to bid on the Board's requirements for cattle dip for the year 1929. The bids were to be based on a minimum of 10,000 gallons for the year. Bidders were required to submit certain information and guarantee their product in accordance with the following:

A) name of the product as listed with the Bureau of Animal Industry, supported by evidence that said product has been approved by the USDA for official use in cattle dipping for the eradication of the cattle fever tick.

B) coefficient of strength which is the quantity of water to which one gallon of dip added will produce a resultant dipping solution showing the desired strength, by field test, of 0.18% arsenous oxide.

C) all dipping solutions were to be packed in five gallon containers, a description of the container being incorporated in the bid.

The minutes from the SLSSB meeting on January 10, 1930, detail the names and companies who spoke to the Board in relation to products and services being offered. The contract for the Board's requirements for cattle dip for the year 1930 was awarded to William Cooper & Nephews, Inc., Chicago, Illinois.

Arsenic solutions had some disadvantages. There was a narrow tolerance between the effective concentration needed for tick eradication and the toxic concentration for cattle. Arsenic was gradually phased out due in part to the lack of highly sensitive analytical methods for detecting arsenic and cresol residues in animal tissue.

Arsenical dipping solutions were used throughout the eradication campaign in Florida. Until the mid-1940's only arsenical dip solutions were used in Florida. Experimentation led to the use of toxaphene (Coopertox), arsenic with DDT or BHC added, and DDT with BHC. The DDT-BHC mixture, Dip #30, was a preparation of 38% DDT and 15% BHC. Florida began to use DDT, benzene hexachloride (BHC), Coopar-Tox, and DuPont's Dip 30, along with arsenical dips in the late 1940's. A test study program was conducted in 1950 using toxaphene.

After a reinfestation of the fever tick in Florida in the late 40's, dipping vats were filled with 0.5% DDT plus 0.03% gamma benzene hexachloride. Use of this mixture was discontinued because of high residues of the chemicals in the tissue of animals.

All domestic animals going through livestock auction markets after the end of 1948 were required to be dipped in DDT. Dipping vats were to be provided at each auction market. In 1949, the Board amended this regulation to say that animals going through livestock auction markets were to be dipped, where vats were available, and sprayed, where vat construction was not complete.

In June of 1949, interest was expressed regarding Dupont Livestock Spray Dip #30. It consisted of DDT 38.1 %, BHC gamma isomer 2.3%, other BHC

isomers 12.2%, and inert ingredients 47.4%. The first shipment of Dip #30 was made to Orlando, Florida, on June 6, 1949. Cooper-Tox or DDT-BHC was used, in certain instances at 21- and 28-day intervals, in the fall of 1949.

In 1950, some vats were filled with chlorinated hydrocarbons (DDT and/or BHC) of both the wettable powders and emulsion types. In 1952 and 1953, cattle at auction markets were dipped in a DDT-BHC dip solution.

Dip #30 was used exclusively during the reinfestation of cattle tick fever in 1957. Animals were dipped in Dip #30 at 21-day intervals.

In 1960, CFR Part 72 was amended to add dioaxathion (Delnav) to the list of permitted tick dips. During the 1960-61 reinfestation, arsenical dipping solutions were used on dairy herds at 14-day intervals; toxaphene at 21-day intervals was used on all beef herds (with the exception of one herd where Delnav was used) and Delnav (Del-Tox or dioxathion) was used at auction markets.

The public's concern over tissue residues left from dipping solution lead to the search for a solution that would allow cattle dipped at action markets to go for immediate slaughter. It became apparent that the BHC-DDT could not be used for this purpose and a malathion dip was considered. The BHC-DDT solution left high levels of residue of the two insecticides in the tissue of the animal. Delnav was chosen as a result of this search.

Field work was performed with Delnav. In October 1960, Delnav was added to the list of permitted tick dips (as an immediate kill agent only). Further field tests in 1961 proved unsatisfactory and its use was discontinued.

The basis for the arsenical dips was arsenic trioxide. It has a half life in soil of 6.5 years. DDT, dichloro-diphenyl-trichloroethane, was first synthesized and described by Zeider in 1874. It was first prepared as an insecticide by Mueller in 1939. DDT was patented in 1942 and released for commercial use in 1945. It has a half life in soil of 2 to 15 years. Toxophene also known as chlorinated camphene shows moderately high levels of acute toxicity, being four times as toxic as DDT. It is readily absorbed through the skin. Toxophene has a half life in soil of 1 to 14 years. As a result of rainfall, these compounds may move into groundwater and exceed acceptable standards.

VIII. DIPPING VATS

From Cattle Tick Eradication by Charles F. Dawson, M.D., D.V.S., reprinted from the Twenty-Fourth Annual Report of the State Board of Health (the predecessor of the State Live Stock Sanitary Board), it was stated that:

> "the dipping vat method is the method par excellence for destroying ticks as well as other vermin that may infest live stock, and is the method that the federal government recommends most highly, because it admits of a thoroughness that is impossible by any other method.
>
> A dipping vat consists essentially of a two thousand gallon cement tank built into the ground and filled with an arsenical solution composed of white arsenic, , eight pounds; washing soda, twenty-four pounds; pine tar, one gallon; to every five hundred gallons of water."

The March 1913 publication of the Twenty-Fourth Annual Report (Exhibit H) included an excerpt from Circular No. 183, Bureau of Animal Industry, which was entitled Construction Of A Dipping Vat. The following is a summary of that part of the report that relates to the dipping solution and charging the vat.

Arsenical dips were favored due to their efficacy, cheapness, ease of preparation and lack of significant injury when used and prepared properly. The most commonly used formula for arsenical dip was as follows:

Arsenic Trioxide (white arsenic)	8 pounds
Sodium Carbonate (washing soda)	24 pounds
Pine Tar	1 gallon
Water (enough to dilute solution to a final volume of 500 gallons)	

Sal Soda = Sodium Carbonate

A stronger dipping solution was required by regulations of the Bureau of Animal Industry for the dipping of cattle that were to be shipped across state lines from quarantine areas. This dipping solution used 25 pounds of sodium carbonate and ten pounds of arsenic trioxide in place of the amounts given in the above formula.

The dip was prepared by dissolving the sodium carbonate in thirty or forty gallons of boiling water in a large caldron or galvanized tank. The arsenic trioxide was added and dissolved by stirring. The solution was cooled to 140 degrees Fahrenheit. The pine tar was added in a fine stream while constantly stirring the solution. After the solution was mixed thoroughly, water was added to dilute the solution to 500 gallons. A larger amount of solution could be prepared using the same proportions.

The arsenical solution could be poured into the dipping vat as soon as it had been prepared until the amount required to fill the vat, when properly diluted, had been reached. Water was added to dilute the solution to the required volume. For example, if the vat held 2,000 gallons then the above formula would be prepared four times, placed into the vat and the vat was filled with water to make a final volume of 2,000 gallons. The amount of arsenical solution prepared depended on the capacity of the vat used. If the capacity of the vat was unknown it could be calculated and for future reference marked on the wall of the vat.

A stock solution could also be used to prepare the dipping solution. The stock solution might contain the quantity of ingredients for 500 gallons dissolved in 50 gallons of water. The dipping solution was prepared by diluting the stock solution with 450 gallons of water for a final volume of 500 gallons.

The arsenical solution was left in the vat and used repeatedly, replenishing it with the proper quantities of water and ingredients. When the solution became filthy due to dirt and manure carried into the vat by the animal, the vat had to be emptied, cleaned and filled with fresh solution. The frequency of this procedure would depend on several factors including the number of animals dipped and the frequency of the dippings. Over the course of time the efficiency of the solution would decrease due to the gradual oxidation of the arsenic. It was advised that the vat be recharged every four to six weeks regardless of the cleanliness of the dip solution.

Before the vat could be emptied, the solution inside had to be rendered harmless. It was necessary to first determine the approximate amount of solution left inside the vat. For every 100 gallons of dipping solution left inside the vat, six pounds of slacked lime must be added to the solution in the vat. The whole solution was to be mixed thoroughly and allowed to stand several hours. Six pounds of commercial copperas (sulphate of iron), for every 100 gallons of solution in the vat, was to be dissolved in hot water. This hot copperas (iron) solution was added to the vat and the whole was mixed thoroughly and allowed to stand for ten

to twelve hours. The process taking place is the bonding of the arsenic to the iron that results in precipitation. The precipitate would fall to the bottom of the vat leaving a clear liquid on top. The directions stated that the clear liquid should not contain any arsenic and could be pumped, or siphoned out onto the ground. The precipitate should be harmless, insoluble matter. The precipitate or sediment could be taken out of the vat and buried, if desired, although it should be non-poisonous.

After each dipping it was recommended that the position of the surface of the dip solution should be marked for future reference. Before the next dipping any change in the level of the dip solution should be noted. If the level had gone down and the vat was not leaking, the loss was most likely due to evaporation. Water should be added to the vat to bring the level back up to the mark made after the last dipping. The evaporation of water would increase the strength of the solution and it was necessary to return the dip to its former strength. If the decrease in the level of the solution was due to leaking, the strength of the solution should be unchanged and water alone should not be added. If the level had increased due to rain, the amount of water added to the vat should be calculated. One gallon of the stock solution previously mentioned was to be added for every additional nine gallons of water present.

To eradicate the ticks, all the cattle and any other animals (mules, horses, etc.), which could harbor the cattle tick, had to be dipped, at regular intervals, until there were no more ticks detected. The purpose of the repeated dipping was to kill as many of the adult ticks as possible. The short interval between dippings was to prevent the ticks from maturing and producing more ticks. An interval of two weeks was considered the most satisfactory.

When the vat was not being used, a cover was to be placed tightly over the vat to prevent any evaporation of water or the dilution of the dipping solution by rain.

The following summarizes what the report had to say on the specifics of vat construction:

The area where the dipping vat was to be located should be dry and large enough to accommodate the dipping vat, the chute, the dripping pen and at least two other pens -- one for holding the animals prior to dipping and the other to hold the animals after dipping until sufficiently dried.

The excavation for the vat should be 1 foot longer and 1 foot wider than the inside dimensions of the vat and should conform to its shape. The inside dimensions were as follows: Length at top of vat, 26 feet; bottom, 12 feet. Width at top, 3 feet; at bottom, 1 1/2 feet. Depth, 6 1/2 feet. (Figure 2) The sides and bottom of the excavation should be firm and solid, as they would serve as the foundation for the mold when the concrete was poured. The stability of the concrete depended on a well-defined foundation.

The mold for the dipping vat had to be set and thoroughly braced into place. Wooden forms were to be constructed of 1-inch boards and 2 by 4 inch braces. The sides and end walls should be 8 inches higher than the surface of the ground.

The concrete was to be made with 1 part of cement, 2 1/2 parts of sand and 5 parts of broken rock or gravel. The cement should be of a standard brand of Portland, the sand should be clean and coarse, and the broken rock should be 1/4-inch pieces to not larger than will pass in every direction through a 1-inch ring. The concrete could be mixed in a tight wooded platform or box. A convenient batch size consisted of 2 bags of cement, 1 measure (5 cubic feet) of sand, and 2 measures (10 cubic feet) of stone. The sand and stone were to be measured by the use of a bottomless box, 2 1/2 feet long by 2 feet wide by 1 foot deep, having a capacity of 5 cubic feet.

After the sand was measured, the cement was to be added. The two materials were thoroughly mixed together. Water was added to this dry mixture to form a mortar. The stone was measured out and drenched with water. The sand-cement mortar mixture was spread into a thin layer and the wettened stone shoveled on top of it. The stone was mixed into the mortar mixture until it is thoroughly coated.

The concrete for the bottom and incline should be laid first. It should have a consistency such that water will flush to the surface on ramming. The concrete for the sides and end should be very wet and have a consistency such that it will run off the shovel unless handled quickly. The concrete for the sides and end were to be "puddled" into place. It was advised the laying of the concrete be done in one operation so that there were no joints between old and new work. The form was removed only after the concrete had thoroughly set. This could be as soon as 24 hours. In damp weather, the form should remain for at least 48 hours if not more.

A surface coat should be applied to the walls and floor by dampening them thoroughly and covering the entire exposed area of the walls and floor with a one-

inch thick coat of cement mortar mixture of 1 part cement and 2 parts sand. This coat was to be floated and trowled to a smooth finish. The vat could be waterproofed by painting the surface with a good hot pine tar or after the mortar coat has hardened the inside may be painted with an oil-cement paint. The ground around the vat had to be dry in order for the waterproofing to be satisfactory. If ground water was present around the vat, painting the surface of the vat would not give satisfactory results.

The exit incline had a false wooden floor. Iron bolts were to be embedded into the dirt before the concrete for the incline was laid. Two by four scantings were place at the top, center and bottom of the incline. The bolts should extend through the scantings, the head placed next to the dirt, and they should be long enough to extend through the concrete and the inch boards of the floor so that the wooden floor could be securely fastened.

After the animal had gone through the dipping vat, it would walk up the exit incline into the dripping pen. The dripping pen, 12 by 15 feet with a concrete floor, was prepared as described for the vat and laid in a similar manner. The floor should have a rough consistency so that the animal will not slip. The floor was to be pitched to one corner of the pen, where a pipe laid into the floor carried the excess dipping solution (drippings) into a barrel sunk into the ground. Collected drippings could be returned to the vat.

The chute leading to the dipping vat should be 20 feet long and 2 1/2 feet wide. Any other pens should be a sufficient size to accommodate the all the animal to be dipped.

The cover for the vat should consist of two leaves hinged on posts along each side of the vat. When the leaves were open they may serve as splash guards. There should be removable doors to close off the triangular opening left when the cover was closed.

More detailed information concerning vat construction can be found by referencing Construction of A Dipping Vat, contained in March 1913 publication. 103.

Regulation 6, 1930 Florida State Live Stock Sanitary Board, dealt with designated dipping stations. According to Section 1, Regulation 6, the Board would approve privately owned facilities for use in tick eradication work. The facilities had to have "a properly equipped dipping vat, noninfectious pens, constructed in accordance with Section 2 of this Regulation and a roofed or

covered section of pens of sufficient size to protect all dipped animals from exposure to rain or sun." The alleys, chutes or pens had to be paved or properly floored.

The text of Section 2, Regulation 6, is as follows:

"(a) The outside fences inclosing such pens, and the fences on either side of the alleys, chutes, and platforms leading thereto, shall be tight board fences not less than 6 feet high on the inside.

(b) If such pens, alleys, chutes, and platforms are adjacent to pens, alleys, chutes, and platforms used by cattle of the quarantine area, there shall be between them a space not less that 10 feet wide, which shall be inaccessible to live stock. This space shall be limited on each side by the 6-foot fence required by specification (a). The remaining space around such yards shall be limited as in specifications (c) following.

(c) If such pens, alleys, chutes, and platforms are isolated from other pens, alleys, chutes, or platforms, there shall be built and maintained outside thereof on all sides to which cattle of the vicinity might otherwise approach a cattle proof fence not less than 5 feet high and not less than 15 feet from the 6-foot fence required by specification (a).

(d) The only means of egress from such pens shall be by way of the alleys, chutes, and platforms inclosed by 6-foot fences as required by Specification (a), to cars for re-forwarding; and under no circumstances shall there exist any connection between such pens and other adjacent premises.

(e) Such noninfectious premises shall be so located, or such drainage facilities shall be provided therefor, that water from the surrounding area will not flow on to or through them."

According to Section 3, Regulation 13, the only recognized materials and methods for disinfection are the same as those stated in Section 3, Regulation 14, of the Rules and Regulations propagated by the Board in 1917 (See Page 21 of this Report).

Exhibit I consists of copies of various views of the 1949 revised blue print for a standard cattle dipping vat approved by the Florida Live Stock Sanitary Board. The original is located in Department of Agriculture and Consumer Services (DACS) file: Dipping Vats (old info). The inside dimensions were as follows: Length at top of vat, 28 feet; bottom, 14 feet. Width at top, 3 1/2 feet; at bottom, 1 feet 8 inches. Depth, 6 1/2 feet. After the animal had gone through the dipping vat, it would walk up the exit incline into the dripping pen. The dripping pen was five sided with a sloped floor and 1 1/4 feet drain pipe. It had three consecutive 10 feet sides and two 4 1/2 feet sides. The chute leading to the dipping vat should be 20 feet long and 2 1/2 feet wide. Also contained in DACS file: Dipping Vats (old info) is a 1957 revised blue print for a standard cattle dipping vat approved by the Florida Live Stock Board. It has similar proportions.

Approximately 3500 cattle dipping vats were constructed in Florida between 1910 and 1958. A list of over 3200 dipping vats constructed in Florida has been placed on the "Mercury!" computer bulletin board that is a public access bulletin board at (904)487-0461. A modem is needed to access the information. Set the modem to 2400 baud, 8-N-1, using ANSI or VT-100 terminal emulation. The file containing the information is FL_CDV.EXE. Some of the sites have been located and are currently under investigation. Some of the vats were discovered through environmental audits done relative to property transfers. The Department of Agriculture and Consumer Services has notified the Department of Environmental Protection of several vats on state property. The list is updated periodically when more information becomes available. Most of the vats listed are from old records of the State Live Stock Sanitary Board, which listed each vat as it was put into operation.

The Department has located some of the vat sites and some of those sites have been investigated. Analytical results of sampling are reported along with other information about the vat sites. The information provided by the FL_CDV file includes the city and county where the vat is located, the type of sampling done (if sample taken), the contaminant(s) discovered, and the level of contamination. Only about 20 sites have had some form of sampling performed to date. Excessive levels of chemicals have been detected at some of these sites.

Facility Name	Contaminant	Maximum Level
AREC Brooksville	Arsenic (Soil)	35.8 mg/kg
Walker Ranch	Arsenic (Groundwater)	220 ug/L
San Felasco Hammock	Arsenic (Soil)	77 mg/kg
San Felasco Hammock	Arsenic (Soil)	77 mg/kg
San Felasco Hammock	DDT (Soil)	90000 ug/kg
San Felasco Hammock	DDT (Soil)	90000 ug/kg
San Felasco Hammock	Toxaphene (Soil)	660000 ug/kg
San Felasco Hammock	Toxaphene (Soil)	660000 ug/kg
Atlantic Gulf Communities	Arsenic (Groundwater)	1340 ug/L
Atlantic Gulf Communities	DDD (Groundwater)	280 ug/L
Atlantic Gulf Communities	DDE (Groundwater)	150 ug/L
Atlantic Gulf Communities	DDT (Groundwater)	225 ug/L
Atlantic Gulf Communities	Arsenic (Pit Water)	31600 ug/L
Atlantic Gulf Communities	Arsenic (Sediment)	68 mg/kg
Atlantic Gulf Communities	Arsenic (Sludge)	5491 mg/kg
Atlantic Gulf Communities	DDT (Sludge)	1010000 ug/kg
Atlantic Gulf Communities	Arsenic (Soil)	1010 mg/kg
Atlantic Gulf Communities	DDD (Soil)	47000 ug/kg
Atlantic Gulf Communities	DDE (Soil)	450000 ug/kg
Atlantic Gulf Communities	DDT (Soil)	6375000 ug/kg

For those vats that have not been discovered, the facility name and site description listed were taken from DACS records. Some private vats may have existed which were not listed by the State Live Stock Sanitary Board. Also, some boundaries may have changed since the vats were first listed.

IX. INDEX TO ATTACHMENTS:

Chart 1 - Prepared Chart of Quarantined Counties.

Exhibit A - History of Tick Eradication in Florida, Florida Grower, December 1928.

Exhibit B - 1924 Notice and Resolution for Holmes County.

Exhibit C - 1924 Notice and Resolution for Washington County.

Exhibit D - Section 72.13, Title 9, Code of Federal Regulation 1938.

Exhibit E - State Live Stock Sanitary Board 1949 Regulations.

Exhibit F - August 9, 1917 Minutes of SLSSB, Important Notice.

Exhibit G - January 8, 1929 Minutes of SLSSB.

Exhibit H - Cattle Tick Eradication, from March 1913, Publication 103.

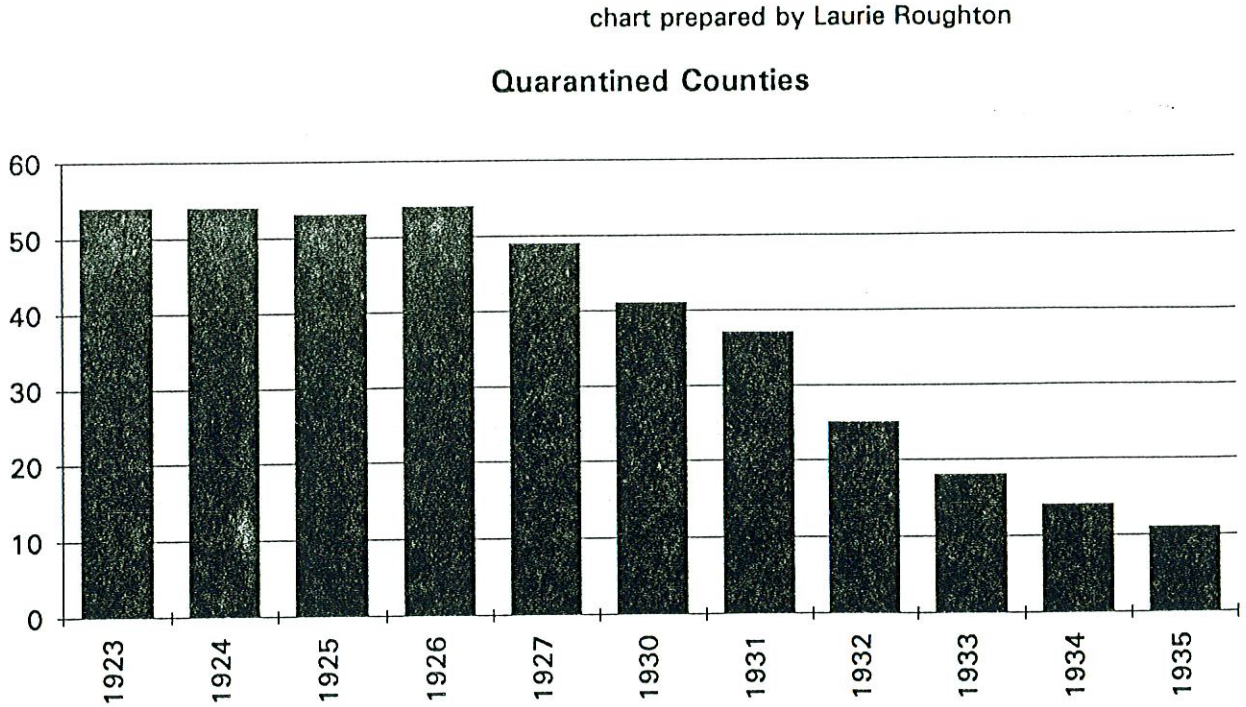
Exhibit I - Copy of blueprints for 1949 Standard Cattle Dipping Vat.

Figure 1 - Copy of Map of quarantined area in 1906.

Figure 2 - Copy of cattle dipping vat from Cattle Tick Eradication, March 1913 Publication 103.

CHART.1

chart prepared by Laurie Roughton



CHART

1

History of Tick Eradication in Florida

Expect to Complete Work in State by 1935

By Dr. J. V. Knapp

Prior to 1915 Florida, as a state, had taken no active interest in cattle tick eradication. One or two veterinarians, representing the United States Bureau of Animal Industry, had made visits to the State and interested a few cattlemen in the construction of dipping vats.

In the latter part of 1914, Dr. J. G. DuPuis and Mr. M. A. Milam of Miami, Florida, wrote the Bureau of Animal Industry at Washington and requested bureau cooperation in tick eradication in Dade county. In compliance with this request a veterinarian, representing the bureau, was stationed in Dade county in April, 1915. There was no specific state law at that time on tick eradication, the State Board of Health having jurisdiction of animal diseases as well as the diseases of humans. The State Board of Health furnished one inspector and Dade and Broward counties financed the building of vats, employed the inspectors and furnished the dipping solution. During 1915 Dade county, Broward county and that part of Palm Beach county south and west of the Hillsborough Canal, conducted systematic tick eradication work and was released from federal quarantine March 10, 1916.

Monroe county was the next to undertake tick eradication, conducting the work during 1916 and the early part of 1917 and was released from federal quarantine December 1, 1917. The remainder of Palm Beach county, which includes the present Martin county, undertook the work in 1917 and was released from federal quarantine on December 1, 1918.

It will be observed that tick eradication was accomplished in Dade, Broward and a portion of Palm Beach county without the aid of state law on the subject. The work in Monroe and the northern part of Palm Beach county was assisted by the state law of 1917 which created the first State Live Stock Sanitary Board and provided for local option tick eradication.

At the time tick eradication was undertaken in Dade and Broward counties, there were less than 800 head of cattle in that area and it was common belief that cattle would not do well on the East Coast of Florida. However, since tick eradication, that area has developed to be one of the principal dairy sections of the state and now has in the neighborhood of 30,000 head of dairy cattle, among which are some of the finest registered herds in the United States.

Under the provisions of the 1917 act, which was amended in 1919 and 1921, the following counties voted to conduct systematic tick eradication work: Escambia, Washington, Jackson, Gadsden, Leon, Duval, Seminole, Orange, Lake and Osceola. The work in these ten counties was unsuccessful, due to the opposition of the people and the inadequacy of the law and from 1920 to 1923 there was no active tick eradication work carried on in Florida.

In the spring of 1923 the legislature revised and also created a new State Live Stock Sanitary Board and granted said board authority to conduct statewide tick eradication upon a program outlined by the legislature. There being practically no money available to this board during 1923, there was little accomplished that year, but in 1924 Gadsden county and Zone 13, comprising Jackson, Calhoun, Gulf, Bay, Washington and that part of Holmes and Franklin counties east of the Choctawhatchee River, conducted systematic tick eradication work and were released from state and federal quarantine December 10, 1925.

Systematic tick eradication was conducted in Liberty and Franklin counties in 1925, which resulted in the release of Liberty county December 10, 1925 and Franklin county December 1, 1926.

Zones 14 and 16, comprising Escambia, Santa Rosa, Okaloosa, Walton and the balance of Holmes county, undertook the work of tick eradication in the spring of 1926 and were released from state and federal quarantine December 1, 1927.

In the spring of 1927 systematic tick eradication was inaugurated in Zones 11, 12 and 15, comprising the counties of Wakulla, Leon, Jefferson, Madison, Hamilton, Taylor, Lafayette and Dixie. This entire area will be released from federal quarantine December 1, 1928.

Systematic work is now in progress in Suwannee, Columbia, Baker and Union counties, which territory should be released in 1929.

The tick free area of Florida at the present time consists of 18 counties, all of which have been released from state and federal quarantine, with the addition of the eight counties between the Ochlockonee and Suwannee Rivers to be released from state and federal quarantine December 1 of this year, will make a total of 26 tick free counties in the state, which is approximately 45 per cent of the state.

The program of the State Live Stock Sanitary Board in its effort to eliminate the cattle fever tick from Florida is to work each succeeding year as much tick infested area, adjacent to the tick free area just completed, as their funds will permit and we estimate with the one-half mill levy now in effect for tick eradication purposes that the entire state should be tick free by 1935 or not later than 1936.

The principle of tick eradication is based on the studies of its life cycle which show us that the tick's life is divided into two periods. First, the parasitic stage, during which time the tick is found as a parasite on the cattle and, second, the non-parasitic stage, during which time the tick is found on the vegetation on the ground. It is obvious that we can not treat all the territory in the State of Florida to eliminate the tick from the vegetation on the ground, therefore, our attention is directed to attacking the tick during the period of time that it is found upon the cattle. Further, as its non-parasitic stage on the ground does not have opportunity to get upon the cattle that it will ultimately die of starvation, therefore tick eradication resolves itself into the problem of killing all ticks that get onto cattle in a given area so that none drop to the ground to reproduce themselves. If we carry this process on long enough it will result in the death of all the ticks by starvation that are on the ground and in the meantime, through the regular 14-day dipping of cattle, all the ticks will have been killed that have attached themselves to the cattle and tick eradication in that area is complete. Ticks in their non-parasitic stage on the ground will live for a period of seven to nine months, therefore it is necessary to dip the cattle for a period of time sufficient to starve the ticks to death which are on the ground. If it were possible to dip 100 per cent of the cattle in a given area every 14 days, it would only require seven to nine months to eradicate the tick but in view of the physical impossibility of getting 100 per cent of the cattle dipped every dip day when you are dealing with hundreds of thousands of cattle, it requires for practical purposes a dipping of the cattle for a period of 12 to 15 months to eliminate the tick.

The history of the cattle industry in Florida shows that it has never been really profitable. This is unquestionably due to the fact that the cattle of this state are tick infested and their movement to open markets restricted. The fact that our cattle were ticky has also prohibited us from developing the industry through the introduction of pure bred bulls, as a great majority of such animals, when brought into contact with ticks will die. Therefore it has been impossible for the Florida cattleman to increase the quality of his cattle.

As an example of what tick eradication will do for the cattle industry in the areas where ticks have been eliminated and the cattlemen given the advantages of the open market, they have been and are receiving from 35 to 50 per cent increase for their cattle of equal grade and have become so enthused with the outlook of the cattle industry that the open range cattle owners living in that part of Florida west of the Ochlockonee River have purchased, during the past two years, over 200 head of pure bred bulls of the various beef types which they have placed on the range with the native Florida cows for the purpose of breeding up their cattle. Calves, the result of this breeding, show weights of approximately 450 pounds at six to eight months of age and many of them at a year old are larger than their mothers.

Invariably when a county completes the work of tick eradication her citizens, who are cattle owners, purchase a carload or more of pure bred bulls. Time sufficient has elapsed to demonstrate that the introduction of pure bred bulls is not a fad but the means of developing a Florida beef animal of size and quality and, if tick eradication goes on to a conclusion in the state and is followed by the introduction of pure bred bulls the state should, within a period of ten years, be producing a type of beef that is

EXHIBIT

A

N O T I C E

TO WHOM IT MAY CONCERN:

Notice is hereby given, that on the 10th day of April, A. D., 1924, the State Live Stock Sanitary Board of Florida in regular meeting assembled, acting pursuant to, and in accordance with, Chapter 9201 of t Acts of the Legislature of the State of Florida, of the year 1923, adopt ed and passed the following resolution:

R E S O L U T I O N

"Whereas, the State Live Stock Sanitary Board of the State of Florida, acting pursuant to, and in accordance with, Chapter 9201, Acts of the Legislature of the State of Florida, of the year 1923, has heretofore by resolution duly adopted by said Board, placed under quarantine Zone No. which includes that part of Franklin County lying west of the Apalachico River, all of C alhoun County, all of Jackson County, that part of Holme County lying east of the Chotawhatchee River, all of Washington County, all of Bay County, and that part of W alton County lying east and south of Chotawhatchee River and Chatawhatchee Bay and East Pass, and has give due notice of the establishment of such quarantine as required by said Chapter 9201, and all necessary dipping vats, fences, corrals and pens have been constructed in Holmes County which is a portion of said Zone No. 13;

"NOW, THEREFORE, BE RESOLVED, by the State Live Stock Sanitary Board of the State of Florida, in regular meeting assembled, this 10th day of April, A. D., 1924, that regular systematic dipping of cattle shall be held in said Holmes County which is a portion of said Zone No. 13, at each of theofficial dipping vats located in said Holmes County, on the days and dates respectively hereinafter set opposite the name of each such dipping vats, respectively. The nemes of each of said dipping vat in said Holmes County, and the days and dates of regular systematic dipping of cattle thereat, are as follows:

HOLMES COUNTY

Mavie Vat	May 6 and every 14 days thereafter.
Lindsay Still Vat	May 7 and every 14 days thereafter.
Lee Anderson Vat	May 8 and every 14 days thereafter.
Jim Brock Vat	May 9 and every 14 days thereafter.
Broadaker Vat	May 10 and every 14 days thereafter.
McLaughlin Vat	May 13 and every 14 days thereafter.
Davis Still Vat	May 14 and every 14 days thereafter.
Fulford Vat	May 15 and every 14 days thereafter.
Kelley Vat	May 16 and every 14 days thereafter.
Jackson Vat	May 17 and every 14 days thereafter.
Pate Vat	May 9 and every 14 days thereafter.
Live Oak Vat	May 13 and every 14 days thereafter.
Noma Vat	May 6 and every 14 days thereafter.
Esto Vat	May 7 and every 14 days thereafter.
W ells Vat	May 8 and every 14 days thereafter.
Ben Anderson Vat	May 9 and every 14 days thereafter.
Moody Vat	May 10 and every 14 days thereafter.
Williams Vat	May 13 and every 14 days thereafter.
Paine Vat	May 14 and every 14 days thereafter.
Collins Vat	May 15 and every 14 days thereafter.
Register Vat	May 16 and every 14 days thereafter.
Martin Vat	May 17 and every 14 days thereafter.
Jones Vat	May 6 and every 14 days thereafter.
Jim Paul Vat	May 7 and every 14 days thereafter.
White Water Vat	May 8 and every 14 days thereafter.
Rogers Still Vat	May 9 and every 14 days thereafter.
Stevenson Vat	May 10 and every 14 days thereafter.
Butram Vat	May 13 and every 14 days thereafter.
Monroe Paul Vat	May 14 and every 14 days thereafter.
Faircloth SpringsVat	May 15 and every 14 days thereafter.
Paulk Vat	May 16 and every 14 days thereafter.
Mathis Still Vat	May 17 and every 14 days thereafter.

EXHIBIT B

And each and every person, firm or corporation, who is now, or hereafter the owner, or custodian, or person in charge of any cattle now, or hereafter, being within Holmes County, Florida, are by law required to dip all such cattle within fourteen days from and including the first dipping date in said Holmes County, Florida, as specified in the aforesaid resolution, that is to say, within fourteen days from and including the 6th day of May, A. D., 1924, at one or more of the official dipping vats described in the aforesaid resolution, and schedule, as shall be most convenient for the owner, or custodian, or person in charge of such cattle, upon the date specified for official cattle dipping at such vats, respectively, and to dip, or cause to be dipped, all such cattle, each and every fourteen days from and after the date of the first dipping of such cattle, rrespectively, in such of the aforesaid vats, as shall be most convenient and on the dates above specified for official dipping at such vats, respectively, until such time as the State Live Stock Sanitary Board of Florida shall discontinue dipping in said County.

DONE, ORDERED, AND ADOPTED, by the State Live Stock Sanitary Board of the State of Florida, this 10th day of April, A. D., 1924.

STATE LIVE STOCK SANITARY BOARD OF THE STATE OF FLORIDA

H H Simmons CHAIRMAN.

ATTEST:

J. V. Knapp, SECRETARY.

DONE AT JACKSONVILLE, FLA.,
APRIL 10, 1924."

N O T I C E!

"TO WHOM IT MAY CONCERN:

Notice is hereby given that the State Live Stock Sanitary Board of the State of Florida, in regular meeting assembled, on the 10th day of April, A. D., 1924, adopted the following resolution:

"BE IT RESOLVED, by the State Live Stock Sanitary Board of the State of Florida, in regular meeting assembled, that until further ordered, the said Board will pay to each and every owner, or custodian, or person in charge of any cattle now or hereafter being in Holmes County, Florida, who shall dip under the supervision of said Board, or its agents, ALL cattle owned by, or in the custody or charge of such owner, or custodian, or person in charge, at one or more of the official dipping vats in said Holmes County, within fourteen days from and including the 6th day of May, A. D., 1924, and each and every fourteen days from and after the first official dipping hereunder of such cattle, respectively, and on the dates on which official cattle dipping is held at said vats, respectively, a schedule of said dates being as above, the sum of three cents per head, the same being one-half of the reasonable and necessary cost of dipping cattle in said County; provided, however, that the said Board will not pay to any owner, custodian or person in charge of any cattle now or hereafter being in said County, for ANY cattle dipped by such owner, custodian, or person in charge, unless such owner, custodian or person in charge, shall under the supervision of this Board, or its agents, dip ALL cattle ownedby him, or in his custody or charge, in said County, and on the days of official dipping at one or more of the official dipping vats in said County, respectively, within fourteen days from and including the 6th day of May, A. D., 1924, and each and every fourteenth day from and after the date of the first dipping of such cattle, respectively.

DONE, ORDERED, AND ADOPTED, by the State Live Stock Sanitary Board of the State of Florida, this 10th day of April, A. D., 1924.

STATE LIVE STOCK SANITARY BOARD OF THE STATE OF FLORIDA.

H H Simmons CHAIRMAN.

ATTEST: J. V. Knapp SECRETARY.

DONE AT JACKSONVILLE, FLA.,
APRIL 10, 1924.

...under and in accordance with the Rules and Regulations of the Sta Live Stock Sanitary Board for the eradication and prevention of the spread or dissemination of the cattle fever tick. This quarantine shall be in full force and effect on the 3rd day of May, A. D., 1924.

By Order of the State Live Stock Sanitary Board.

R R Simmons, Chairman..

J. T. Meade, Secretary, State Veterinarian.

Done at Jacksonville, Fla., April 10, 1924.

Upon mption of Mr. Wells, seconded by Mr. King, the following resolution and dipping schedules were unanimously adopted:

NOTICE

TO WHOM IT MAY CONCERN:

Notice is hereby given , that on the 10th day of April, A. D., 1924, the State Live Stock Sanitary Board of Florida in regular meeting assembled, acting pursuant to, and inaccordance with, Chapter 9201 of the Acts of the Legislature of the State of Florida, of the year 1923, adopted and passed the following resolution:

R E S O L U T I O N

Whereas, the State Live Stock Sanitary Board of the State of Florida, acting pursuant to, and in accordance with, Chapter 9201 of the Acts of the Legislature of the State of Florida, of the year 1923, has heretofore by resolution duly adopted by said Board, placed under quarantine Zone No. 13, which includes that part of Franklin County lying West of the Apalachicola River, all of Calhoun County, all of Jackson County, that part of Holmes County lying East of the Choctawhatchee River, all of Washington County, all of Bay County, and that part of Walton County lying east and south of Choctawhatchee River and Choctawhatchee Bay and East Pass, and has given due notice of the establishment of such quarantine as required by said Chapter 9201, and all necessary dipping vats, fences, corrals and pens have been constructed in Washington County, which is a portion of said Zone No. 13,

NOW, THEREFORE, BE IT RESOLVED; by the State Live Stock Sanitary Board of the State of Florida, in regular meeting assembled, this 10th day of April, A. D., 1924, that regular systematic dipping of cattle shall be held in said Washington County, which is a portion of said Zone No. 13, at each of the official dipping vats located in said Washington County, on the days and dates respectively hereinafter set opposite the name of each such dipping vats, respectively. The names of each of said dipping vats in said Washington County, and the days and dates of regular systematic dipping of cattle thereat, are as follows:

Oak Hill Vat	May 6 and every 14 days thereafter
Lou Kent Vat	May 7 and every 14 days thereafter
Midway Vat	May 8 and every 14 days thereafter
Thorpe Vat	May 9 and every 14 days thereafter
Brown Williams Vat	May 10 and every 14 days thereafter
Boy Williams Vat	May 13 and every 14 days thereafter
W. C. Alford Vat	May 14 and every 14 days thereafter
McGeachey Vat	May 15 and every 14 days thereafter
S. A. Alford Vat	May 16 and every 14 days thereafter
McCloskey Vat	May 17 and every 14 days thereafter
West Kent Vat	May 6 and every 14 days thereafter
Wells Vat	May 7 and every 14 days thereafter
Bush Vat	May 8 and every 14 days thereafter
Meyers Vat	May 9 and every 14 days thereafter
Bradford Vat	May 10 and every 14 days thereafter
Duncan Vat	May 13 and every 14 days thereafter
Whittington Vat	May 14 and every 14 days thereafter
Simmons Vat	May 15 and every 14 days thereafter
Wausau Vat	May 16 and every 14 days thereafter
Brunner Vat	May 17 and every 14 days thereafter
Walkup Vat	May 6 and every 14 days thereafter
Fuller Vat	May 7 and every 14 days thereafter

EXHIBIT C

Carter Vat	May 8 and every 14 days thereafter.
Finch Vat	May 10 and every 14 days thereafter.
White Oak Vat	May 13 and every 14 days thereafter
White Water Vat	May 14 and every 14 days thereafter.
Deadmon Vat	May 15 and every 14 days thereafter.
Greenhead Vat	May 16 and every 14 days thereafter.
McKeithen Vat	May 17 and every 14 days thereafter.
Davis Vat	May 9 and every 14 days thereafter.
Ebro Vat	May 6 and every 14 days thereafter.
Redhead Vat Vat	May 7 and every 14 days thereafter.
Armstrong Vat	May 8 and every 14 days thereafter.
Bates Vat	May 9 and every 14 days thereafter.
Southside Vat	May 10 and every 14 days thereafter.
Stanley Vat	May 13 and every 14 days thereafter.
Lucas Pond Vat	May 14 and every 14 days thereafter.
Gerdon Vat	May 15 and every 14 days thereafter.
VarnumVat	May 16 and every 14 days thereafter.
Macon Vat	May 17 and every 14 days thereafter.
D. G. Brock Vat	May 6 and every 14 days thereafter.
Hardy Vat	May 7 and every 14 days thereafter.
DunnVat	May 8 and every 14 days thereafter.
John Parish Vat	May 9 and every 14 days thereafter.
Hinson Vat	May 10 and every 14 days thereafter.
Billy Parish Vat	May 13 and every 14 days thereafter.
Cook Vat	May 14 and every 14 days thereafter.
Maudlin Vat	May 15 and every 14 days thereafter.
Ang Brock Vat	May 16 and every 14 days thereafter.
Vernon Vat	May 17 and every 14 days thereafter.
Johnson Vat	May 6 and every 14 days thereafter.
Caryville Vat	May 7 and every 14 days thereafter.
Brackens Vat	May 8 and every 14 days thereafter.
Pipkins Vat	May 9 and every 14 days thereafter.
Chestnut Vat	May 10 and every 14 days thereafter.
Sellers Vat	May 13 and every 14 days thereafter.
Mattox SpringsVat	May 14 and every 14 days thereafter.
J. H. Brock Vat	May 15 and every 14 days thereafter.
Britt Still Vat	May 16 and every 14 days thereafter.
Hasty Vat	May 17 and every 14 days thereafter.
Merrell Vat	May 8 and every 14 days thereafter.

And each and every person, firm or corporation, who is now, or hereafter the owner, or custodian, or person in charge of any cattle now , or hereafter, being within Washington County, Florida, are by law required to dip all such cattle within fourteen days from and including the first dipping date in said Washington County, Florida, as specified in the aforesaid resolution, that is to say, within fourteen days from and including the 6th day of May, A. D., 1924, at one or more of the official dipping vats described in the aforesaid resolution and schedule, as shall be most convenient for the owner or custodian, or person in charge of such cattle, upon the date specified for official cattle dipping at such vats, respectively, and to dip, or cause to be dipped, all such cattle, each and every fourteen days from and after the date of the first dipping of such cattle, respectively, in such of the aforesaid vats, as shall be most convenient and on the dates above specified for official dipping at such vats, respectively, until such time as the State Live Stock Sanitary Board of Florida, shall discontinue dipping in said County.

DONE, ORDERED, AND ADOPTED by the State Live Stock Sanitary Board of the State of Florida, this 10th day of April, A. D., 1924.

STATE LIVE STOCK SANITARY BOARD OF FLORIDA

By R K Simmons, Chairman.

ATTEST:

J V Knapp, Secretary.

DONE AT JACKSONVILLE, FLA.,
APRIL 10, 1924. "

N O T I C E !

"TO WHOM IT MAY CONCERN:

Notice is hereby given that the State Live Stock Sanitary Board of the State

Florida, in regular meeting assembled, on the 10th day of April, A. D., 1924, adopted the following resolution:

"BE IT RESOLVED, by the State Live Stock Sanitary Board of the State of Florida, in regular meeting assembled, that until further ordered, the said Board will pay to each and every owner, or custodian, or person in charge of any cattle now, or hereafter, being in Washington County, Florida, who shall dip under the supervision of said Board, or its agents, ALL cattle owned by, or in the custody or charge of such owner, or custodian, or person in charge, at one or more of the official dipping vats in said Washington County, within fourteen days from one including the 6th day of May, A. D., 1924, and each and every fourteen days from and after the first official dipping hereunder of such cattle, respectfully, and on the dates on which official cattle dipping is held at said vats, respectively, a schedule of said dates being as above, the sum of three cents per head, the same being one-half of the reasonable and necessary cost of dipping cattle in said County; provided, however, that the said Board will not pay to any owner, custodian or person in charge of any cattle now or hereafter being in said County, for ANY cattle dipped by such owner, custodian, or person in charge, unless such owner, custodian or person in charge, shall under the supervision of this Board, or its agents, dip ALL cattle owned by him, or in his custody or charge, in said County, and on the days of official dipping at one or more of the official dipping vats in said County, respectively, within fourteen days from and including the 6th day of May, A. D., 1924, and each and every fourteenth day from and after the date of the first dipping of such cattle, respectively.

DONE, ORDERED AND ADOPTED by the State Live Stock Sanitary Board of the State of Florida, this 10th day of April, A. D., 1924.

STATE LIVE STOCK SANITARY BOARD OF FLORIDA.

BY H. H. Simmons, Chairman.

ATTEST:

J. V. Knapp,
Secretary.

DONE AT JACKSONVILLE, FLA.,
APRIL 10, 1924."

72.11 Quarantined area; cattle considered infested; requirements for placing in noninfectious pens or premises. Cattle of the quarantined area shall be considered infested and shall not be placed in noninfectious pens or premises until after the final inspection or dipping.† (Sec. 4, 33 Stat. 1265; 21 U.S.C. 126) [Reg. 2, sec. 2, par. 4 (c)]

72.12 Cattle; exposure to tick infestation after treatment or inspection prohibited. The cattle shall not be exposed to tick infestation after treatment and/or inspection.*† [Reg. 2, sec. 2, par. 4 (d)]

*§§ 72.12 to 72.24, inclusive, (with the exception noted in the text,) issued under the authority contained in sec. 3, 33 Stat. 1265; 21 U.S.C. 125.

72.13 Dipping requirements; permitted dips; facilities; handling. The dipping of cattle for interstate movement shall be done only in a permitted dip and at places where proper facilities are provided for dipping and for handling the cattle in a manner to prevent exposure to infection after the final dipping. Cattle which are to be dipped shall be given an opportunity to drink sufficient water to quench their thirst prior to dipping, be carefully handled, and not dipped while they are in a heated or exhausted condition. Dipped cattle shall not be loaded for shipment until dry. The dip at present permitted by the Department is an arsenical solution which shall at all times show a minimum of twenty-two hundredths percent of arsenious oxide in solution, as indicated by the Bureau field test for the arsenical dipping bath.[14] A proprietary brand of arsenical solution may be used in official dipping only after specific permission therefor has been issued by the Bureau; and no dip will hereafter be given Department permission for official use in the dipping of cattle for ticks unless it has been shown to the satisfaction of the Bureau (a) that the strength of the bath prepared therefrom may be satisfactorily determined in the field by a practical, portable testing outfit; (b) that under actual field conditions the dipping of cattle in a bath of definite strength will effectually eradicate ticks without injury to the animals dipped.*† [Reg. 2, sec. 2, par. 4 (e)]

72.14 Arsenical cattle dips; requirements for determination of suitability. The following specifications will be employed for determining the suitability of arsenical cattle dips for use under the provisions of this part.

(a) The product must remain a uniform liquid when held at the temperature of 0° C. (32° F.) for 3 hours (chill test).

(b) The product must be readily and completely miscible with water when added thereto in the proportion and in the manner employed for the preparation of dipping baths (solubility test).

(c) The product must contain arsenious oxide within the limits of 28.2 and 30.7 grams per 100 cubic centimeters measured at 25° C. (77° F.).

(d) The product must contain soap, derived from an appropriate soap base, in quantity not less than one-half the quantity of arsenious oxide present. The soap is to be reckoned as potassium soap, exclusive of glycerin and unsaponified matter.

[14] Description available on application to the Department.

*For statutory citation, see note to § 72.12.
†For source citation, see note to § 72.6.

1933

EXHIBIT
D

EXHIBIT E

Bulletin No. 6

The State Live Stock Sanitary Board of Florida

1949

REGULATIONS

Governing eradication of the cattle fever tick in Florida.

MEMBERS OF BOARD

J. D. WILBANKS, Chairman	Tampa
J. H. BRIGHT	Hialeah
J. G. DUPUIS, JR.	Miami
NATHAN HOLMES	Ft. Pierce
H. O. PARTIN	Kissimmee
J. O. PEARCE	Okeechobee
D. C. TURNER	Bradley Junction
J. V. KNAPP, DVM, Secretary and State Veterinarian	Tallahassee
E. O. FRIDAY, Supervisor of Tick Eradication	DeLand

SUGGESTIONS TO CATTLE OWNERS TO PREVENT INJURY TO LIVE STOCK

Chapter 585, Florida Statutes, 1941, as amended, charges each owner or custodian of live stock with the responsibility of dipping; therefore, each owner or custodian of live stock is cautioned to handle his animals with due care and consideration.

The following recommendations are made by the State Livestock Sanitary Board to owners or custodians dipping animals:

That before animals are dipped, they be allowed ample time to properly cool and rest;

That all animals be watered prior to dipping;

That no excessive or undue abuse or punishment be inflicted upon animals in the process of dipping;

That all animals be allowed that length of time necessary to dry thoroughly following dipping before being loaded into cars, trucks, trailers, boats or planes, for shipment;

That animals, although thoroughly dry following dipping, should not be crowded in vehicles when being moved.

REGULATION 1

General Provisions

DEFINITIONS — For the purpose of these Regulations the following words, phrases, names and terms shall be construed, respectively, to mean:

Section 1. BOARD—State Live Stock Sanitary Board.

Section 2. LIVE STOCK INSPECTOR — A competent person employed and commissioned by the State Live Stock Sanitary Board to act as Live Stock Inspector, Live Stock Market Inspector, Range Rider or Quarantine Line Guard.

Section 3. INTERSTATE — Movements of live stock from any point outside of the State of Florida within the United States into this State or movements originating in this State destined to any other state in the United States.

Section 4. TICK EXPOSED AREA — Any area, pasture or premises which has been exposed to cattle fever ticks through the movement of cattle, horses, mules or asses from a known tick infested area.

Section 5. SYSTEMATIC TICK ERADICATION AREA—Any area designated, quarantined and duly advertised by resolution of the Board in which active and regular dipping of all cattle, horses, mules or asses is being conducted under the supervision of the said Board.

Section 6. TICK-FREE AREA—Any area in which systematic tick eradication has been completed and which has been released from quarantine by resolution of the State Live Stock Sanitary Board.

Section 7. LIVESTOCK MARKETS — Shall mean any stock yards, sales pens, pavilions or other assembling places, public or private, where livestock is bought and sold.

REGULATION 2

To prevent the Introduction or Spread of Splenetic, Southern or Texas Fever in Cattle; Governing Tick Eradication; Quarantine; Inspection; Dipping; Spraying; Transportation and Movement of Cattle, Horses, Mules or Asses.

Section 1. Cattle, horses, mules or asses originating in any area of this State or of any other State, quarantined on account of the existence of the cattle fever tick, **Margaropus annulatus**, shall not at any time be transported, driven or allowed to Stray or drift therefrom into any portion of the State for any purpose except in accordance with the Regulations of this Board to prevent the introduction or spread of Splenetic, Southern or Texas Fever.

Section 2. Cattle, horses, mules or asses originating in any other State or part thereof, quarantined on account of the existence of the cattle fever tick, **Margaropus annulatus**, may be shipped by rail or boat or trucked into Florida when inspected, found free of ticks, dipped and certified by a representative of the United States Bureau of Animal Industry.

Section 3. Cattle, horses, mules or asses originating in a tick free area and straying, drifting or moving in any manner into a tick exposed or systematic-tick-eradication area, immediately and automatically attain the status of the area into which they move and must thereafter be handled as specifically provided in these Regulations governing the movement of live stock in and from such areas.

REGULATION 3

SYSTEMATIC AREA

Section 1. All cattle, horses, mules or asses in quarantined areas in which systematic-tick-eradication is being conducted shall be dipped regularly every fourteen (14) days until such time as it is ascertained by regular official inspection and dipping that such cattle, horses, mules or asses are free of ticks and the area is released from quarantine.

Section 2. For the purpose of checking and apprehending undipped cattle, horses, mules or asses in quarantined areas in which systematic-tick-eradication is in progress, a Livestock Inspector shall uniformly mark all dipped cattle, horses, mules or asses, with a paint mark. Such paint mark, officially applied, shall be the only recognized indication that said animals have been dipped under official supervision.

Section 3. All cattle, horses, mules or asses originating in quarantined areas in which systematic-tick-eradication is being conducted, may be shipped or trucked into tick-free, tick-exposed or systematic-tick-eradication areas, provided such animals have been inspected, found free of ticks and dipped under the supervision of the State Supervisor of Tick Eradication or any Livestock Inspector duly appointed by the Board, and moved to destination under authority of an official permit.

Section 4. Transportation companies, trucking companies or individuals shall furnish clean and disinfected cars, boats, trucks or other vehicles for cattle, horses, mules or asses moving under provisions of Section 3 of this Regulation and deliver such livestock to destination without exposure to tick infestation en route.

Section 5. All stock yards, pens, lots, chutes or other equipment in an area in which systematic-tick-eradication is being conducted shall be cleaned and disinfected under official supervision before they are used for the receipt of cattle, horses, mules or asses for transportation as provided in Section 3 of this Regulation.

Section 6. Cars, boats, trucks or other vehicles, pens, lots, chutes or other equipment, used in the movement of cattle, horses, mules or asses, shall be cleaned of all bedding, manure or other litter, and disinfected by the transportation company or owner under the supervision of the State Supervisor of Tick Eradication or any Livestock Inspector duly appointed by the Board, with a 5% solution of cresol compound USP made at the rate of 4 ounces to each gallon of water, or its equivalent.

Section 7. Transportation or movement of cattle, horses, mules or asses from or within areas in which systematic-tick-eradication is being conducted must move free of ticks under provisions of inspection and dipping and be accompanied by an official permit irrespective of destination or purpose of movement.

REGULATION 4

TICK EXPOSED AREA

Section 1. All cattle, horses, mules or asses in a tick-exposed area shall be dipped or sprayed for wet inspection regularly every twenty-eight (28) days, unless otherwise directed by the Board, until such time as it is ascertained by regular official inspection, dipping or spraying that such cattle, horses, mules or asses are free of ticks.

Section 2. For the purpose of checking and apprehending undipped or unsprayed cattle, horses, mules or asses in a tick-exposed area, a livestock inspector shall uniformly mark all dipped, sprayed, or inspected cattle, horses, mules or asses, with a paint mark. Such paint mark, officially applied, shall be the only recognized indication that said animals have been dipped, sprayed or inspected under official supervision.

Section 3. All cattle, horses, mules or asses

originating in a tick-exposed area may be shipped or trucked into a tick-free area, a tick-exposed area or systematic-tick-eradication area, provided such animals have been inspected, found free of ticks and dipped or sprayed under the supervision of the State Supervisor of Tick Eradication or any Livestock Inspector duly appointed by the Board, and moved under authority of official permit.

Section 4. Transportation companies, trucking companies or individuals shall furnish clean and disinfected cars, boats, trucks or other vehicles for livestock moving under provisions of Section 3 of this Regulation and deliver such livestock to destination without exposure to tick infestation en route.

Section 5. All stock yards, lots, pens, chutes or other equipment in a tick-exposed area shall be cleaned and disinfected under official supervision before they are used for the receipt of cattles, horses, mules or asses for transportation as provided in Section 3 of this Regulation.

Section 6. Cars, boats, trucks or other vehicles, pens, lots, chutes or other equipment, used in the movement of cattle, horses, mules or asses, shall be cleaned of all bedding, manure or other litter, and disinfected by the transportation company or owner under the supervision of the State Supervisor of Tick Eradication or any Livestock Inspector duly appointed by the Board, with a 5% solution of cresol Compound USP made at the rate of 4 ounces to each gallon of water, or its equivalent.

Section 7. Transportation or movement of cattle, horses, mules, or asses from or within a tick-exposed area must move free of ticks under provisions of inspection, dipping or spraying and be accompanied by an official permit irrespective of destination or purpose of movement.

REGULATION 5

Should it become necessary to unload cattle, horses, mules, or asses, originating from a tick free area, or moving under authority of official permit, in a tick exposed or systematic-tick-eradication area, the State Supervisor of Tick Eradication shall be immediately notified and the cattle, horses, mules or asses held pending receipt of instructions for handling.

REGULATION 6

All shipments of livestock, poultry, hay, straw, litter bedding or manure in the hands of transportation companies within the State of Florida are subject to inspection at any point by the State Supervisor of Tick Eradication or any Livestock Inspector duly appointed by the Board. Should such shipments, upon investigation, be found moving contrary to the Regulations of this Board, they shall be quarantined and handled in accordance with these Regulations.

REGULATION 7

All hay, straw, pine straw, wild shrubbery, plants, crossties, pulpwood, or similar material, on, in, by, or to which cattle fever ticks may become attached, carried or transported, originating in a tick-exposed or systematic-tick-eradication area, shall not be shipped, moved or transported in any manner into, within or through a tick-free-area or into or through any other tick-exposed or systematic-tick-eradication area unless and until thoroughly disinfected by the owner under the supervision of the State Supervisor of Tick Eradication, or any Livestock Inspector duly appointed by the Board.

REGULATION 8

Section 1. Hides of cattle, horses, mules or asses, originating in a tick-exposed or systematic-tick-eradication area, may move into, within or through any tick-free area or any tick-exposed or systematic-tick-eradication area, provided such hides are dipped or sprayed under the supervision of the State Supervisor of Tick Eradication or any Livestock Inspector duly appointed by the Board in a standard strength arsenical solution or (other approved dipping solutions) and a written permit issued covering the movement to destination; and provided further, that hides which have been salt-cured for a period of ten (10) days and are covered by a duplicate affidavit as provided in Section 2 and 3 of this Regulation may move from any tick-exposed or systematic-tick-eradication area, into, within, or through the tick free area or any tick-exposed or systematic-tick-eradication area.

Section 2. The following form of affidavit shall be the only form recognized and accepted by the State Live Stock Sanitary Board.

..... , Florida, ... 19.....

I, ..., under oath, declare that I have carefully examined the following described hides and they are free from live ticks; further, that said hides have been salt cured for a period of 10 days or more prior to the date of offering the same for shipment from ..... in .....County, Florida, to ..... in ..... County, Florida, via .....

(name of transportation company)

Description and number of hides:

Cattle Hides .....
Horse Hides .....
Mule Hides .....
Ass Hides .....

.....
Name of Owner, Firm or Corporation
(state which)

Section 3. The agent of the transportation company at point of origin must attach the original affidavit to the waybill which must accompany the said hides to destination and immediately send duplicate of the affidavit to the office of the State Supervisor of Tick Eradication.

REGULATION 9

Section 1. If at any time cattle, horses, mules, or asses, in the tick free area, are found to be infested with or exposed to the cattle fever tick, **Margaropus annulatus**, they shall be immediately quarantined by the State Supervisor of Tick Eradication, and subject to the provisions of the foregoing regulations governing tick eradication, movement and transportation of such animals.

Section 2. Cattle, horses, mules or asses moved or being moved in violation of these Regulations shall be placed in quarantine, freed of ticks according to prescribed methods, at the risk and expense of the owner if driven or trucked, or the transportation company if shipped, as the case may be, or they may be returned to the point of origin at the discretion of the State Supervisor of Tick Eradication.

Section 3. The only recognized materials and methods for disinfection of cattle, horses, mules or asses in systematic-tick-eradication work are as follows: standard arsenical solution or other approved preparations which are recognized and conform to the test adopted by the United States Bureau of Animal Industry, when used at standard strength in an approved cattle dipping vat.

REGULATION 10

Any person, firm, corporation, transportation or other company which violates these Regulations governing the control and eradication of

cattle fever ticks, or the provisions of quarantine, inspection, disinfection, dipping, spraying, and movement of cattle, horses, mules, or asses, hay straw, litter, bedding, manure, cross ties or pulpwood, is subject to prosecution for each such offense.

REGULATION 11

Transportation companies doing business within the State of Florida will be notified by mail by the Secretary of the Board of all quarantine regulations governing the transportation of live stock and also of all changes of or amendments to such quarantine regulations.

REGULATION 12

Section 1. All cattle, horses, mules or asses entering any livestock market in Florida shall upon arrival be dipped under the supervision of a livestock inspector duly appointed by the Board.

Section 2. For the purpose of checking cattle, horses, mules or asses entering livestock markets, the Livestock Inspector in charge shall uniformly mark all dipped cattle, horses, mules or asses with a paint mark. Such paint mark, officially applied, shall be the only recognized indication that said animals have been dipped under official supervision.

Section 3. Any cattle, horses, mules or asses, together with all animals of a lot or from the same origin, found upon official inspection, to be infested with cattle fever ticks shall be immediately segregated from all other animals in the market and held at the owner's expense until freed of ticks, or at the discretion of the State Supervisor of Tick Eradication, may be returned to the owner's premise and placed under quarantine.

Section 4. Any cattle, horses, mules or asses originating in any tick-exposed or systematic-tick-eradication area shall not enter any livestock market unless covered by an official permit.

These orders, rules and regulations supercede and revoke all previous regular and special orders, rules and regulations and amendments thereto pertaining to quarantine and movement of cattle, horses, mules, or asses on account of Southern or Texas Fever in live stock in the State of Florida.

Done at Tampa, Florida, this 5th day of May, 1949.

Effective on and after June 1, 1949.

STATE LIVE STOCK SANITARY BOARD
OF FLORIDA

By J. D. WILBANKS, Chairman

ATTEST:

J. V. KNAPP, Secretary
State Veterinarian.

IMPORTANT NOTICE

The dipping of cattle in the recognized standard arsenical solution to eradicate the tick is simple, safe and practical; however, CERTAIN PRECAUTIONS MUST AT ALL TIMES BE OBSERVED AND CLOSELY FOLLOWED.

First: Cattle must not be driven long distances and dipped while in a fatigued and heated condition. They must be rested and have opportunity to drink their fill of water at least six (6) hours prior to dipping.

Second: In systematic dipping in a given county, vats must be so located that no cattle shall be driven more than two or three miles.

Third: ARSENIC IS A DANGEROUS POISON and must at all times be handled and used with great care and caution. The dipping bath must be prepared as provided in these Regulations and before dipping cattle the bath must be at all times tested for the arsenic content to see that it is not too weak to destroy ticks or too strong to injure cattle. Accordingly to effectively conduct systematic dipping of all cattle regularly every fourteen (14) days, the bath must show not more nor less than eighteen hundredths of one percent (.18%) arsenous oxide by the recognized chemical test.

Fourth: Cattle, after being dipped, must be allowed sufficient time for the bath to thoroughly drain from their bodies, while being held in a concrete dipping pen or other place where water, feed or vegetation will not be accessible to live stock.

Fifth: In dipping cattle suffering from weakened vitality, thin flesh or emaciation, owners or others interested must be equipped to aid such animals safely through the vat. Cattle suffering from tick fever or high temperatures from any cause must not be dipped, but treated in a manner to destroy ticks until recovered sufficiently to safely dip them.

EXHIBIT F

Sixth: Cows in advanced pregnancy may be dipped safely, but should be cut from the herd and dipped separately.

Seventh: Young calves should be cut from the herd and dipped separately from older and larger cattle. In dipping calves one must take the precaution that they are supported and quickly put through the vat. The dipping fork must be promptly put into use in dipping calves.

Eighth: Indifference, negligence or carelessness on the part of the officials connected with the Board will not be tolerated but the Board disclaims all responsibility for infractions of these precautionary measures on the part of others.

By order of the State Live Stock Sanitary Board

Signed: J. W. Delilly, Secretary,
Acting State Veterinarian.

Minutes of the Meeting of the
State Live Stock Sanitary Board of Florida,
Tallahassee, Florida, January 8th, 1929.

The meeting was called to order by Chairman Edwards. Other members present were Messr. Beville, Lykes and Pennock.

Mr. J. W. H. McClelland, Lloyd, Florida, presented his claim against the State Live Stock Sanitary Board for damage to his cattle, alleged to have resulted from dipping. This claim was taken under advisement.

The following notice was published in the Florida State News, a daily newspaper published in Tallahassee, Florida, on December 29rd, and 30th, 1928, and the following invitation to bid furnished to all firms desiring to bid on the Board's requirements for cattle dip for the year 1929, in response to which the following bids were received and opened in open meeting:

"TO WHOM IT MAY CONCERN:

You are hereby notified that the State Live Stock Sanitary Board of Florida will receive sealed bids for its requirements of cattle dip for the year 1929, said bids to be filed in the office of the Board in the Capitol Building, Tallahassee, Florida, not later than nine o'clock A. M., Tuesday, January eighth, 1929.

Information concerning the requirements of the Board for dip and conditions of bidding can be obtained by communicating with the State Live Stock Sanitary Board, Tallahassee, Florida."

"TO WHOM IT MAY CONCERN:

You are hereby notified that the State Live Stock Sanitary Board of Florida will receive sealed bids for its requirements of cattle dip for the year 1929, said bids to be filed in the office of the Board in the Capitol Building, Tallahassee, Florida, not later than nine o'clock A. M., Tuesday, January eighth, 1929.

Bids are to be based on a minimum of 10,000 gallons for the year, with the privilege of purchasing up to 50,000 gallons on the same terms, price to be f.o.b. Florida points in car lots. Also it is required that a supply of dip be maintained in Jacksonville, or other convenient Florida point, where less than car lot shipments may be obtained.

Bidders will submit information and guarantee their product in accordance with the following:

NAME OF PRODUCT as listed with the United States Department of Agriculture, Bureau of Animal Industry, supported by evidence that said product has been approved by the Department of Agriculture for official use in dipping cattle for eradication of the cattle fever tick.

COEFFICIENT OF STRENGTH, that is the quantity of water to which one gallon of dip added will produce a resultant dipping bath showing the desired strength, by field test, of 0.18 per cent arsenous oxide.

CONTAINERS. All dip shall be packed in five gallon containers, a description of such containers being incorporated in the bid."

EXHIBIT
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	Per Gallon		Per Gallon
Groover-Stewart Drug Co., Jacksonville (TICTOC By Baird & McGuire)(Delivered Jax)	77		
" Tampa	81		
" Tallahassee	81		
" Miami	86		
" Pensacola	83		
" Orlando	84		
" Fort Myers	84	(del Jax)	81
Sherwin-Williams Co., Jacksonville, Fla. Kiltik D. Cattle Dip	75		85
Chipman Chemical Engineering Co., Bound Brook, NJ Atlas Cattle Dip	75		85
Atlantic & Gulf Fertilizer Co., Jacksonville, Fla Lariat Arsenical Cattle Dip	75		85.
William Cooper & Nephews, Inc., Chicago, Ill. Cooper's Cattle Dip	75		85

Upon motion of Mr. Beville, seconded by Mr. Lykes and unanimously carried, the bids of the Mobile Drug Company, Mobile, Ala., and the U. S. Chemical & Sanitary Supply Co., Tampa, Florida, were not considered by the Board for the reason that these two bids did not specify the less than carlot prices and therefore did not comply with the call for bids and further that the Board did not know the exact proportion of carlot and less than carlot shipments and was therefore unable to compare these prices with others.

Upon motion of Mr. Lykes, seconded by Mr. Beville and unanimously carried, the contract for cattle dip for 1929 was awarded to William Cooper & Nephews, Inc., Chicago, Illinois at 75¢ per gallon in carlots and 85¢ per gallon in less than carlot shipments, f.o.b. destination.

This action on the part of the Board was taken in view of the fact that they had used Cooper's Cattle dip for a period of four or five years and had found the same to be absolutely satisfactory in every particular and also that this dip is used in cooperative tick eradication work between the Federal Government and the States of Oklahoma, Arkansas, Texas and Georgia, whereas their experience prior to using the present brand of dip was unsatisfactory with two other manufactured products and the Board felt that their responsibility in handling other people's cattle was too great to make a change at this time.

Minutes of the previous meeting were read and approved, with a minor correction.

The claim of Mr. J. W. H. McClellan, Lloyd, Florida was considered and the Secretary was requested to make his report thereon to the Board at its next meeting, upon motion of Mr. Beville, seconded by Mr. Pennock and unanimously carried.

Upon motion of Mr. Lykes, seconded by Mr. Beville and unanimously carried, the State Veterinarian was authorized to construct a quarantine line fence between the counties of Columbia and Alachua for a distance of approximately four miles on what is known as the Natural Bridge, where the Santa Fe River, the coundary line between these counties, has its course, for a distance of about four miles under the ground and the area on the surface between the "Sink" and "Rise" is know as the Natrual Bridge, on which there is a dense growth of vegetation and timber between the several ponds and through which the imaginary line between Columbia and Alachua Counties passes. Systematic tick eradication was undertaken in Columbia County in March 1928, and has not yet commenced in Alachua County and the purpose of the above fence is to prevent movement of cattle back and forth between these counties. It is believed that the cost of constructing this fence would be less expense than to maintain a range rider for the purpose of patrolling this line.

Upon motion of Mr. Beville, seconded by Mr. Lykes, the following current bills were considered, approved and ordered paid:

PUBLICATION 103 MARCH, 1913

STATE BOARD OF HEALTH OF FLORIDA

Cattle Tick Eradication

VETERINARY DIVISION

CHARLES F. DAWSON, M. D., D. V. S.,
Veterinarian

Reprinted From the Twenty-Fourth Annual Report of the State Board of Health

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CATTLE TICK ERADICATION

By Charles F. Dawson, M. D., D. V. S.

Veterinarian

Veterinary Division

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CATTLE TICK ERADICATION.

By Charles F. Dawson, M. D., D. V. S.

THE HISTORY OF TEXAS FEVER.

The State Board of Health is directed by law to look after the health of our domesticated animals as well as that of the people. This it has been doing for a number of years, and has had constantly in its employ, the best veterinary talent it could obtain since 1902.

It is now proposed that Florida get into line with the other Southern states and start the work of eradicating the cow tick, which causes a disease of the blood which prevents that thrifty condition necessary in cattle that makes the raising of them a paying business. It is claimed by statisticians that this cow tick causes a loss of from $40,000,000 to $200,000,000 annually.

So it seems that this fact alone is the best reason that can be given for eradicating the tick. It seems wonderful that an agricultural interest can thrive under this enormous handicap, and also that comparatively so little has been done to remove it.

HISTORY OF TICK FEVER IN CATTLE.

It may not be amiss at this time to say something of the history of tick fever in cattle. Dr. Salmon, chief of the Bureau of Animal Industry, in his letter of transmittal to the Secretary of Agriculture of the manuscript of Smith and Kilborne's work on Texas fever said:

"In the whole list of diseases affecting domesticated animals there is none so peculiar in its character or so mysterious in its phenomena, as was this one, previous to these researches. The dissemination of the deadly contagion by apparently healthy cattle, and the harmlessness in general of the really sick animals were inexplicable by any facts which were furnished by the study of other diseases. Veterinarians who had not had an opportunity to observe this disease were skeptical in regard to the correctness of such conclusions, and some spoke of them as a 'romance in pathology.'

These early observations have not only been confirmed, but the phenomena have been explained and our knowledge placed upon a scientific basis.

EARLY OBSERVATIONS.

"That Southern cattle in a state of health might bring destruction to Northern cattle was observed as early as 1796 by Dr. Pease, who observed an outbreak of the disease among cattle, in Lancaster county, Pennsylvania, following the passage of a herd of cattle from South Carolina. Dr. Pease made it the subject of an interesting communication in which he pointed out the peculiar fact that though the Southern cattle themselves seemed healthy, they scattered a peculiar disease in the northern territory they crossed. The literature upon the disease was very meager in those days, and the next important contributions were from the pens of Dr. R. C. Stiles of the Metropolitan Board of Health, Drs. John Gangee, John S. Billings and Curtis of the National Government, in 1868. In that year, Texan cattle shipped up the Mississippi river to Cairo and thence by rail into Illinois and Indiana early in June, caused during that summer, enormous losses in cattle in those states. Eastern cattlemen became alarmed because cattle shipped from those states were dying of tick fever in the New York stock yards, and elsewhere. The cattle commissioners of New York State and the Board of Health of New York City became alarmed as to the possible harmful effect of such diseased meat upon the human health.

BOUNDARY LINE DETERMINED.

"The most important special contributions were next made by Dr. D. E. Salmon, in his annual reports, as chief of the bureau of animal industry, in the year 1883-1884-85, in which years he determined the boundary line of the permanently infected territory.

"While it had long been known that this peculiar fever did not occur except where the cow tick existed, the relation of the tick to the disease was not definitely established until 1889, when it was observed by Smith and Kilborne, of the bureau of animal industry, that when young ticks are placed on cattle there develops a high fever accompanied by extensive loss of the red blood-corpuscles. These observations were repeated and confirmed in 1891 and

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1892. However, Smith, in 1889, made the most important discovery connected with the disease. On October 23, 1889, he read a paper at the Brooklyn meeting of the American Public Health Association, in which he stated he had discovered a peculiar micro-organism in the red blood corpuscles of cattle suffering from tick fever, that it was the cause of the disease, and that this newly discovered organism was carried by the cow tick. This was a most important discovery, as it was the first instance in which it was proven that diseases may be insect-borne.

AN INCURABLE DISEASE.

"Tick fever may be said to be an incurable disease, or at least treatment is usually unsatisfactory as animals surviving an attack of acute tick fever generally make a slow recovery and during the convalescent period are more subject to the attack of other diseases, owing to the resulting anaemia. The old answer for the treatment of diseases, given by the pert first year medical student—'remove the cause,' applies with great force here, when changed to 'remove the tick.' In all sanitary work, however, it is necessary to have the co-operation of the people in order to bring about the desired result; and this applies with special force in the eradication of an insect. There seems no special difficulty in exterminating the cattle tick, because of its peculiar life history. What has been and is being done in other states, can also be done in Florida.

"The latest reports show that about one-fifth of the tick infested territory has been already cleared of the tick. This work has been carried on by the co-operation of the federal, state and county governments, and already the results have been very pleasing and profitable to those sections that now enjoy a free and unrestricted cattle business with the great Northern markets.

ORIGINATOR OF TICK ERADICATION METHOD.

"The idea of tick eradication seems to have been originated by Dr. Cooper Curtice, former zoologist, and now veterinary inspector in the Bureau of Animal Industry. Dr. Curtice was also the first to study the life history and development of the tick. His researches paved the way for tick eradication. In 1899, while State Veterinarian of North Carolina, he presented a plan of action to the

commissioners of agriculture of that state for improving the cattle industry, by tick eradication. That plan was put into operation, and by 1906, or in seven years, twelve counties in North Carolina had been released from quarantine. This practical demonstration of the feasibility of tick eradication attracted the attention of the federal authorities and also the other Southern states, and congress was asked for a small appropriation to be applied in assisting those states which had live stock laws, competent to deal with the subject.

"The federal appropriation was in 1907, $82,500; in 1908, it was increased to $150,000; and since, it has been $250,000 annually. Congress will be asked for an appropriation of $750,000 at the coming session.

ELEVEN STATES CO-OPERATING.

"In 1906, there were fifteen states more or less infested with ticks. Nine hundred and twenty-nine counties in these states were under federal quarantine on account of ticks. When the work was begun only seven states had laws that would enable the Bureau of Animal Industry to co-operate with them. Therefore, work could only be started in Virginia, North Carolina, Georgia, Kentucky, Tennessee, Oklahoma and California. Since then, four other states, South Carolina, Alabama, Mississippi and Arkansas have enacted laws which allow of tick eradication.

"Up to April 1, 1911, or in five years, Virginia had cleaned up 24 counties of ticks. North Carolina had, unassisted, cleaned up 12 counties, when the work was started elsewhere in 1906; since 1906, with federal aid, that state has cleaned up 30 more, making 42 in all.

"In South Carolina, four counties are clean; in Georgia, 3; in Tennessee, 26; Alabama is clearing up 7 counties, Mississippi has cleaned 3; Arkansas 10; Louisiana 2; Oklahoma 7; Texas 7; California 3½; Missouri 4; Florida none. In all the states mentioned, except Florida, the work is in progress and, no doubt, many more counties will soon be released from quarantine.

"To state it another way, there were, originally, 741,515 square miles of tick infested territory in the United States. The cleared

area, up to April 1, 1911, was 139,821 square miles, or one-fifth of the mileage area."

The above article on the history of Texas fever was presented for reading at the first meeting of the Florida Live Stock Association held at the University of Florida, December 17-19, by the State Health Officer.

THE CATTLE TICK.

Further study into the history of the cattle tick—the cause of Texas fever—brings to light the following information and shows that in all probability the cow tick was first collected and studied in Florida.

In 1818 Thomas Say, curator of the Philadelphia Academy of Sciences, with three companions, made a scientific survey of Fla. He collected ticks from deer, and in 1821 published a description of them which shows his specimens were of the same species as those now infesting Florida cattle. He named his tick Ixodes annulatus.

In 1867 C. V. Riley found the same tick infesting cattle in Missouri and named it Ixodes bovis. In 1891 Cooper Curtice changed the name to Boophilus bovis. Later, the name Boophilus annulatus was applied and now we call the great fever-producing tick of North America, Margaropus annulatus.

OTHER SPECIES IN OTHER COUNTRIES.

The United States is not the only country that is infested with a fever-producing cattle tick; but no other country has our species.

There are three distinct species of fever-producing ticks; the North American, the Australian and the South African. The Australian species produces this cattle fever in Australia, South America, Cuba and Porto Rico and therefore has a very wide distribution.

There are eight different kinds of ticks that infest our cattle in the United States; but only one of these species can carry the fever. This one species is found resident only in the South, below the federal quarantine line, and is the most numerous of all. The body of the full grown engorged female is oblong-oval in shape and may reach one half inch in length. The color varies from a dull yellow to an olive brown and often is streaked with wavy lines of

these colors. There are two longitudinal grooves on the back, at the front of the body, and three at the rear. These are more prominent at times, especially after the tick has dropped from the animal. The head parts are short and broad and of a chestnut brown color.

SOME OTHER TICKS.

From the tick eradicator's standpoint all ticks look alike. The harmless ones cannot produce Texas fever, but all species succumb to the arsenical solution, so that the question of the species cuts no figure in tick eradication operations. The harmless ticks have a different life cycle from the fever-producing tick. This tick, the common cow tick, cannot reach maturity unless it gets upon cattle, horses, or mules, while all the other harmless kinds can develop independently. When the common cow tick does get on horses and mules, its progeny cannot produce Texas fever, but may acquire the germ from Southern cattle, whose blood always contains the parasite. Their progeny then become as infectious as those reaching maturity on Southern cattle.

While it is known that the fever germ is carried from cow to cow by the tick, no one has ever been able to discover the germ in the ticks themselves, nor will extracts made by grinding the ticks and injecting this material into susceptible cattle produce the fever. Yet we can readily produce the fever by injecting a small quantity of blood from a Southern cow into a Northern cow or by putting a few of the seed ticks upon a Northern cow. These seed ticks hatch out from the eggs laid by the old tick when she falls from the cow.

TRANSMITTED THROUGH THE EGG.

It therefore follows that the germ of Texas fever is in some way transmitted through the egg to the young seed tick. These young ticks are very small and are barely visible when they first get on cattle. Hence they are at that stage capable of producing the fever and the susceptible animal may be very sick and even die without the owner noticing any ticks.

Other interesting facts are that the germ will live in the blood of animals removed from the South to the North for at least thirteen years. Texas fever can be produced by injecting some of this

animal's blood into Northern cattle. Rough handling or bad treatment may induce a fatal attack of the fever in this supposedly immune animal. This explains why and how it is that Texas fever has occurred in animals when no ticks could be discovered on them.

ALLEGED IMMUNITY OF SOUTHERN-BORN CATTLE.

The mere fact that a cow is Southern born does not mean that she is immune to Texas fever. In fact it is claimed today that there is no such thing as immunity to Texas fever. However, Southern cattle do acquire a resistance when they are attacked by ticks from birth that the Northern-born cattle do not possess.

On account of the many failures to immunize cattle against the fever and in this way improve the Southern breeds by the importation of finer cattle from the North and West, those interested in the subject have given up the idea, which at one time promised so much.

It was found that even though a fine bovine did successfully run the tick gauntlet the incessant attacks of ticks devitalized and impoverished the blood so that succeeding generations showed plainly a loss of the stamina possessed by the original stock. The logical thing to do is, therefore, to get rid of the cause—the tick—by the methods now in vogue for tick eradication. A result of this practice will be not only improvement of the scrub cattle as scrubs, for it can improve them in no other way, but farmers will be encouraged to improve their cattle by the introduction of finer animals of the beef and dairy types.

The following upon the life history of the cattle tick is copied from an address delivered by Dr. E. M. Nighbert, at the University of Florida.

LIFE HISTORY OF THE CATTLE TICK.

Facts on which the campaign for eradicating the pest is based: An intimate knowledge of the life history of the cattle tick is necessary. A knowledge of the manner in which the tick propagates must be had before eradication can be carried on intelligently and successfully.

Only a part of the development of the tick takes place on cattle,

the remainder occurs in the pastures and ranges. The female tick, which is attached to the skin of cattle, increases enormously in size as a result of drawing large quantities of blood, and when fully filled with blood drops to the ground, where she at once begins to search for a suitable hiding place that will serve as a protection from the sun and enemies. These large juicy ticks are sometimes destroyed by ants, and thousands perish as the result of unfavorable conditions, such as hot weather, dry weather, or extremely wet conditions in the ranges, pastures, or swampy conditions that exist in the State of Florida. Thousands and thousands of ticks are destroyed in this way in the state without having laid any eggs. This condition accounts for few ticks appearing on cattle at times and many more at other times, depending on climatic conditions.

Egg-laying begins during the spring, summer and fall months in two to twenty days, and during the winter months in thirteen to ninety-eight days, depending on weather conditions. The eggs are small, elliptical shaped bodies, of a light amber color that later changes to dark brown, one fiftieth of an inch in length, coated with a sticky secretion that causes them to adhere in clusters and keeps them from drying out. During egg-laying the mother tick gradually shrinks and dies when all eggs have been laid. The egg laying period continues from four days in warm weather to a hundred days if the weather is cool or cold, and during this period from several hundred to five thousand eggs may be deposited.

THE FIRST STAGE.

Within a few days in summer to several days in fall or winter after the eggs have been deposited they begin to hatch. From each one issues a small six legged seed tick, amber colored, later changing to a rich brown. It is very active in warm weather, but does not travel any distance. Its instinct is to ascend the nearest bit of vegetation, such as grass, herbs or shrubs and wait for cattle. If cattle do not come its way it dies of starvation.

During its life in the pastures and ranges, the seed tick takes no food and does not increase in size. It must reach cattle or die of starvation. This fact is significant and is taken advantage of in the work of eradication of ticks. Their endurance, however, is very great, and under certain conditions they may live [illegible]out

nourishment from four and a half to six or eight months, especially during the colder part of the year.

The length of the period from the time females drop to the ground until all the seed ticks hatching from the eggs laid by them are dead, or in other words, the time required for pastures and ranges to become free of ticks after all cattle, horses and mules have been excluded or treated regularly every two weeks by dipping or spraying with the standard arsenic solution, varies with the season of the year, being shortest during the warm season and longest during the cold season. For example, all the seed ticks resulting from females dropped June 15th will be dead by November 1, a period of four and a half months; but some of those resulting from females dropped September 1, may survive for seven or eight months.

THE SECOND STAGE.

Further development begins when the tick reaches cattle, horses or mules. It at once begins to draw blood and increases in size. In about seven days it sheds its skin and the color changes from brown to white, the new form having eight instead of six legs, and known as a Nymph. In another seven days the Nymph tick sheds its skin. It is now sexually maturedl, and it is at this stage that males and females are conspicuous for the first time. The male tick is about one-tenth of an inch in length, it never becomes larger and displays great activity in moving about on the animal. The female is slightly larger but shows much less activity, seldom moving from her point of attachment previous to molting. After mating with the male, she rapidly engorges with blood, and in eighteen to twenty-one days, after first attaching as a seed tick, she drops to the ground to repeat the cycle of development. You see, then, by treating cattle regularly every fourteen days, the chain of life is broken, never to be again mended. The tick is completely exterminated. To accomplish this, all cattle, horses or mules using the ranges, pastures or cow lots that are infected must be considered.

TICK ERADICATORS MEET LAW MAKERS.

On January 3 and 4, duly appointed delegates from ten of the tick infested states had hearings before the house and senate committee on agriculture at the capitol in Washington.

On January 2, the delegates held a preliminary meeting at the Hotel Raleigh in Washington, for the purpose of deciding upon a line of action. At this meeting it was decided to divide the time allowed so as to give each delegate five minutes to explain the needs of his state.

ASK FOR $750,000.00 A YEAR.

It was also decided to ask for an annual appropriation of $750,000, instead of $400,000, as originally intended. This increase was advised by the Secretary of Agriculture, who gave as his reason that it would be economy to increase the number of veterinary inspectors by 150, on account of the great progress already made in the work, the number of counties in the various states now awaiting federal inspection, the number of counties that would apply during the year for federal inspection, and because the work can now go on the year round, owing to the fact that much of it is being done in the southern parts of the states where it is warm enough to dip cattle.

DUTIES OF VETERINARY INSPECTORS.

These inspectors are appointed upon civil service examination. They must be veterinary graduates and pass a satisfactory examination in veterinary science. Each man costs the government about $2,500 a year, hence the increased amount asked for by the committee. The work of these inspectors is to supervise the building of dipping vats and show how the dipping is done. Then, when a county is said to be free of ticks, the inspector must visit every farm and satisfy the government that the representations made by the state officials are correct. Upon his favorable report that county is released from quarantine. When a farm, or a county, is declared freed from ticks, it will be illegal for anyone to bring upon that farm, or into that county, any cattle from a quarantined or ticky county.

Obviously, this means co-operation upon the part of county officials and even individuals. This co-operation is easily obtained when the beneficial results of tick eradication are perceived.

TICK-BITTEN HIDES ALMOST WORTHLESS.

It has been claimed that tick-bitten hides depreciate 10 per cent in value because they do not make good leather, and that this loss

alone would pay for tick eradication. At the hearing before the senate committee the statement was made that the loss on hides alone was estimated at ten per cent.

At this statement a Northern senator said: "I deal in calf hides, and I never pay more than half as much for Southern calf hides as I do for Western and Northern hides. They don't make good leather." Here is a loss of fifty per cent, instead of ten per cent, and the department officials were surprised when we told them what this business senator had said.

We went before the senate committee with more misgivings than we did before the house committee; but events made us reverse our opinion of the United States senators. We were most kindly received. We were not hurried to the same extent as before that of the house. We all came away from the hearings encouraged. Each delegate made it his business to visit the members from his own state. We, of course, did not believe it possible that any representative of a Southern state would fail to vote favorably upon this important subject, but we wanted them fortified by a more intimate knowledge of the vast importance of tick eradication.

NOT MERELY A SOUTHERN PROBLEM.

After all, tick eradication is not strictly a Southern problem, it is a national problem. What affects fourteen states; affects the whole United States, and is, therefore, a national problem, and we were deterred from asking for millions instead of thousands, because it takes time to train men in the work. Tick eradication is merely a question of men and money. It is not an experiment. A state could be free of ticks in six months. We know what can be done, how long it takes to do it, and what the results will be. When once eradicated, the ticks are gone forever.

HOW COW TICKS DEPRECIATE VALUE OF FLORIDA CATTLE.

The 1910 agricultural census for Florida gives the following facts:

First. Cattle represent 45 per cent of the value of all live stock combined.

Second. In 1900 the cattle industry amounted to 56.8 per cent

of the value of all live stock combined, showing a decrease of 11.8 per cent.

Third. There are 845,188 head of cattle in the state, valued at $9,262,262. The average price is less than $11 per head.

Statistics show that three per cent of our cattle die from exposure every year in this mild climate. Many know these 2,500 head of cattle do not actually die from exposure, as that term is generally understood; but that the cause of death is the cow tick and lack of care.

Under our present conditions, Florida cattle have no market except in other quarantined areas of the South, and in the foreign tick-infested countries to the south of us.

As long as this condition exists, Florida cattle, no matter how high their breeding or quality, must be sold under quarantine or as quarantined animals. This means they are always sold for less than they would bring if sold as coming from a tick-free state.

WHY THEY SELL FOR LESS.

Cattle, irrespective of breeding or condition, shipped to Chicago from Florida, must be shipped for immediate slaughter, and are held, pending slaughter, in special pens, by the national quarantine officers. The cars they are shipped in must be disinfected of the ticks that drop off, in transit. They must be sold for immediate slaughter. They cannot be held and fed for a few days awaiting a favorable market.

This extra trouble and expense attending the marketing of Florida cattle, of all breeds, and conditions, is paid for from the proceeds of their sale and for this reason Florida cattle would bring from 1½ to 2½ cents less per pound on the Chicago market, or any Northern Market, than similar cattle shipped from a tick-free state.

HIDES ARE WORTH LITTLE.

Even the hides of the Florida cattle are worth less per pound because a hide that is full of tick bites does not make good leather.

Therefore it is easily seen that cattle ticks exact heavy toll from this branch of our agriculture, by causing a large increase of the death rate, by causing a sickness which brings about shrinkage in

size; by keeping people out of the cattle business, which could be made a paying one; by loss of the land fertilizing value of the animals that could be raised; by the loss in prices of meat products, in the price of hides, and many depressing influences upon farm life.

SEVERAL REASONS FOR ERADICATING CATTLE TICKS.

It is now recognized by all observing people that the cow tick is the principal cause of depression in the cattle industry of the South.

There is no other reason that is so apparent. The best cattle feeds that the world produces can be and are being grown right here in Florida. If our feeds were not of the best, other sections would not buy them.

FEWER ANIMAL PLAGUES IN FLORIDA.

All classes of animals, except cattle, do as well in Florida as in any other part of the United States. The difference is most marked when we consider the matter. In fact, there are fewer animal plagues in Florida than in most sections. There are very important diseases, which at times decimate the animal population in other sections, that do not occur at all in Florida. When, however, we compare our cattle with those in the North and West, and even now in those sections of the South where the tick has been exterminated, it does not require the expert's eye to see the difference.

CATTLE VS. COTTON.

The eastward march of the cotton-boll weevil has forced the farmers in one state to grow other crops because they can no longer borrow money on a crop so uncertain as a weevil-infested cotton crop. The surplus of the crop is fed through cattle, and as these bring rich returns, the farmer has demonstrated to himself that cattle are a money crop and that the raising of cattle is worthy of his most serious attention. He soon realizes that he cannot produce the best cattle in the presence of the tick, because successful cattle production and marketing demand the eradication of the tick.

WASHED CLEAN OF TICKS.

The great overflow of the Mississippi River last year was not entirely without a useful object-lesson in tick-eradication in the State of Mississippi. Cow ticks cannot survive being submerged in water any more than can other air-breathing animals. Several counties were entirely submerged and the cattle were either drowned or removed to other sections. Here was an excellent chance to secure an immense tick-free territory without further trouble or expense. Through co-operation and the enforcement of local quarantine, the flooded counties were not allowed to restock with any cattle that had not been cleaned of ticks by the dipping vat. The people of that section will now raise good cattle, and these may be sent to Northern markets to compete, on equal terms, with cattle from any other section.

WHEN THE COTTON-BOLL WEEVIL ARRIVES.

When the cotton-boll weevil arrives in Florida, our farmers will be forced into raising other crops. Some of these will be for cattle feed. The fertilizing value of these feeds will be returned to the soil by the cattle, as a by-product of the cattle business, and the commercial fertilizer bill will be materially reduced. It has been observed that fields upon which cattle have grazed show the effect of this manuring for twenty-five years.

This improved farming cannot reach its highest development if the cattle are forced to give up their blood to ticks instead of converting it into flesh and milk.

THE DAIRYMAN'S DOUBLE LOSS.

The dairyman's loss from ticks is from two direct sources, viz.: shrinkage in the milk output and deaths from Texas or tick fever.

When an animal has fever from any cause, milk production is either lessened or entirely suspended, according to the nature of the disease.

In acute Texas fever, the temperature runs very high, and the milk secretion is suspended. In chronic Texas fever, the kind we

see most of, milk secretion is diminished. The shrinkage in milk production of cattle heavily infested with ticks will, according to a government report, average one quart a day. A dairyman can, therefore, easily figure out his loss in a year. Even if he lose one pint a day, he could figure up a bad case against the tick. Government experts figure up a loss in milk alone of nearly $800,000 a year, in the whole South.

ANNUAL LOSS OF ABOUT $8,500.00.

When a dairyman tries to improve his herd by the introduction of better milkers, he loses ten per cent of these imported cattle, even if they be immunized against Texas fever, and sixty per cent if they are not so immunized. Then you must take into consideration these cattle are usually high-priced, and, in some instances, a valuable strain of animal that cannot be replaced, dies, and this loss is also to be charged up to the tick. About 4,600 such cattle are brought South each year. If ten per cent die, and they cost anywhere from one hundred to one thousand per head the loss is from $46,000 to $460,000. The losses from deaths and shrinkage in milk production, therefore, cost the Southern dairyman about $8,500.00 annually, a sum that would probably pay for the entire cost of tick eradication in the South, if the co-operation of those most affected could be quickly obtained.

METHODS FOUND EFFECTIVE IN EXTERMINATING CATTLE TICKS.

The extermination of this insect pest is one of the easiest things imaginable, if we go about it in the right way.

This insect, as well as all others, develops according to a natural law; hence, if we take advantage of our knowledge of the life-history of the cow tick nothing is simpler or easier than its extermination, by interrupting its life cycle. It is so easy and simple that a five year old child can eradicate the ticks, from the family cow, and the small-fenced pasture she grazes on, by daily picking off and killing every large tick for a period of six months. The explanation of this is, that it is only the big ticks that lay eggs, and as they do not lay them until they voluntarily drop off the cow, picking them off by hand and destroying them by placing them in a can

of kerosene or any oil, will end their career. In other words, if no big ticks lay eggs, there will be no young ticks to crawl upon the cattle. If there are no young ticks, there can certainly be no old ones. This method, known as the hand-picking method, is, of course, only applicable where there are a few head, from one to a half dozen.

THE SPRAYING METHOD.

This method is applicable to herds of half a dozen or more. The standard arsenical solution is sprayed on the cattle by means of a coarse nozzle, one that will force the spray through the hair and on to the skin. A fine spray that merely leaves a sort of dew upon the hair, such as those required in spraying plants, will not do. The liquid must penetrate to the skin, and to accomplish this the spray must be directed against the hair. The animals must be thoroughly gone over so that every tick will be hit. Particular effort must be made to wet the under surface of the body, and especially the tail, as it is this member which affords ticks easy access to the body when the cow passes through vegetation harboring the young ticks.

The animal must be sprayed every two weeks, fourteen or fifteen times. A half-and-half mixture of cotton seed oil and kerosene makes an efficient spray. The arsenical solution is the cleanest to handle, but the fact that it is poisonous must not be lost sight of. However, there is no more danger attending its use than in the case of other arsenical sprays used on plants.

The arsenical spray is made on a small scale by dissolving four ounces of washing soda and one and one third ounces of white arsenic in five gallons of water by boiling fifteen minutes. Cool to 140 degrees (or to a point just a little too hot to bear) and add, in a fine stream, an ounce of pine tar, stirring so it will mix.

Gould's barrel and bucket spray pump with 12 to 15 feet of high pressure hose fitted with a simplex nozzle using the largest size disc, is recommended as a suitable apparatus for spraying cattle.

THE DIPPING VAT METHOD.

This is the method par excellence for destroying ticks as well as other vermin that may infest live stock, and is the method that

the federal government recommends most highly, because it admits of a thoroughness that is impossible by any other method.

A dipping vat consists essentially of a two thousand gallon cement tank built into the ground and filled with an arsenical solution composed of white arsenic, eight pounds; washing soda, twenty-four pounds; pine tar, one gallon; to every five hundred gallons of water. The arsenic and soda are dissolved in thirty or forty gallons of water by boiling. The syrup-boiling kettle so commonly in use in Florida would be excellent for the purpose; but it should be carefully washed out after using for this purpose. After the solution has cooled to a point that is just too hot to bear, the tar is added in a fine stream and stirred thoroughly. Now put the solution into the tank and add enough water to make five hundred gallons. Repeat three times more, and you have two thousand gallons in the tank.

These vat tanks and other necessary arrangements for handling the cattle cost from thirty-five to one hundred dollars according to cost of labor and materials. Plans and specifications will be gladly furnished. The arsenic, soda and tar are also inexpensive materials. The infested animals are made to jump into the vat one at a time, and as the vat is too narrow for them to turn around, they are forced to swim out at the other end where their feet strike an incline and they walk out into a dripping pen to dry off. This is repeated every two weeks fourteen times. After each dipping the animals are again placed upon the pastures, where they, of course, become re-infested.

As the life of the seed-tick is limited to four months, unless it gets on a cow, horse or mule, it is readily seen that those seed-ticks which failed in this have starved to death; while those that did get on cattle and develop have been destroyed in the dipping before the females could mature, drop off, and lay eggs. Hence, the farm and cattle so treated are ever after free of cow ticks, unless ticky cattle are introduced. In this case, the whole process would have to be repeated.

THE MEDICAL MAN AND TICK ERADICATION.

The present agitation for the eradication of the cattle tick has a special significance to the medical profession. Not only does the cow tick convey a blood parasite to the cattle it bites, but this parasite has some points in similarity to the malarial organism in man, in that it is carried by an insect, and that it lives in the red blood corpuscles, destroying these, reducing, in some cases, the corpuscle count to 1,500,000.

Of special interest are the facts that this intra-corpuscular parasite, the *Pyrosoma bigeminum*, was discovered by a medical man, Theobald Smith, M. D. The life history of the cattle tick, its host, was discovered by a medical man, and the idea of tick eradication was first introduced by the same medical man, Cooper Curtis, M. D. It is, therefore, to these three discoveries that the final riddance from the cattle industry of the formidable disease produced by this parasite will be due.

One of the chief glories to be added to those already enumerated is the fact that the discovery by Dr. Theobald Smith that this *Pyrosoma bigeminum*, carried by the cattle tick, the cause of Texas fever, or southern cattle fever, or cattle malaria, was the first instance in the history of medicine, where it was proven by scientific investigation that a disease can be insect-borne. This was truly an epoch in medical history.

It is also of special interest that the cow tick can be eradicated. It is being eradicated. No other disease-producing insects can be eradicated. They can be controlled.

Digressing, what a boon to humanity, could mosquitoes and hookworms be eradicated. Malaria, yellow fever and uncinariasis would cease for want of carriers, and a cause.

Finally, it appears to the writer that the eradication of the hookworm, which is sapping the vitality and manhood of millions, is not only not an impossibility, but that it could be carried out as successfully as is tick eradication.

The following companies quote prices on arsenic, sal-soda and pine tar, used in the preparation of the standard arsenic solution for dipping and spraying cattle to destroy ticks: F. O. B. point of shipment:

The following is a stenographic report of a hearing granted by the Senate Committee on Agriculture to delegates from ten tick-infested states to secure an increase to the appropriation for tick-eradication from $250,000 to $750,000 annually.

AGRICULTURAL APPROPRIATION BILL,

SOUTHERN CATTLE TICK ERADICATION.

Saturday, January 4, 1913.

Committee on Agriculture and Forestry, United States Senate, Washington, D. C.

The committee assembled at 10:30 o'clock a. m. for the purpose of hearing certain gentlemen on the eradication of the Southern cattle tick.

Present: Senators Burnham (chairman), Page, Crawford, Chamberlain, and Sanders.

The Chairman. Gentlemen, the committee will come to order. We have here several gentlemen from different States who are to be heard in relation to a matter that will come, perhaps, under the appropriation bill.

Dr. Cary, of Alabama, is perhaps informed in regard to the members present, and he may make his statement. I desire, Dr. Cary, that you and those who may make statements here, shall avoid, so far as possible, repetition of what has been said before the House committee, because the House committee has had those statements taken down, and they will be printed.

Dr. Cary. I have suggested to the men, Mr. Chairman, that each man confine his remarks to the important things he desires to say, and give his reason why each State could use more help—more Federal help.

STATEMENT OF DR. C. A. CARY, STATE VETERINARIAN OF ALABAMA, AUBURN, ALA.

The Chairman. Will you please state definitely, in the first place, what the subject matter of this hearing is?

Dr. Cary. This subject matter is the question of eradicating the cattle tick that conveys the cause of disease, or is the cause of tick fever, and kills off a great many of the Southern cattle, and thereby induces the United States Government to quarantine all the infested area in the South, taking them off the world markets. That discriminates against Southern cattle, and puts them off the world's markets.

The Chairman. Dr. Cary, let me suggest for the record that you state what your official position is.

Dr. Cary. I am State Veterinarian of Alabama.

The Chairman. Give your full name.

Dr. Cary. Dr. C. A. Cary, of Auburn, Ala.; State Veterinarian, and chairman of the committee appointed by the Southern Agricultural Workers; that embraces the entire Southern infected area. This committee was appointed to take up this matter, especially before Congress.

The Chairman. Now you may proceed with your statement.

Dr. Cary. The general question is the eliminating of this disease from the South by getting rid of the carrier of the disease, the tick.

Senator Crawford. To what extent is it done?

Dr. Cary. Last year the Government appropriated $250,000 for leadership in this work. The States have given as much, and some of them two or more times as much for the work.

Now, you ask why the different States come here and ask for Federal help. They come here simpy for this reason: The Department of Agriculture, under the Bureau of Animal Industry, has quarantined the South, and in order to lift that quarantine these ticks must be destroyed, and the Government must know that, by having inspectors there to know when the ticks have been eradicated. Furthermore, these Government inspectors are men qualified and educated to carry on that work and direct and instruct the people.

Senator Chamberlain. Have the efforts of the Government and of the States diminished the big area affected by the tick?

Dr. Cary. About one-fourth. I stated yesterday one-third, but after seeing the chief of the Bureau yesterday he stated it was one-fourth; that one-fourth of the infested area has been cleared since we started the work.

Senator Crawford. And how much money have you been getting from the Federal Government for this work?

Dr. Cary. We got last year $250,000.

Senator Crawford. For how large a territory—all over the South?

Dr. Cary. All over the South that was.

Senator Crawford. And you want more than that this time?

Dr. Cary. That is what we are here to ask for.

Senator Crawford. What is Alabama doing toward it? How much money has she raised for this work?

Dr. Cary. The State and the counties co-operated in this work—last year the State and counties gave about twice as much as was given by the Federal Department. I cannot give you the exact figures. We want in Alabama about ten or twelve more inspectors for the next year from the Government, in order to be leaders in this work. You understand that these men are to be the leaders and direct the work. I do not want to take more time, because there are other speakers.

Senator Chamberlain. Let me ask you one question, Doctor, before you leave. I have before me a map showing the affected area. There are about 500,000 square miles affected?

Dr. Cary. About that.

Senator Chamberlain. How much was it when the Government undertook to assist the States?

Dr. Cary. There have been cleaned up something like 165,000 to 180,000 square miles.

Senator Chamberlain. Much or all of this territory was originally quarantined against?

Dr. Cary. Yes, sir.

Senator Chamberlain. As the area has been cleared up of the tick pest it has been released?

Dr. Cary. Yes, sir.

Senator Chamberlain. Released from quarantine?

Dr. Cary. Yes, sir.

Senator Chamberlain. And there is some other territory now within the affected area that is expected to be released soon?

Dr. Cary. Yes; expected to be released soon—to be released by the 1st of April, I think.

Senator Chamberlain. Has the effort to rid the country of the pest been quite effective?

Dr. Cary. As far as it has gone. So far as it has been applied it has been effective.

Senator Chamberlain. Is it possible to rid the tick from the whole territory?

Dr. Cary. There is no doubt about that.

The Chairman. How long has the Government been assisting in this work?

Dr. Cary. Dr. Dalrymple can answer that question.

Dr. Dalrymple. Since 1906.

Senator Crawford. How do you do this? Do you have dipping tanks?

Dr. Cary. It is done by using dipping vats.

Senator Crawford. Our State, at its own expense, built these dipping vats all over the State, and appropriates the money for their maintenance.

Dr. Cary. The counties and the States do a great deal of that; the counties in the State, in co-operation with the State. But you have a good many Federal men who are superintending that work.

Senator Crawford. Supervising it?

Dr. Cary. Yes, sir; that is what we want these fellows for. We have a much wider territory, in a sense, and a great deal more work to do than you have in the Northwest in your mange question.

The Chairman. This plague of the ticks, as you call them, has been continued how long?

Dr. Cary. In 1906 the Federal aid began.

The Chairman. Yes; the Government has assisted since that time, but how long has it been since the ticks were known to cause the disease?

Dr. Cary. It has been there for years and years, long before the Government found that the tick transmitted the cause of the disease. But for years and years we did not know what the cause of this Texas fever or tick fever was. We did not know it until about twenty years ago or a little over, when it was discovered at the Department of Agriculture.

The Chairman. You say now that it is lessening?

Dr. Cary. It is lessening; there is no question about that. It is no more an experimental work; it is an absolute fact that we can eliminate it; get rid of it.

The Chairman. Just what are the methods of eradication?

Dr. Cary. By the dipping vat largely. That is the most practicable method. There are other methods that are used, but that is the most practicable and efficient.

Senator Crawford. I presume it acts like this disease we have—the mange. It affects cattle if they are allowed to run down and get poor and lank and lean?

Dr. Cary. Only it is worse than that.

Senator Crawford. And good fat animals resist it; it does not harm them?

Dr. Cary. No, sir. It is different from that. The condition of the animal does not signify resistance. Some of the fattest animals are the quickest to die with the disease. But it does do this: It restrains the production of cattle in the South in that we cannot profitably grow beef or produce milk; neither

can we expect to handle new cattle for improvement of our cattle. It simply retards our cattle industry to such an extent, as compared with the North, that we are not in it.

The Chairman. What are the States especially affected with it?

Dr. Cary. Nearly all the Southern States. Virginia is nearly clean, and Tennessee is nearly clean, as you will see, but all the other infested States have quite a territory that is not tick free. North Carolina is about half clean.

Senator Chamberlain. Forty-three out of the fifty-one counties in Tennessee have been cleared?

Dr. Cary. Yes, sir.

Senator Page. What is the State worse affected?

Dr. Cary. Texas probably has the largest infested area. It is more extensive in Texas than in any other State.

Senator Page. Doctor, explain this, please: We have had for years ticks in Southern cattle. I am a hide dealer, and I know that we have had ticks in Southern cattle for some time. Is this something new, comparatively, or is it the same old disease, with greater force?

Dr. Cary. I am glad that you brought that out. I did not wish to be so long in discussing this matter, but I will say this in regard to that, that there is a discrimination against tick-marked hides—what is this discrimination in hides, Dr. Dalrymple?

Dr. Dalrymple. It is ten per cent.

Dr. Cary. Ten per cent. discrimination on hides that have been attacked by the cattle tick. So that injures the hide as a product of the South. The cattle tick has been in existence for years in the South. I do not know how long, but it is probable that this tick came in by way of Florida by the Spanish, or by way of Mexico by the Spanish. The Spanish brought it to America from Africa.

Senator Page. As I understand it, when a tick first imbeds itself in the hide of an animal it is not bigger than a pinhead, is it?

Dr. Cary. It is just a little seed tick.

Senator Page. Then it grows to be almost half the size of a nutmeg?

Dr. Cary. Yes, and all the time it is taking the blood from the animal.

Senator Page. And when it satiates itself it drops off.

Dr. Cary. Yes. They produce a large number of eggs; these eggs hatch and the process is repeated.

Senator Page. So that the whole surface of the animal underneath might be affected?

Dr. Cary. The whole body might be covered.

Dr. Dalrymple. It destroys the animal for all purposes.

Dr. Cary. Practically, that is it. And it does prohibit cattle producing in the South.

The Chairman. You are now receiving $250,000?

Dr. Cary. Yes, sir.

The Chairman. How much do you want to increase that amount?

Dr. Cary. We went to the Department of Agriculture before we went to the House committee, and in conjunction with the Bureau men, who know the Bureau side—the Federal side—we figured that with what we wanted this year in the respective States infested, 150 new men. The Bureau of Animal Industry figured that each man would cost about $2,500, and that means about $375,000.

The Chairman. In addition to the $250,000?

Dr. Cary. In addition to what is now given. That looks big, but let me say that is not to be continuous, if we get it. This appropriation will stop when we get rid of the tick. This will allow the quarantine line to be removed. At the present time if tick-infested cattle are permitted to come into the northern area, the cattle there die off also with tick fever.

Senator Page. When the Southern cattle infected by the tick move into the northern market they convey the fever, do they not?

Dr. Cary. They convey the tick, and the tick conveys the cause of tick fever.

Senator Page. The tick itself does not thrive in the Northern climate?

Dr. Cary. Yes, sir; in the summer time.

Senator Page. But it affects the Northern cattle?

Dr. Cary. Yes, sir. We cannot bring Northern cattle into the South because they die. We can hardly improve our cattle on that account. It is a very grave thing with us. It is a national question; it is not limited to the South. It is limited only to the United States, because it affects the entire United States. The United States must take care of this quarantine; they have to protect the cattle. The reason that induced them to put this quarantine upon the South was the Western range men who bought cattle in Texas, carried them to Northern ranges and infected their pastures in the summer, and they lost great numbers of Western cattle. That is what induced the Government to put this quarantine on the South. It has hurt the South worse than it has the North, but it hurts the North as well.

Another point of interest right here: A few years ago Germany put an embargo on American meats largely on account of the tick fever. While it was absurd in a way, it was done for that purpose.

The Chairman. Doctor, is there anything further that you care to say?

Dr. Cary. I would like to have these men state, in a few words, their views of the subject.

The Chairman. If you will give us the names of the gentlemen you wish to call we will be glad to hear them. Whom will you call first?

Dr. Cary. I will call on Dr. W. H. Dalrymple, Professor of Veterinary Science and a member of the Board of Live Stock Commissioners of Louisiana.

Senator Chamberlain. Before you leave the stand, Dr. Cary, let me ask you this: What proportion of Alabama was at first infected by the cattle tick—all of it?

Dr. Cary. All of it.

Senator Chamberlain. How much now has been eliminated by quarantine?

Dr. Cary. We have been working in twelve counties, but there is only one county from which the tick has been eliminated. We lack educated help. However, we expect other counties to eliminate the pest next year. The sentiment is much more in favor of the work now. You have to educate the people to an appreciation of these things, because the people did not know why the tick injured the cattle.

Senator Page. Do you establish a quarantine as between those counties that you have recovered and the counties that are infected?

Dr. Cary. Yes; as soon as a county is free of ticks it is protected. We have to do it. If we did not do it the county would be re-infected.

The Chairman. Dr. Cary, if you have nothing more to say we shall be glad to hear Dr. Dalrymple.

Dr. Cary. I thank you very much, Mr. Chairman.

The Chairman. And we thank you, Dr. Cary.

STATEMENT OF DR. W. H. DALRYMPLE, PROFESSOR OF VETERINARY SCIENCE AND A MEMBER OF THE BOARD OF LIVE STOCK COMMISSIONERS OF LOUISIANA, BATON ROUGE, LA.

The Chairman. Dr. Dalrymple, please state your name, residence and profession.

Dr. Dalrymple. W. H. Dalrymple; I have the chair of veterinary science in the Louisiana State University; my residence is Baton Rouge, La. I am also a member of our State Live Stock Sanitary Board. Mr. Chairman and members of the committee, I might say that I had the honor of appearing before the House committee six years ago, when the first appropriation was made for this work, and since that time, as you have just heard, something like 165,000 square miles of Southern territory have been reclaimed—that is, the tick has been eradicated from that territory, and which is now in what is called the free area. In other words, it is free just as much as any other section of the United States.

This quarantine that we have had put against us prohibits our cattle going to any of the large markets of the country, except for, I think, probably sixty days in the coldest months of the year, after they have been inspected by Federal inspectors and it has been seen that there are no ticks on them. Notwithstanding that fact they are placed in parts of the stock yards that are set aside for Southern cattle, which means ticky cattle, or cattle from the tick-infested area. They may have no ticks on them, they may be just as fine butcher stock as the Western man's animals, but they are discriminated against because they come from the infested area.

I think the estimate made by the Federal authorities is that something like 1,000,000 Southern cattle are marketed in the markets of the North annually, and the discrimination on account of the tick is from $3.00 to $5.00 a head. There is one item of three millions to five millions of dollars that the people of the South pay annually as a tribute to the cattle tick.

Speaking for my own State, after the Federal appropriation was made in 1906, Louisiana appropriated a small amount at that time, $5,000 a year for two years for tick eradication. I might say that the conditions were that the money was not to do the work, the Federal money, but was to assist those who desired to help themselves, which is a very good basis, I think.

Our State appropriated $5,000 a year for two years, making $10,000 in two years, and that has been the amount that has been appropriated every year since. Of course we are away down below the quarantine line, if you will, and we started to work in two of our northern parishes. As you may remember, Louisiana is divided into parishes. Since then the work has been carried on in other parishes.

In my own parish, the East Baton Rouge parish, forty or fifty dipping vats have been put up entirely at the expense of the people themselves, and given to the neighbors to use gratuitously. There are some other parishes that have done the same thing. The parish authorities have voted money for the building of the dipping vats in each ward of the parish.

There is one parish that I remember just now; we call it East Feliciana, where the police jury—that is the name of the local authority—voted enough money to build one dipping vat in each ward (there are eight wards), and

afterwards some stock men decided to put in half the money, which made sixteen dipping vats; and then it was decided by private vat owners that if the parish would pay for the materials, which are very cheap, and keep up the solution, that they would make them public dipping vats.

You see that the aggregate of the local money is quite considerable in addition to the State money. I could not give you the exact amount. We have only been working in two parishes, you might say, systematically, but the people themselves have been taking it up and doing it, and it is on their demand that we are requiring or requesting the additional Federal help to assist in that work.

We have one parish in which we took advantage of the recent disastrous overflow of the Mississippi River, just opposite Vicksburg. When the overflow came we decided that it would almost entirely eliminate the ticks from this overflowed district, and we took advantage of that and sent out information to the people to see if they would put on restrictions—the parish authorities—and not allow any cattle to come back into the overflowed parts without having been dipped at least once in the arsenical solution, a standard solution. Then, after they were dipped, they would bring the clean cattle back into a tick-free parish. And they did so. We were able to get some Federal assistance in the form of an inspector to help them along, direct the preparation of the dipping solution, and operation of the dipping vats; and possibly at the end of this next summer that parish will be cleared of ticks entirely, just by taking advantage of the overflowed condition of that area. So you will see that we are losing no opportunity locally to take advantage of every possibility that presents itself to enable us to overcome this menace.

Senator Crawford. Do I understand, then, that after you have dipped cattle and cleaned the ticks from the cattle that these ticks will have a habitat there in that neighborhood on other cattle, or these same cattle may be exposed again by staying in that infected region?

Dr. Dalrymple. The cattle tick is the only tick that we are concerned with, because it is the only one that carries the organism of Texas fever. Of course, it is a parasite, and it has to have its host to live on, or it would starve to death.

Senator Crawford. But if the animals have been put through this process, and the ticks have been killed, if they remain in that infected territory they will be infected over again?

Dr. Dalrymple. Yes, sir. Perhaps I should explain a little more about the method or process. We have found out that in our latitude the life history of the cattle tick is just about twenty-two days from the time the little seed tick gets on until all the changes in the life history of the tick take place on the animal; and then the large female tick, which is engorged and is impregnated, drops to the ground to lay eggs. She will lay from 1,500 to 5,000 eggs at a laying. These, of course, hatch into little seed ticks. In some parts they dip every two weeks during the season. But in Louisiana and some of the other States that are under the direction of one of the Federal men, we dip every twenty-one days. That is just one day short of the time that the ticks drop off, so that we do not allow the ticks to mature and drop off. The animals gather the ticks, and every twenty-one days in some States and every fourteen in others they bring them to the vats and dip them.

We are satisfied that, with sufficient vats and sufficient help and co-operation of the people, we could clean the whole State in one season, practically, of the tick.

Senator Chamberlain. Your efforts have proven that you can absolutely clean a particular area of the tick?

Dr. Dalrymple. Absolutely. It was only last summer that we had a representative from the Australian Government, Dr. C. J. Pound, the Government Bacteriologist, and others looking into our methods. Its use means absolute tick destruction. It is the best, and by its use the tick can be stamped out.

Senator Chamberlain. What is the formula?

Dr. Dalrymple. The formula of the solution?

Senator Chamberlain. Yes.

Dr. Dalrymple. Simply white arsenic, sodium carbonate, or ordinary washing soda, and pine tar.

Senator Chamberlain. That is not very expensive, is it?

Dr. Dalrymple. Five dollars will fill a 1,500 gallon vat.

Senator Chamberlain. How many animals will you dip with that?

Dr. Dalrymple. They will run, perhaps, 300 or 400 head of animals through that solution, and then they will keep on re-enforcing it.

A Voice. It will cost about 25 cents to dip one for one season.

Dr. Dalrymple. And the vats. Somebody said yesterday that they will run from $35 to $75. Some of our farmers in Louisiana have paid as much as $150 for their private tick vats, and they have told me that they would not take $1,000 for them, when they considered what they had done in the way of eliminating the tick.

Speaking about hides, I have a letter in my possession from one of the large exporters in Louisiana. He said that if we could get rid of the tick that he could pay at least one cent per pound more for the hides.

Senator Page. The Southern hides run a little light, do they not?

Dr. Dalrymple. Yes. We have found that the solution is destroying the grubs in the backs of the cattle, and that is a tremendous thing from an economic point of view.

Senator Page. Those we have in the North. I am quite interested.

Dr. Dalrymple. We have them down our way, too.

Senator Crawford. What was that—destroyed what?

Dr. Dalrymple. The grubs.

Senator Page. The "warbles" is a common name.

Dr. Dalrymple. The great object of this work is to get an open market to the whole of the United States for our cattle. We are absolutely hemmed in; we cannot compete with our Western friends in the market. The South, with her magnificent opportunities for her cattle growing, etc., is prohibited from competing on account of this tick. We could grow cattle for the whole United States and have some for export, too.

Senator Page. You say you want more inspectors?

Dr. Dalrymple. Yes, sir.

Senator Page. Why? If you have the matter fully in hand and know just what to do, why do you need inspectors?

Dr. Dalrymple. The inspector, of course, is a man who is qualified to take charge of that work. The States expend their money, their share of the money. You remember the State at the beginning put up its share of the expense.

Senator Crawford. This money which you want us to furnish is largely to be used in pay for these inspectors?

Dr. Dalrymple. For the Department of Agriculture.

Senator Crawford. Where can we get inspectors to use up half a million dollars a year?

Dr. Dalrymple. There are lots of men in the civil service.

Senator Page. You want $150,000?

Dr. Dalrymple. You are referring to money and I am referring to men. We want 150 more men in addition to what we have—Federal inspectors. The local money is expended under the direction of these Federal men in the building of dipping vats, etc. The Government does not build any of these vats down there, but they superintend and show the people how to put them up to the best advantage. In the early days we had to work and educate the people against very crass ignorance, as you may imagine. We have had to educate them in regard to the new methods. People have lived all their lives under tick conditions. They have never seen anything to compare them with what would be tick freedom. The importance of this work cannot be overestimated. I know one case, and it was made the subject of an illustration by the Government people. It is a very good one. It is that of a common Mississippi steer which weighed 730 pounds before it was dipped. After dipping two or three or four times in just exactly sixty days that animal weighed 1,015, or 285 pounds gain on the same food in sixty days.

I figured with one of our butchers and asked him: "What would you give before it was dipped? He said: "I wouldn't give anything; it wouldn't suit me." I said: "Put a price on it." He said: "I wouldn't pay more than 2½ cents a pound." I said: "What would you give for the same steer after sixty days?" He said: "I can give you at least 3½ cents a pound."

There was not only an increase in the weight of the steer, but in the price per pound. The fact is that the steer gained $17.28 in sixty days just by getting the ticks off the feed bill, really.

Instead of the ticks sucking the blood and getting the benefit of it, the animal is getting the benefit of that blood that the tick got.

Senator Page. Does this tick prove fatal to some animals?

Dr. Dalrymple. Oh, yes; by depletion of the blood. Our Southern cattle are immune to the fever, but the depletion of the blood kills or impairs them. I think it has been ascertained that an animal will sometimes lose as much as 200 pounds of blood in a season from the tick, and it prevents fattening. It reduces the milk supply at least 10 per cent. In fact, tick eradication is the basis of our agricultural prosperity, and in that, as Dr. Cary has said, "it is not a sectional question."

Senator Page. We get a great many thousand skins from the South that are taken off animals about a year old that are poor in the center, and the tick has done from 10 to 50 per cent. of damage to the hide.

Dr. Dalrymple. You get an irregularity in the hide?

Senator Page. The tick lays itself in the grain of the hide, but when the hide is tanned it shows through to the finished side—to the flesh side of the skin.

Dr. Dalrymple. Yes, sir.

Senator Page. And on your live stock it does a great damage, much more than you have stated?

Dr. Dalrymple. Yes; there is no doubt about that. And so it is we say, simply to get rid of this barrier, if you will, so that we can bring the animals from the North to improve our stock, and then have the markets of the world open to us when we ship. I thank you.

The Chairman. Whom do you wish to call next?

Dr. Cary. The next will be Dr. George R. White, State Veterinarian of Tennessee.

Statement of Dr. George R. White, State Live Stock Inspector, Nashville, Tenn.

Dr. White. Mr. Chairman and gentlemen of the committee, I am not going to take more than two minutes of your time. I just want to show the result that we have obtained in Tennessee through this tick eradication work.

Tick eradication started in Tennessee about seven or eight years ago. At that time we had fifty-one counties out of ninety-six counties quarantined on account of this parasite. That work has been conducted by the counties and the State in co-operation with the Federal Government, and at this time we have succeeded in eradicating ticks, as you will see from the green, in forty-three counties on this map here.

Senator Crawford. The green represents the localities where they have been eradicated?

Dr. White. Where they have been eradicated. The white represents the counties where no tick fever ever appeared, and the black represents the present quarantined area.

That means that after six or seven years' work we have succeeded in eradicating ticks in our State down to about seven counties.

The Chairman. When you began the work did the ticks extend all over the State?

Dr. White. Not in those white counties.

Senator Crawford. But in the blue or green?

Dr. White. Yes, sir. But if ticks can be eradicated in forty-three counties in Tennessee they can unquestionably be eradicated in those other seven counties, and if they can be eradicated in the whole State of Tennessee they can be eradicated in Florida, Georgia, and all the other tick-infested States.

Senator Page. How do you account for the absence of the ticks in the white counties on your map?

Dr. White. It had not time to spread that far north. The disease was gradually going farther and farther north each and every year.

Senator Crawford. You did all that in Tennessee without very much help from the Federal Government, did you not?

Dr. White. We received more Federal aid there than any other State, because this Federal Government aid was furnished those States on the northern border to a greater extent than it was to these southern States. If those people would receive as much Federal aid as Tennessee has received, ticks could be eradicated in Georgia, Alabama, Florida, and most of these other States in three or four more years. There is nothing experimental in tick eradication. It has been demonstrated as a fact, as this map will show to any thinking man. It simply resolves itself into a question of men and money.

Senator Chamberlain. In those forty-three counties in Tennessee from which you have eradicated the tick, have they had the quarantine released?

Dr. White. They have been released from quarantine.

Senator Chamberlain. So that the cattle from them, formerly infected, can go into the Northern markets.

Dr. White. Go anywhere without any quarantine restrictions. This tick will probably be eradicated finally, even with the small expenditure now made on the part of the Federal Government, but at that rate of appropriation it will be fifteen or twenty years before these ticks will be eradicated from these Southern States.

Our idea is to have you gentlemen consider the advisability of increasing this appropriation so that this work can be done in five or six or seven years, in place of letting it run along for fifteen or twenty years or twenty-five years, because when the ticks are finally eradicated from those States the Federal appropriation for this work will, of course, cease. It is not a continuous proposition, by any means.

I thank you very much.

The Chairman. Whom will you call next, Dr. Cary?

Dr. Cary. Dr. Peter F. Bahnsen, State Veterinarian of Georgia.

STATEMENT OF DR. PETER F. BAHNSEN, STATE VETERINARIAN OF GEORGIA, OF ATLANTA, GA.

Dr. Bahnsen. Mr. Chairman and gentlemen, in regard to tick eradication there are a few points that have already been discussed that I would like to further elucidate.

A tick infested area is not absolutely covered with ticks. There are certain areas within the tick infested areas that are free from ticks, but the people in that free area, in those free districts, get no benefit from the fact that they are free of this parasite. Their cattle are restricted from the markets, just as much so as cattle from the infected areas—that is, from infected premises. Nor can they be shipped under any conditions. The Federal Government would not supervise an inspection from tick-free premises within a tick infested area, in order that they be relieved from quarantine and put on an equal footing with the cattle from the North.

Nor can the State authorities make this inspection and certify to it. That must be done by the Federal Government. The State is not recognized along those lines. It is absolutely essential if this work of tick eradication is to progress, as it should progress, that the Federal Government make a liberal appropriation in order to supervise or rather to investigate and then release from quarantine such territory as is free of this pest. Of course, so far as the work in a tick infested area or a tick infested premise is concerned, that is mostly done by the State. Very little of the money given by the Federal Government goes to do any of the actual field work, except supervision. Of course, they have to supervise it.

If we do free a county we cannot release it from quarantine; that would not be in our power at all. The Federal Government has to have a man on the job who will look into this matter, and it is only his word that finally releases the county from quarantine.

Senator Chamberlain. Even before efforts were made to eradicate the tick the Government was at enormous expense to quarantine the North against the South.

Dr. Bahnsen. It was at the request of the North that the Southern cattle were quarantined.

Senator Chamberlain. I say it was a large expense on that account.

Dr. Bahnsen. Yes, sir.

Senator Chamberlain. That will be gradually eliminated when the tick is eliminated?

Dr. Bahnsen. When the tick is eliminated that will be absolutely eliminated; all expense for quarantine against the cattle tick. There will be no further expense. In other words, it is the only appropriation that is called for right now that we can say with absolute certainty will, within a fixed number of years, according to the amount of money and the number of men we will have to do this work, be completed, and when it is done it will always remain done.

Since the work was taken up by the Government in 1906 not a single county that has been released from quarantine has been placed back under quarantine.

We know that just across the imaginary border between a tick infested county and a free county they are not free from ticks on one side and heavily infested on the other; we know that is not reasonable. But infestation is there, and we know that people will violate the quarantine restrictions and cross over into the free and released area; but when they do so they take a great deal of precaution to see that they do not carry ticks. Records for the past six years show absolutely that once the work is completed there is no danger of reinfestation again.

The line has moved progressively to the South, and not a county has been placed back in quarantine after being released from quarantine.

In regard to the State aid, the States—at least those that I am familiar with—have all done more than their share of work, so far as the educational feature of it is concerned, and the expenditure of money. They have built most of the dipping vats and done most of the cattle farm-to-farm inspection. That has always been done by the State and counties, although the Federal Government has to have a hand in it in order to be able to release the territory from quarantine. They have to have a part in it. The counties provide money and the States provide money; some States more, some States less. Last year the State of Georgia gave $15,000. That was the first liberal appropriation that was given by the State for the work of tick eradication. We fully expect to get a larger appropriation. In addition, the counties have always appropriated very liberally where we have gone into the matter with them.

Another point that has already been brought out that I should like to emphasize is the one raised by Senator Crawford, who asked if cattle were once infected if they might not become reinfected. One disinfection or two disinfections will not free any premises from ticks. You have to disinfect cattle regularly at an interval not exceeding three weeks; that is the very limit. It is much better to disinfect every fourteen days; and from ten to fifteen or sixteen disinfections beginning April 1 of any year will absolutely eradicate the tick from any premises or from any county or from any State, provided the work is done regularly and thoroughly. That is all there is to tick eradication.

So we know that we can finish this work in a few years; we know we can do it, because we have had the experience in the matter, and we know that we are doing it right along. The only time that we have ever had any trouble is when, for some reason, an individual either fails to disinfect them regularly or fails to do it thoroughly.

Senator Crawford. Do you find a good deal of prejudice among people against doing anything of that sort?

Dr. Bahnsen. Yes. It is so in every work of advancement. There is no work of advancement that does not meet with opposition.

Senator Crawford. They think you are interfering with their personal privilege?

Dr. Bahnsen. That is right. That is often so when you begin to talk to a man about raising 40 bushels of corn instead of 14. He will tell you, "You are a fool, and you cannot do it." At the same time, when you demonstrate it to him you would think that he would believe that you could.

Senator Chamberlain. Are your States passing any laws compelling this eradication?

Dr. Bahnsen. Yes, sir; we have a law enforcing disinfection and making a violation of that law a misdemeanor.

Senator Chamberlain. That is very essential, I should think.

Dr. Bahnsen. Yes, sir. In fact, we could not make any headway at all without it.

I thank you.

The Chairman. Who is your next speaker, Dr. Cary?

Dr. Carey. The next will be Dr. R. F. Kolb.

STATEMENT OF DR. R. F. KOLB, COMMISSIONER OF AGRICULTURE OF ALABAMA, MONTGOMERY, ALA.

The Chairman. Dr. Kolb, you are Commissioner of Agriculture?

Dr. Kolb. Commissioner of Agriculture in Alabama; yes, sir.

The Chairman. And have been for a good many years?

Dr. Kolb. Well, I have only been now for two years. I was commissioner and held the same office over twenty years ago, but I retired and am one of the "come backs."

Mr. Chairman and members of the committee, I am very glad indeed that you had an opportunity of hearing the gentlemen who have preceded me, because I want to assure you that they are experts, educated veterinarians, and know what they are talking about, and I can only endorse what they have said and emphasize the needs of the South and for the United States Government to aid us with more men and money. That is what we need. We are not asking for this money for ourselves, or to distribute it ourselves, but for the United States Department of Agriculture to take charge of it, of course, and by putting more men in the field, which requires a larger appropriation, in order to have a sufficient number of them to do this work, to educate our people along this line, and to absolutely, as you have been told, eradicate the tick in a very short time—within a few years.

Now I know that in my State alone—and the National Department of Agriculture verifies it—we lose annually in Alabama over $5,000,000 by this tick in the loss of cattle and have been doing it annually for two years, and it is increasing every year.

The United States Government ought to come to our assistance and stop this thing. We are doing all we can in the various States. While our State of Alabama has not made any direct appropriation for this special work, our counties have. We are probably giving two or three or four times as much—the counties are—than the United States Government has given; at least $25,000 to $30,000 to $40,000 in the various counties. But I want to call your attention

to the fact that Alabama, through her legislature and through her appropriations, is giving more money today in the interest of the approved methods of agriculture than any State in the Union, excepting none—South, North, East or West. We give $25,000 annually now, for the moneys are all paid out of the funds of my department—and I know what I am talking about—for this farm demonstration work that we carry on jointly with the State and the Department of Agriculture here. We pay three-fifths of the salaries of these demonstrators. We have one in every county of the State of Alabama. We pay every month three-fifths of the salaries of these demonstrators, while the Government only pays two-fifths. Then in soil survey work we are doing still more than any other State in the Union. We are carrying on this soil survey and will soon have—in a few more years—every county in the State surveyed.

We have now got about two-thirds of the State surveyed. Alabama appropriates $10,000 annually for that purpose, and these soil surveyors are employed by the Commissioner of Agriculture of my State to co-operate in that work with the soil surveyors of the United States Department of Agriculture. We have four and they have four carrying on this work in every county in Alabama.

Mr. Chairman, I do not know anything that I can say that will aid you in coming to a just conclusion in this matter, except to emphasize what these experts have told you. They know what they are talking about, because they are educated in that line of work.

I thank you, gentlemen.

STATEMENT OF PROF. ARCHIBALD SMITH, PROFESSOR OF ANIMAL INDUSTRY OF THE AGRICULTURAL COLLEGE AND SECRETARY OF THE STATE LIVE STOCK SANITARY BOARD OF MISSISSIPPI, STARKSVILLE, MISS.

The Chairman. Just state your position, please.

Professor Smith. I have the chair of animal industry at the State Agricultural College, and am Secretary of the State Live Stock Sanitary Board.

Mr. Chairman and gentlemen of the committee, when the first Federal appropriation was made for this work, the State of Mississippi was far below the quarantine line, and, we having no State laws that would enable us to work there was nothing done in this line until 1908. At that time the State made an appropriation of $5,000 for two years' work, and as a result of our work during those two years they made an appropriation of $40,000 to carry on this work. Now, as a result of our work since beginning, we have eight counties cleaned and above the quarantine line and an area about equal to the size of eight counties now ready to be released.

Gentlemen, we are in a peculiar condition in that State, different from some of the others in that it is naturally a great stock-raising State. There is no State that has a greater variety of grasses and feed suitable for economic stock production, while as you know, cotton is the one great cash crop of the State, and of the South. During these last two or three years what is known as the cotton boll weevil has been sweeping over the State, and that has made it absolutely necessary for these farmers to change their system of agriculture; they have got to adopt other methods. The farm demonstration work through the Department of Agriculture and the State departments are urging these farmers to grow other crops and to go into live-stock raising.

Gentlemen, in order to utilize these other crops when we get them grown

we must necessarily have cattle and other stock, and we have got to create the condition that will enable these people to breed and feed cattle successfully. The boll weevil has had the effect of reducing land values seriously and reducing the revenue of the farmers. When you advise those people to go into cattle raising they say, "Where am I going to get them?" I can get the common cattle, the scrub cattle of the district, but there is not much money in handling them. We cannot go out into the free areas of the country and buy good cattle and ship them here, because the risk of losing them is so great.

This last year the Live Stock Sanitary Board, in co-operation with the Federal Bureau, has had men working in about 22 counties. That is all the money we had available. We have about 30 counties in the State—that is, the Boards of Supervisors of 30 counties are willing to appropriate funds to employ county inspectors to visit these farms and see that they are disinfected if the Federal Bureau in the State could provide men to supervise their work and report to the Federal Department when it is cleaned. No matter how much money the State and county might appropriate the area cannot be released until the Federal Department is satisfied through the reports from their own men that the area is free. We cannot make progress any faster than the Federal Department is able to supply competent inspectors to supervise their work.

During these past two years we have had over 3,000 dipping vats built within the State at an average cost of about $35 each, and during this last year the counties of the State alone have appropriated about $50,000 for inspectors. That will give you some idea of the interest on the part of the people.

Senator Chamberlain. The people there are pretty nearly driven to stock raising in view of the existence of the boll weevil, are they not?

Professor Smith. They are being forced to it, and we are doing our best to bring about a condition that will enable them to carry it on profitably. It is a very serious matter for those people. We have many farmers who come down from the North to purchase land, especially in the prairie counties. We are about ready to release half of them. The black land underlaid with lime rock is attractive to these Northern farmers. The land was cheap, and they have bought large areas of it. But they are not familiar with growing cotton, and the cattle tick there prevented them from handling their cattle properly that they took down with them, and as a result many of these people have failed to realize on their money as a result of this condition. We are trying to create a condition there that will enable those people to go down there and farm just as they would farm at home. They can grow the same crops, and if we can give them an opportunity to raise cattle as successfully there as at home there is no reason why they should not find that land very profitable. The State is appropriating very liberally; every county is appropriating, liberally. The counties furnish the services of from four to five men for each county for the one man that the Federal Bureau furnishes, and we are asking for at least thirty new men in Mississippi next year, in order to give relief to those people who are so desperately in need of it. We are doing our utmost not only to free the boll-weevil-infested area from ticks, but to free the other areas from ticks as rapidly as the weevil infests it, so that these people can change their methods of farming and prevent this enormous reduction in land values and the revenue of the owners.

I thank you, gentlemen.

Dr. Cary. Now, gentlemen, we will call on a man from the State of Florida, a State that has not taken up the work, but wants to take it up. I introduce Dr. Dawson.

Statement of Dr. C. F. Dawson, Veterinarian of the State Board of Health of Florida, Jacksonville, Fla.

Dr. Dawson. Gentlemen of the committee, as Dr. Cary has just said, I come from a State which has not yet done anything in the line of tick eradication, but we are very much interested in the subject and expect to take it up soon. I have no doubt that the State Board of Health will take from its funds an amount equal to that of the other States which have started the work. I do not think it well to ask for too much money from the State legislature or from the Board until we get in a position to use it profitably. We have to know how to handle the money before we can handle it judiciously.

We have in Florida about 850,000 animals. Most of them are known as scrub animals, because they have been raised under Florida conditions, and that means under conditions which the tick produces. There is no section in Florida which is not infested with ticks. Some of our Southern States have sections, as we have already been told, where there never have been ticks. But I think in our State ticks are prevalent everywhere. We lose every year, according to the census—and I believe the report is not as heavy as it ought to be—3 per cent. That would cause us a loss of $25,000 worth of cattle every year from what is known as exposure. It is difficult to understand how an animal would die from exposure in a climate like Florida, but we must remember that exposure means tick infestation, and that is all it does mean. If we could free Florida from ticks, we would start up practically in that country a new industry. While there are men there who have made money in the cattle business, they have made it at random, owning cattle by the thousands and not knowing much about it, and never seeing them except when they are driven up to be sold. But those people are few and far between. We want it so that everybody can raise cattle in that State profitably, but we cannot do it so long as this tick is there to put a damper on it.

The best way to do is to form in every county cattle improvement clubs—not bringing the tick to the surface as being the one object for its existence there—clubs that are called "cattle improvement clubs," and having tick eradication as one of the things for which the club would work. They would meet annually at Jacksonville, or some other place, having a delegate from each one of the counties, and in that way we expect to carry on the educational side of the work. We are not expecting to jump in and eradicate in any great amount of territory in Florida suddenly. It has got to be an educational campaign. We have got to provide for this work men who can reach all the small owners of cattle, because in a country of that kind they live far away from railroads and are hard to reach, and we have to pick out a certain class of men who have influence with that particular kind of person. I have an idea that our State could claim the distinction of being the point at which the cattle tick first arrived in America. St. Augustine being the oldest settlement, it may be that we are responsible in a way.

Senator Crawford. You are not claiming that as any great honor?

Dr. Dawson. No, sir; just merely a distinction. I believe that is all I have to say. Of course I have no particular or practical knowledge of the real subject of dipping cattle. It is all very simple, though. All that

these gentlemen have told you is absolute truth. The tick can be eradicated or destroyed and the Texas fever can be stamped out, and it is the only one that can be stamped out in that way. The peculiar life history of the tick makes it possible, and if you eradicate the life principle of the tick you then exterminate it. It is the only insect in the world that can be exterminated, in my opinion. It may be interesting to know, with regard to this cattle tick, that the discovery of the tick carrying the germ of the Texas fever was the first instance in the history of medicine, where it was shown that diseases are insect-borne. Since that time we have discovered that malaria is carried by mosquitoes, and that yellow fever is carried by mosquitoes. This particular tick is the only one that carries this particular parasite that causes disease in cattle greatly resembling malaria in man.

Senator Chamberlain. There is one thing in the West more deadly than the tick, and that is the spotted fever in Montana.

Dr. Dawsen. That is all I care to say, gentlemen.

STATEMENT OF W. G. CHRISMAN, STATE VETERINARIAN OF NORTH CAROLINA, RALEIGH, N. C.

Dr. Chrisman. Gentlemen, I have this morning a map of North Carolina indicating what has been done in tick eradication in that State. When the work was first taken up by the United States Government in 1906 the entire State of North Carolina, with the exception of a few counties on the western border, were tick infested. The entire State was tick infested. Beginning in 1906, with the aid of the Bureau, we began in the western part of our State, at the top of the Blue Ridge Mountains, with a force in eradicating ticks. We have worked consistently in that State and are now pushing our line eastward year after year, taking in a tier of counties clear across the State from north to south. From that day to this we have been able to eradicate the ticks from the western part of the State moving eastward down to where you see this black line (indicating) and are now crossing the State from Roanoke River on the north to the Pedee River on the south. That is a clear demonstration of the fact that we can eradicate ticks by persistent and regular methods. The method used in North Carolina is a little bit different from that in some of the other States. We have not used the dipping vat, because conditions do not, as we think, warrant our doing it. We have had our inspector in the field, and have been spraying the cattle with spray pumps, and think for our particular conditions those are the best methods. Now, what we are going to do in the future depends on conditions as we find them when we get to them—whether we shall continue in the use of the spray pumps or adopt the dipping vats. From here (indicating) it is all tick infested and has always been since our country has been infested with ticks.

As the gentleman who preceded me said, our ticks came into Florida and they worked northward. The reason they have not gone further into the Northern States is because they were stopped when they reached this point; taking in Virginia, which is north of us; from there on, the northern boundary of the coast, and all the Coast States, have been infested by these ticks and we have worked persistently in eradicating them; and just one glance at this little map will indicate that we can eradicate ticks successfully.

The question now comes down to one of means to continue our work and to eradicate the tick from the territory that still remains infested. The question is now one of money and men to do the work with. We are asking you

gentlemen to give us a larger appropriation for this work, because the States themselves cannot eradicate the ticks without your assistance. As Dr. Bahnsen has said, no matter how well we have cleaned our territory, and although we may be ready for release, we cannot ourselves release that territory until the bureau inspectors have been there and been over the field and seen conditions themselves, and these reports must come in from your men before the bureau can release this territory.

Now we are asking for more men to supervise the work. These States and counties have appropriated money to do the work, but they want the Federal men to supervise this work. We figure that in North Carolina it will take five additional men next year to provide for the work in the counties that we expect to work, and that the other States have each given the estimate that that many men will be necessary in those States. We are working with a force of men throughout the year doing this work. Heretofore in Virginia and Tennessee, the winters have been especially cold, so much so that they would kill ticks themselves and it was not necessary for us to keep our men in the field the entire year; but now practically all this colder territory has been released from quarantine. We are working now down in the southern and eastern sections of those States where all the winters are so mild that these ticks will live the entire year. Nature is not taking care of us. Now we have to take care of ourselves, and we have to put men and money into the proposition to work the entire year. Therefore, it becomes more expensive and more costly to do that work now than at first, and now we have more territory ready to work that we had when our first appropriation was given us, about seven years ago, when the committee came up before you gentlemen asking for this appropriation.

That is why we are here today asking for a larger appropriation, because the needs of the work are very much larger than they have been in the past The territory is ready. We have the territory ready right now for work, and we are simply asking for men and for money in order that we may continue —money on your part to give us the Federal aid we should have.

The map of the United States on the desk will show the territory that was affected at first, where the first quarantine line was established by the bureau. It also indicates the amount of territory that has been released, and it also states and shows what is yet in quarantine.

Gentlemen, I thank you.

STATEMENT OF J. F. STAMFORD, FAYETTEVILLE, ARK., STATE VETERINARIAN.

Dr. Stamford. Gentlemen, I merely wish to state that at the beginning of this work of tick eradication, six years ago, every county within the State of Arkansas was quarantined by the National Government. At present, we have fourteen counties which have been released from the National quarantine by the United States Bureau of Animal Industry. This has been done through the work of tick eradication. We have an area which composes these counties that represent something like 11,003 square miles. I desire to show you the interest that our pople have taken in this work, to say that during the last year, and during only six months of last year, 1,161 square miles of this total free area was free through the aid of our own people from

private contributions. Our State legislature will meet this month, and that body of men will look well to the interest of the agriculture of the State of Arkansas along the line of tick eradication, for the people of our own State are demanding that we take up the work, and we will have to have the number of Federal men increased in order to take care of the work that we will be forced to take up during the coming years. We estimate that it will take at least eight more men from the Bureau of Animal Industry in order to supervise this work of tick eradication that will be taken up in the coming years—the coming "tick eradication" years which will start in the early days of spring.

FINAL STATEMENT OF DR. C. A. CARY.

Dr. Cary. Now gentlemen, I simply desire to say a word in closing, which will occupy but a minute or two. We have practically four States not represented: Texas, the largest and most extensively infested; Oklahoma, South Carolina, and there is one county in Missouri. Texas demands, and should have more men than any other State. I am sorry they have not a man here to represent it.

Senator Chamberlain. Are they interested in the subject.

Dr. Cary. Yes, sir; they have a call for at least 20 more men. Oklahoma has a call in for 20 more men. As I stated in the beginning, after getting a summary of all the other wants of the different States infested, they are calling for 150 new men from the Department of Agriculture to supervise this work. Now this means, if we can get it, that the work will progress more rapidly in the coming years than ever before, simply because we have now about 75,000 miles of territory that we are working in that will nearly all be practically cleaned up this year, if we get sufficient Federal aid. The people are ready and want the work to go on in this area. This is just one-half as much as was cleaned in the last six years. If we do not get the money and leadership it will simply mean that this work wil drag over a long period of years and in the end cost as much or more to the States, the Government, and the counties interested.

The Chairman. If you secured this large appropriation would not the Government have difficulty in finding competent inspectors?

Dr. Cary. No, sir; I think not.

Senator Crawford. That is what is in my mind. Where are we going to get an army of veterinarians who will eat up half a million dollars?

Dr. Cary. From 150 to 175 men will cover it, and there will be no trouble to get men who are skilled.

Senator Chamberlain. Does it require veterinarians?

Senator Crawford. Oh, yes.

Dr. Cary. That is what we require—graduated veterinarians. There will be no difficulty in finding them.

Senator Sanders. Mr. Chairman, as I understand it, the other departments or other divisions of the Agricultural Department have men that they can draw on for that use.

The Chairman. Very likely.

Senator Sanders. I am told they have.

The Chairman. Is there anything further Doctor, that you desire to say?

Dr. Cary. Not unless there are some questions. We desire to thank you, gentlemen, for your kind favor in giving us this hearing.

The Chairman. I wish to state to you, Dr. Cary, and you, gentlemen, that we fully appreciate the importance of this matter, and when the bill comes from the House, as it will in a few days, I hope, the committee here and the Senate, of course, will give careful consideration to what has been said, and we are obliged to you for the information you have given us.

The Committee thereupon adjourned.

CONSTRUCTION OF A DIPPING VAT.

Directions for Constructing a Vat and Dipping Cattle to Destroy Ticks.

(From Circular No. 183, Bureau of Animal Industry. By Graybill and Ellenberger.)

ARSENICAL DIPS.

Arsenical dips as agents for destroying cattle ticks have come into much favor during the past few years. This has been due to their efficacy, cheapness, the ease with which they are prepared, and the comparatively slight injury they cause to cattle when properly prepared and used. Homemade dips are the ones most commonly used and are quite satisfactory in every way when ordinary care is used in their preparation. Recently there has been placed on the market a proprietary concentrated arsenical dip which has given good results. This dip is prepared for use by diluting it with cold water in the proportions of 1 to 100. The only advantage in such a dip is that comparatively little time is required in preparing the bath, but this advantage is largely counterbalanced by the fact that it is more expensive than a homemade dip.

PREPARATION AND USE OF ARSENICAL DIPS.

The formula most commonly used in making an arsenical dip is the following:

Sodium carbonate (sal soda)	pounds	24
Arsenic trioxid (white arsenic)	do	8
Pine tar	gallon	1
Water sufficient to make 500 gallons.		

If for any reason a stronger dip is desired, 25 pounds of sodium carbonate and 10 pounds of arsenic trioxid may be used in place of the amounts given in the above formula. The stronger dip is required by the regulations of the Bureau of Animal Industry in the

dipping of cattle which are to enter interstate commerce from quarantined areas, but for ordinary eradication work when immediate removal of the cattle to tick-free areas is not contemplated it will probably be best to use the weaker solution, and this is especially true during hot weather and when the animals are to be treated every two weeks.

In preparing the dip a large caldron or galvanized tank is required for heating the water in which to dissolve the chemicals. Thirty or forty gallons of water should be placed in the caldron or tank and brought to a boil. The amount of sodium carbonate indicated in the formula is then added and dissolved by stirring. When this is accomplished, the required amount of arsenic is added and dissolved in a similar manner. The fire is then drawn, and the solution is permitted to cool to 140 degrees F., or this process may be hastened by the addition of cold water. The pine tar is then added slowly in a thin stream and thoroughly mixed with the solution by constant stirring. This solution is diluted to 500 gallons before using.

If a larger caldron or tank is available for preparing the dip, a greater quantity of solution may be prepared at one time, always, of course, in the same proportion as the above. In this way the time required in preparing the amount of solution necessary to fill a vat is reduced considerably. In case it is necessary to use a smaller container, say of about the capacity of 25 gallons, only half the amount of solution indicated should be prepared at one time, the quantities of ingredients used being half those in the formula. This will, however, require so much time in preparing the amount of solution necessary to fill a vat that when possible it is advisable to provide a larger vessel for dissolving the chemicals.

The caldron or tank and utensils used in preparing the dip should be kept free from grease or oil, as small quantities of these may envelope particles of arsenic and prevent or hinder the solution of the arsenic. It should also be borne in mind that when hard water is used in the preparation of the dip the dissolving of the sodium carbonate (sal soda) in the boiling water results in the formation of a fine white or gray insoluble powder or precipitate of lime salts which may be taken for undissolved arsenic, and thus lead to the belief that all the arsenic has not gone into solution.

The arsenical solution may be poured into the vat as rapidly as

it is prepared until the amount required to fill the vat, when properly diluted, has been made. The most convenient way of diluting the solution is to run the water into the vat through a hose or pipe. The capacity of the vat at the depth to which it is necessary to fill it for dipping, if not known, should be calculated, and for future convenience the water line should be plainly marked at some point on the wall of the vat. After the exact amount of solution necessary to furnish diluted dip to fill the vat has been prepared and placed in the vat all that is necessary is to allow water to flow into the vat until the surface of the dip reaches the mark made on the side of the vat. For example, if the capacity of the vat is 2,000 gallons, then four times the amount of solution necessary to make 500 gallons of dip should be prepared, placed in the vat, and the latter filled with water to the 2,000-gallon mark. In case the vat leaks it will be necessary to modify the above procedure by placing the concentrated arsenical solution necessary to fill the vat in barrels and only placing it in the vat when the latter is nearly filled with water, being careful to note, however, that there is ample capacity remaining so that when the solution in the barrel is added the dip surface will not be above the mark to which the vat is to be filled.

The capacity of the vat planned in this circular at a depth of 5 feet 3 inches is 1,470 gallons. In order to fill it to that depth with dip it will be necessary to prepare two batches of concentrated dip each containing the ingredients necessary for making 500 gallons of diluted dip and a third batch containing 7 pounds 9 ounces of arsenic and 22 pounds 3 ounces of sodium carbonate in case 8 pounds of arsenic are being used to the 500 gallons, or 9 pounds 7 ounces of arsenic and 22 pounds 8 ounces of sodium carbonate in case 10 pounds of arsenic are being used to the 500 gallons.

When for any reason it is not convenient to follow the above method of diluting the dip, a stock solution may be prepared in which the quantity of ingredients for 500 gallons of diluted dip are dissolved in 50 gallons of water. Nine parts of water to 1 part of this stock solution will then give the proper dilution. The stock solution is found very convenient for replenishing the dip in a vat when it has become too low for dipping. A stock solution should not be made in more concentrated form than that given (50 gallons of stock for 500 gallons of dip), as the pine tar does not remain properly mixed when the solution is too concentrated.

The arsenical dip may be left in the vat and used repeatedly, replenishing it with the proper quantities of water and stock solution when necessary. When, however, the dip becomes filthy through the addition of manure and dirt carried in by the cattle, the vat should be emptied, cleaned, and filled with fresh fluid. The frequency with which this should be done must be left to the owner, as the condition of the dip at any period after it has been made depends on a variety of conditions, such as the number of cattle dipped, the frequency of the dippings, etc. Even though the dip may not become very filthy, its efficiency decreases somewhat on standing, owing to gradual oxidation of the arsenic. It is therefore advisable to recharge the vat if the dip is more than a month or six weeks old irrespective of its condition as to cleanliness.

At the conclusion of each dipping it is well to mark the position of the surface of the dip on the side of the vat in order to determine at the next dipping whether there has been a change in the level of the dip. If the surface of the dip has fallen and it is known that the vat does not leak, there has been a loss of water by evaporation and consequently an increase in the strength of the dip. In order to bring the dip down to its former strength water should be run into the vat until the dip surface reaches the mark made at the last dipping. If the fall has been due to the vat leaking, the strength of the dip has not been altered and consequently water alone should not be added. If the dip surface has been raised by rain the amount of water added in this way should be determined by calculation, and for every nine gallons of water one gallon of the stock solution previously mentioned should be used.

When not in use the vat should be tightly covered with a waterproof cover to prevent evaporation on the one hand and further dilution by rain on the other hand. Securely covering the vat when not in use also lessens the risk of accidental poisoning of stock and human beings.

PRECAUTIONS IN THE USE OF ARSENIC.

On account of the fact that arsenic is a dangerous poison, great care must be observed in making and using the arsenical dip. From the time the arsenic is procured from the druggist until the last particle of unused residue is properly disposed of, the most scrupulous care should be taken in handling it. Guessing at weights or

measures or carelessness in any particular is liable to result in great damage, and not only may valuable live stock be destroyed, but human beings may lose their lives as well.

Persons using the dip should bear in mind the possibility of absorbing arsenic through cuts, scratches, or abrasions of the skin and also by inhalations of vapors from the boiler in which the dip is prepared. It should be remembered that the absorption of even very small quantities of arsenic, if repeated from day to day, is liable ultimately to result in arsenical poisoning.

Cattle should always be watered a short time before they are dipped. After they emerge from the vat they should be kept on a draining floor until the dip ceases to run from their bodies; then they should be placed in a yard free of vegetation until they are entirely dry. If cattle are allowed to drain in places where pools of dip collect, from which they may drink, or are turned at once on the pasture, where the dip will run from their bodies on the grass and other vegetation, serious losses are liable to result. Crowding the animals before they are dry should also be avoided, and they should not be driven any considerable distance within a week after dipping, especially in hot weather. If many repeated treatments are given the cattle should not be treated oftener than every two weeks.

In addition to properly protecting vats containing arsenical dip when not in use, another precaution must be observed when vats are to be emptied for cleaning. The dip should not be poured or allowed to flow on land and vegetation to which cattle or other animals have access. The best plan is to run the dip into a pit properly protected by fences, and the dip should not be deposited where it may be carried by seepage into wells or springs which supply water used on the farm.

The above precautions are given to inform persons not familiar with arsenic of its poisonous nature and the care that should be observed in its use, and to stimulate a proper care in those who know its poisonous nature and yet might be careless or who may not know all the precautions that should be observed. Unfortunately, however, the giving and emphasizing of such precautions have had the effect of arousing unwarranted fear of arsenic on the part of some stockmen and farmers, and have caused them, for a time at least, to refuse to undertake its use in treating cattle for ticks. For the benefit of those who may unduly fear arsenic because of what has been said, it should be stated that where reasonable care is observed in following the precautions given there is little danger of losses occurring. The arsenical dip has been extensively used during the past five years in tick-eradication work in the tick-infested area, and considering the number of cattle that have been dipped the losses have been very small. Some of these have been definitely traced to carelessness, and there is little doubt that if it had been possible to investigate all losses the majority of them would have been found to be due to this cause.

To Render Harmless the Arsenic in the Dipping Solution Before Emptying the Vat for Cleaning.

Measure approximately the number of gallons of solution left in the vat, and for each 100 gallons add six pounds of slacked lime. Mix the whole thoroughly and allow it to stand for a couple of hours. Then, for each 100 gallons in the vat, take six pounds of ordinary commercial copperas (sulphate of iron) and dissolve it in hot water. Pour the hot copperas solution into the vat, stir it up well and allow the whole to stand for ten or twelve hours. The arsenic unites with the copperas (iron) and will have fallen to the bottom of the vat as an insoluble, harmless precipitate or sediment. The clear fluid on top will contain no arsenic, and may be pumped, or syphoned out on to the ground.

The sediment at the bottom of the vat may be taken out and buried, if so desired, although it too will be non-poisonous.

Method of Dipping.

The procedure to be followed in dipping animals on a farm depends on the end that is sought in undertaking the treatment. If it is simply desired to reduce and keep down the infestation of ticks on a farm, it will only be necessary for the owner to keep his animals under observation and dip them when, according to his judgment, treatment is necessary to keep the ticks under control. Such a procedure may well be followed where the regular tick eradication is not under way; that is, in instances in which it is not yet practicable nor expedient to rid farms completely of ticks.

If, however, it is desired to rid the farm completely of ticks—

and this should be the purpose in every case in which it is practicable and expedient—it will be necessary to dip all cattle, and also any horses, mules, or asses that may harbor the cattle tick, at regular intervals until all ticks have disappeared from the farm. The purpose of such dipping is to prevent as nearly as possible any engorged females dropping to the pasture and there laying eggs which in time may develop into young ticks. In order to do this it is necessary to dip at intervals short enough so that no tick after getting on the cattle will have time to mature and drop off before the next dipping. An interval between dippings of two weeks is considered most satisfactory. This interval, however, may be increased somewhat if necessary, but it should never be greater than three weeks.

In freeing a farm of ticks the dipping should not be discontinued until it has been determined with certainty that the cattle and premises are free of ticks. It should be borne in mind that it is almost impossible to determine by a few inspections, even if carried out with great care, that animals are free from ticks. If the treatment is discontinued and a few unobserved ticks are still on the animals, these, on maturing and dropping, are likely to give rise to a new brood of young ticks. Moreover, even if the cattle are actually free from ticks, the fact should not be lost sight of that there may still be engorged females, eggs and seed ticks on the premises. This is most likely to be the case during the colder part of the year when the development of the tick on the ground progresses slowly and also when any seed ticks that may be present are likely to be slow in reaching the cattle because of inactivity resulting from the low temperature.

To Re-enforce the Arsenical Dipping Solution in a Vat, from Time to Time When in Use.

Measure the water poured in to fill up the vat. Then figure the amounts of the materials necessary for that quantity of water. These will be found to be about as follows:

	Arsenic lbs.	Soda lbs.	Pine Tar	
For 100 gallons	2	5	3	pints
" 200 "	4	10	7	"
" 300 "	6	15	9	"
" 400 "	8	20	14	"
" 500 "	10	25	16	" or 2 gallons

The concentrated solution for the smaller quantities should be prepared in the same manner as when filling the vat the first time, using the proportionate quantities of water.

Specifications for the Construction of a Concrete Cattle-Dipping Vat.

SITE.

The site selected for the location of the vat should be dry and of sufficient size to admit of the construction of the chute, the dripping pen, and at least two additional pens—one for holding the cattle prior to dipping and the other for retaining them after dipping until sufficiently dried.

EXCAVATION.

The excavation should be made 1 foot wider and 1 foot longer than the inside dimensions of the vat and should conform to its shape. The inside dimensions of the vat are shown on the drawings (fig. 1) and are as follows: Length at top of vat, 26 feet; bottom, 12 feet. Width at top, 3 feet; at bottom, 1½ feet. Depth, 6½ feet.

The sides and bottom of the excavation should be firm and solid, as they are to serve for the outside forms in casting the concrete. If it is necessary to do any filling in order to conform to the shape of the vat, the filling should be puddled and thoroughly rammed until solid, because the stability of the concrete depends on the foundation.

FORMS.

The wooden forms should be constructed of 1-inch boards and 2 by 4 inch braces, the boards being nailed to the outside face of the braces, as shown in the drawings. The sides and end walls should be built 8 inches higher than the surface of the ground, which should be level.

CONCRETE.

The concrete should be made of 1 part cement, by measure, 2½ parts of sand, and 5 parts of broken rock or gravel. The cement should be of a standard brand of Portland, the sand clean and coarse, and the broken rock from about ¼-inch pieces to not larger than will pass in every direction through a 1-inch ring.

Mixing.—The mixing should be done on a tight wooden platform or in a tight box. The sand and stone should be measured in a bottomless box, 2½ feet long by 2 feet wide by 1 foot deep, having a capacity of 5 cubic feet. A convenient size of batch to mix is one

FIG. 1.—Plans for a concrete dipping vat.

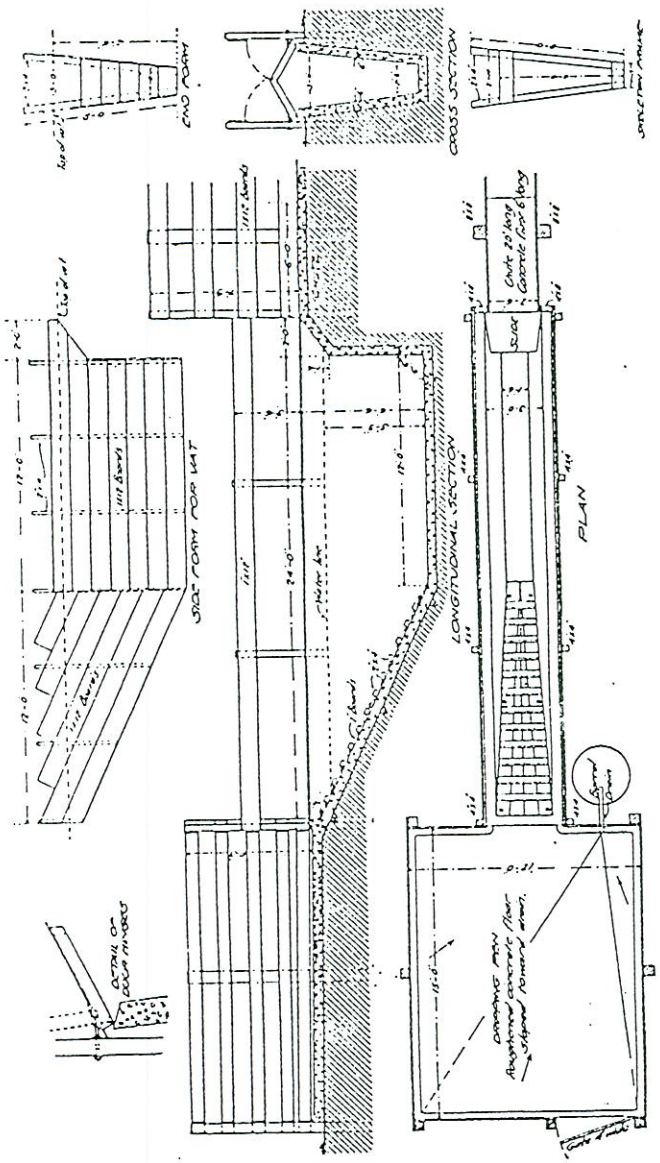


FIG. 1.—Plans for a concrete dipping vat.

consisting of 2 bags of cement, 1 measure (5 cubic feet) of sand, and 2 measures (10 cubic feet) of stone.

The sand is measured out first and the cement emptied on top, after which the two materials are thoroughly mixed together, dry. In the meantime the stone may be measured out and thoroughly drenched with water. The cement-sand mixture is mixed with water and the resulting mortar then combined with the stone. The stone should be shoveled on the mortar, which has been previously spread out in a thin layer. Mixing should continue until the stone is thoroughly coated with mortar, more water being added during the mixing process if necessary.

Laying.—Before laying the concrete the molds should be set and thoroughly braced into place. The side forms may be suspended in the excavation with their lower edges 6 inches from the bottom by means of crosspieces nailed to the uprights and of sufficient length to rest on supports located several feet from the edges of the excavation. The concrete for the bottom and incline is deposited first, this mixture being of a consistency that water will flush to the surface on ramming. The mixtures for the sides and end should be very wet and should be thoroughly puddled into place. The consistency of the concrete for the side walls should be such that it will run off the shovel unless handled quickly.

The laying of the concrete should be done, if possible, in one operation, in order that there may be no joints between the new and old work. If it becomes necessary to lay the concrete on two or more days the surface on which the new concrete is to be deposited should be washed throughly clean and coated with grout of pure Portland cement and water mixed to the consistency of cream. The new concrete should be placed before the grout has set. Extreme care should be taken to prevent dirt from falling in on top of the deposited concrete.

The form should not be removed until the concrete is set, which in moderate weather will have taken place in about 24 hours. In damp, cold weather at least 48 hours should be allowed before removing the forms. It will be advisable, especially in water-soaked ground, to allow the forms to remain in place for one week before removal.

Finishing Coat.—Before applying the surface coat dampen the walls and floor thoroughly. Cover the entire exposed surface of the

floor and walls with a coating one-half inch thick of cement mortar composed of Portland cement 1 part, sand 2 parts. Coating to be floated and troweled to a smooth finish.

WATERPROOFING.

If the earth around the vat is thoroughly drained the vat may be waterproofed by painting the surface coat, but painting the surface will not give satisfactory results if there is ground water to seep in. The paint may be good hot pine tar, or gas-house tar cut with naphtha or gasoline and applied with a brush, or after the mortar coat has hardened the inside of the vat may be painted with an oil-cement paint made as follows:* Mix enough water with Portland cement to make a fairly stiff paste; add to this 5 per cent of heavy petroleum residuum oil based on the weight of the cement, and mix thoroughly until the oil entirely disappears, then add more water and stir until a paint of the consistency of cream is formed. This paint should be applied with a brush and should be well rubbed into the surface. Should the mortar coat be omitted the paint coat should be applied directly to the surface of the concrete.

EXIT INCLINE.

As the exit incline is to have a false wooden floor, it will be necessary to embed iron bolts in the concrete, to which the wooden floor may be fastened. Before the concrete incline is laid embed in the dirt three pieces of 2 by 4 inch scantling, placed at the top, center, and bottom of the incline. The bolts should extend through these pieces and should be placed with the head next to the dirt. The bolts should be long enough to extend through the concrete and the inch boards of the floor, so that the wooden floor may be securely fastened.

SLIDE.

Cover the slide with a sheet of boiler iron properly fastened to the cement.

*These directions for the oil-cement paint are furnished by the Office of Public Roads of the United States Department of Agriculture.

COVER.

The cover of the vat consists of two leaves hinged on posts set 3 feet in the ground along each side of the vat. The leaves are two feet 6 inches wide, and when open rest against the upper part of the posts to which they are hinged and serve as splash boards. The details of the hinge* used and the method of setting it are shown in the drawings. When the leaves are open their lower edges are just above the top of the side walls, which are given a slope inward for the purpose of conducting the dip running from the splash boards back into the vat. Removable doors should be constructed to close the triangular openings left at the ends of the vat when the cover is closed. The hinges may be made by a blacksmith.

DRIPPING PEN.

Construct a dripping pen about 12 by 15 feet at the head of the exit incline. The floor should be of concrete prepared as previously described for the vat and laid in a similar manner. The floor should be pitched toward a corner of the pen, where a pipe should be laid in the floor to carry the drippings into a barrel sunk in the ground. The drippings thus caught may be returned to the vat after settling. The floor should be roughened to prevent the cattle from slipping.

CHUTE.

The chute leading to the vat should be built 30 inches wide and 20 feet long; and the receiving and retaining pens should be of a size to take care of the animals to be dipped.

BILL OF MATERIALS FOR VAT, DRIPPING PEN, AND CHUTE.

LUMBER FOR FORMS.

8 pieces 1 by 12 inches by 14 feet long.
13 pieces 1 by 12 inches by 12 feet long.
2 pieces 1 by 12 inches by 9 feet long.
2 pieces 1 by 12 inches by 6 feet long.
2 pieces 1 by 12 inches by 4 feet long.

*This hinge and the method of setting it for the cover of a dipping vat have been copied from an article by William Taylor Heslop in the Agricultural Journal of the Union of South Africa, Pretoria, vol. 1, No. 1, 1911, pp. 38-43.

8 pieces 2 by 4 inches by 8 feet long.
2 pieces 2 by 4 inches by 7 feet long.
2 pieces 2 by 4 inches by 6 feet long.
2 pieces 2 by 4 inches by 4 feet long.
2 pieces 2 by 4 inches by 2 feet long.
7 pieces 1 by 6 inches by 12 feet long for crosspieces for inside of forms.

LUMBER FOR DRIPPING PEN.

7 pieces 6 by 6 inches by 10 feet long for posts.
10 pieces 1 by 8 inches by 16 feet long for rails of pen.
5 pieces 1 by 8 inches by 12 feet long for side rails of pen.
5 pieces 1 by 8 inches by 8 feet long for side rails of pen.

The covers can be made from the lumber used in making the forms, and the lumber for the exit incline can be gotten in the same way.

The 4 by 4 inch posts to which the cover is hinged may be made from 2 by 4 stuff by spiking together.

End form to be made solid.

HARDWARE AND IRONWORK.

6 bolts, ½ by 10 inches, with nuts and washers, for false floor of incline.
1 sheet of ¼-inch boiler iron cut to shape of slide; plate bored and countersunk for four screws.
4 pairs hinges for covers.
3 heavy T hinges and screws for gate of dripping pen.
1 heavy iron bolt to fasten gate.

CONCRETE.

VAT.

Cement, 10½ barrels (42 bags).
Sand, 3¾ cubic yards.
Stone, 6¼ cubic yards.

DRIPPING PEN AND CHUTE.

Cement, 5½ barrels (22 bags).
Sand, 1¾ cubic yards.
Stone, 3½ cubic yards.

A 26-foot vat has been used extensively for eradication purposes with satisfactory results. However, if it is desired to lengthen the body of the vat on account of large numbers of cattle to be treated,

or to make it conform to the bureau's requirements for the treatment of cattle for movement as noninfectious, there should be added to the amount of concrete material for each lineal or running foot, cement, 0.37 barrel; sand, 0.12 yard; stone, 0.24 yard.

By some a dripping chute is regarded more satisfactory than a dripping pen. One of the advantages that it has is that the cattle are held in line in the order in which they have been dipped, thus making it possible to remove one or more of them at a time as soon as they have drained sufficiently, in order to make room for others. In using the dripping pen this is not practicable and it is necessary to wait until the last animal dipped has drained sufficiently and then remove them all together.

In case it is desired to construct a dripping chute it should be located at the head of the exit incline in line with the vat. It should be about 36 inches wide. The length will depend on the number of cattle it is desired to accommodate at one time, it being necessary to allow 4 to 5 feet for each. A length of from 20 to 40 feet is considered a convenient size for small herds. The floor should be made of concrete and sloped toward the vat. The dip should not be permitted to run directly into the vat, but should be collected in a barrel to settle, as shown in the case of the dripping pen. The floor at the sides should be raised about 2 inches in the form of a curb to keep the dip from running off.

The following companies quote prices on arsenic, sal-soda and pine tar, used in the preparation of the standard arsenic solution for dipping and spraying cattle to destroy ticks; F. O. B. point of shipment:

Gulf Pine Product Company, J. T. Myers, President, Waycross, Ga., quote:

Pine tar, barrel lots, 45 to 50 gallons in barrel, $5.00 per barrel.

Columbia Drug Company, Savannah, Ga., quote: Arsenic, 7 and 8 cents per pound; sal-soda from 1 to 1¼ cents per pound, depending on quantity. Pine tar quoted on application, depending on quantity.

The Groover-Stewart Drug Company, Jacksonville, Fla., quote: Arsenic trioxide in 71-lb. lots (enough for three fillings of vat) 8 cents per pound; sal-soda in 211-lb. lots (for three vats) at 2 cents per pound.

Following is the quotation from the Tampa Drug Co.:— "Arsenic, in kegs, 5½c; Sal Soda, per bbl., 1¼c; Pine Tar, bbls. per gal, 35c, f. o. b. New York." Pine tar has been quoted locally (Tampa) at 27c.

Following is the quotation from the Phoenix Supply Co., of Atlanta, Ga.:—"Sal Soda in bbls. at 1c per pound f. o. b. Atlanta."

UNIVERSITY OF FLORIDA
3 1262 04425926 4

Date Due

Due	Returned	Due	Returned
NOV 25 1992	NOV 19 1992		

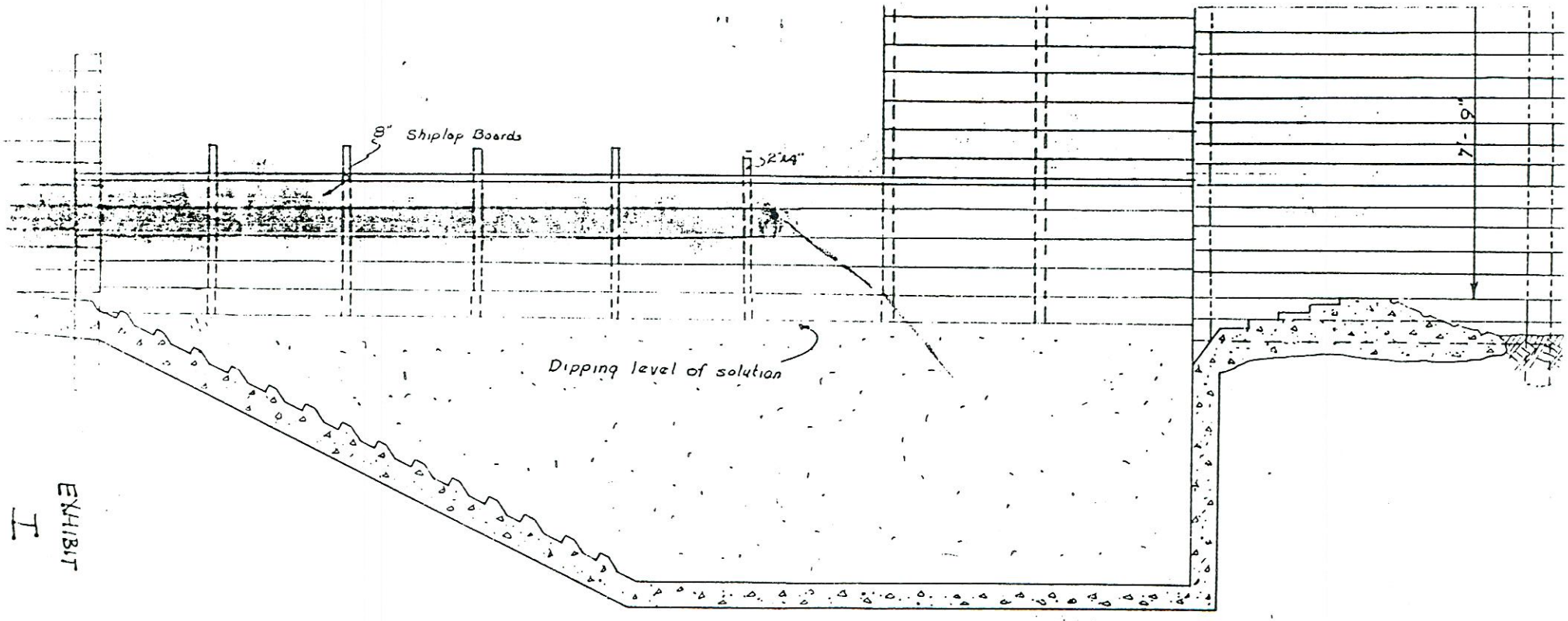


EXHIBIT I

SIDE VIEW OF VAT - SHOWING ENTRANCE CHUTE, SPLASH BOARDS & DIPPING PEN

Scale: 3/8" = 1'-0" ±

STANDARD CATTLE DIPPING VAT

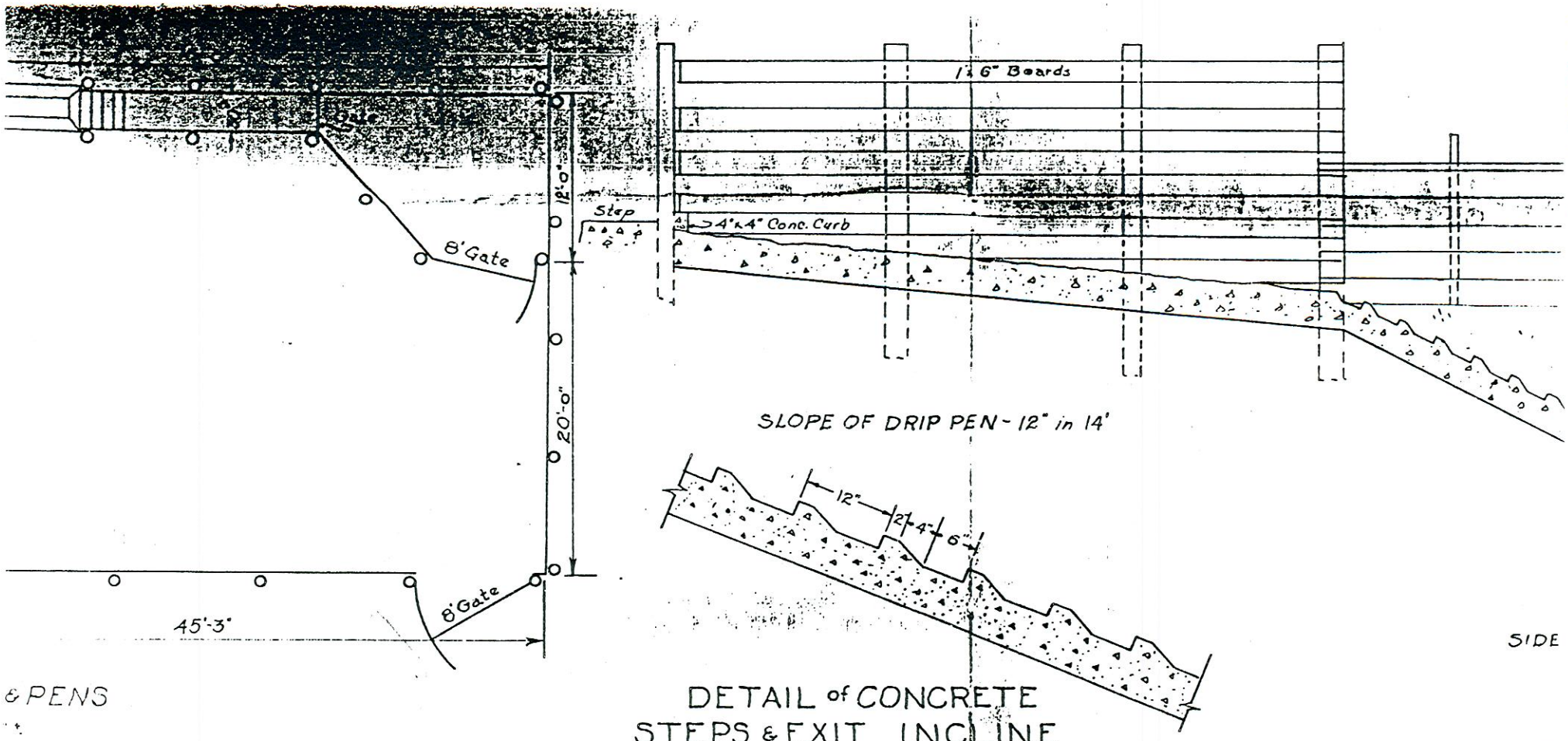
APPROVED BY

FLORIDA LIVESTOCK SANITARY BOARD

Dr. J.V. Knapp ~ State Veterinarian

Dr. By: J.A. Bright - Tr. By: D.R.W.

Revised - 8-31-49



SLOPE OF DRIP PEN - 12" in 14'

DETAIL of CONCRETE
STEPS & EXIT INCLINE
3/4" = 1'-0"

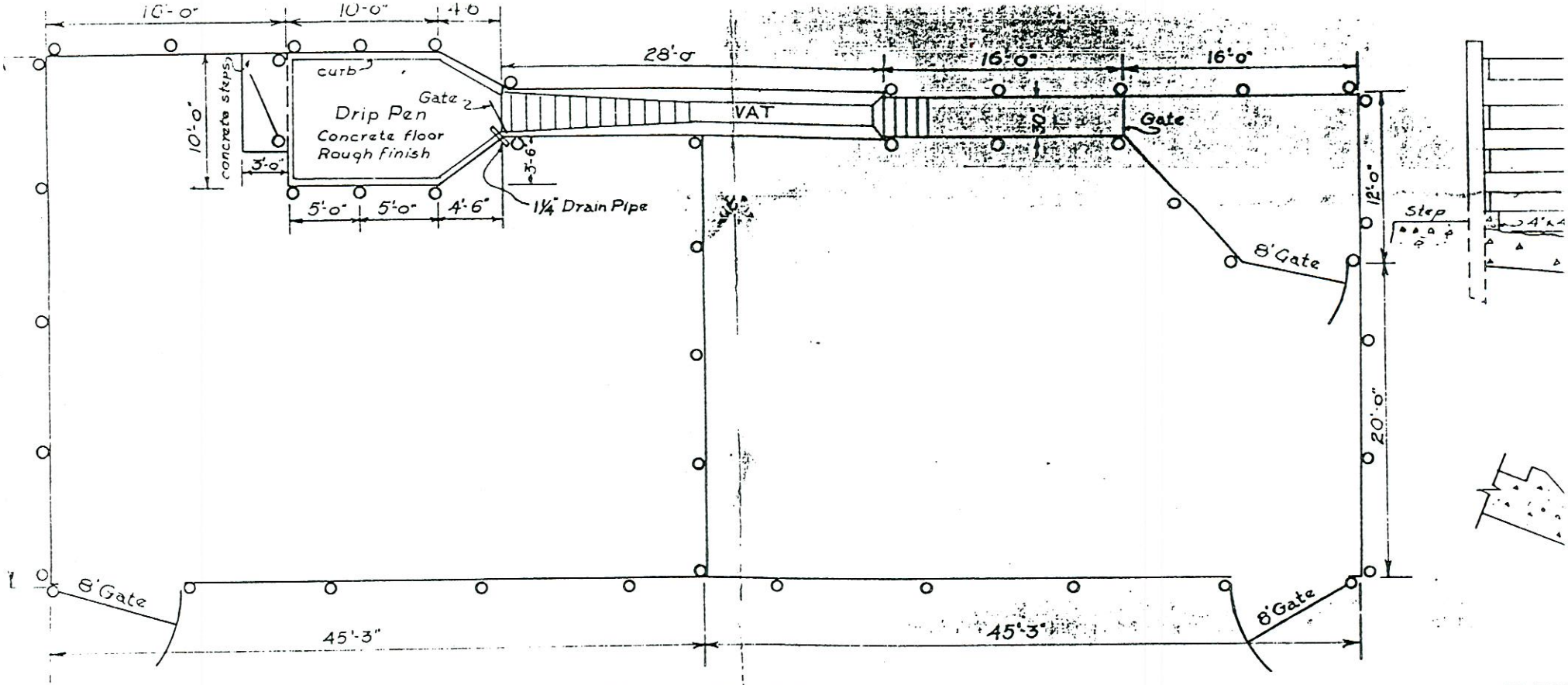
& PENS

SIDE

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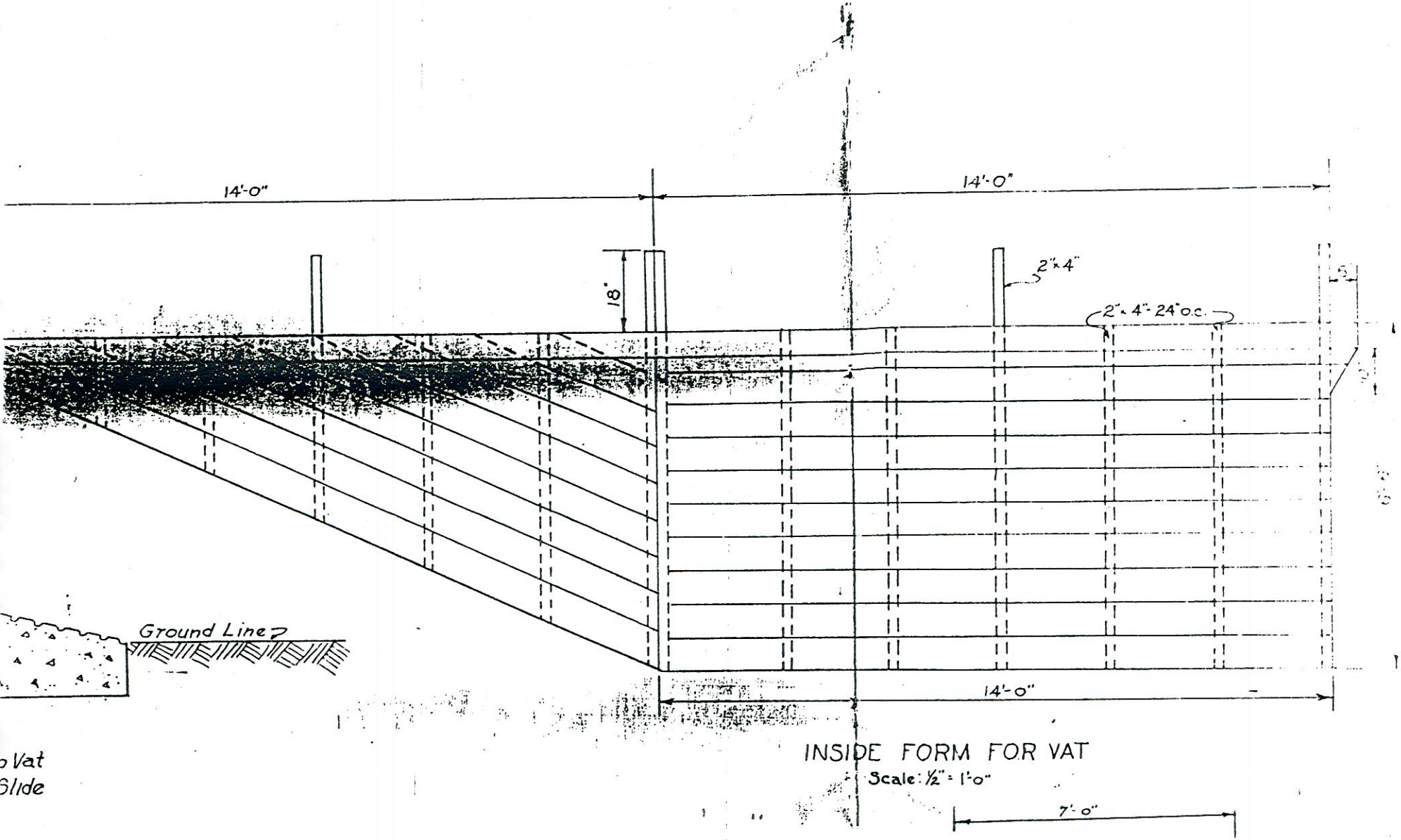
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PLAN OF VAT & PENS

Scale: ⅛" = 1'-0" ±

DE
STEPS

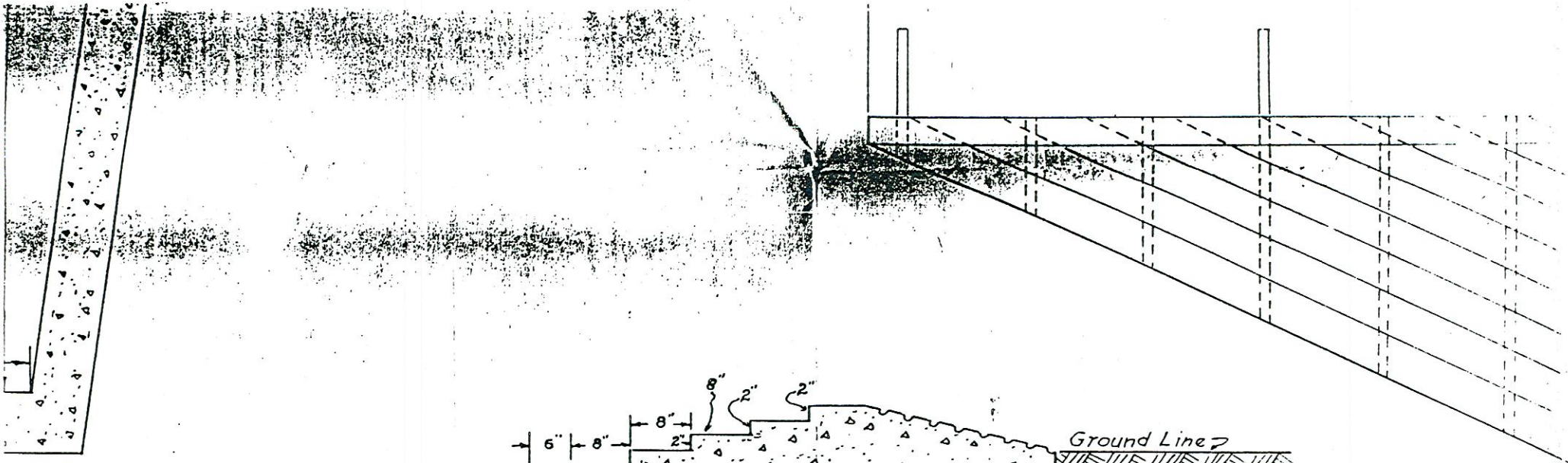


INSIDE FORM FOR VAT

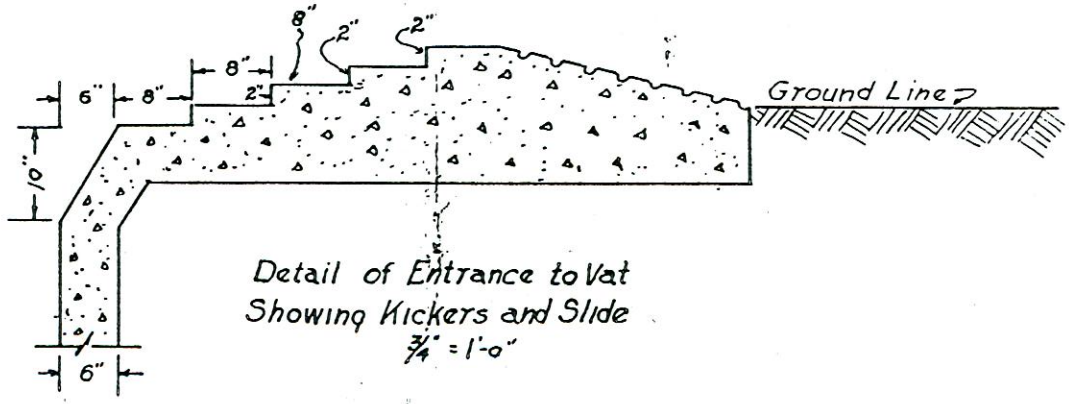
Scale: ½" = 1'-0"

7'-0"

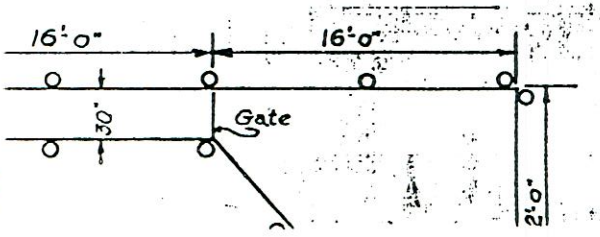
o Vat
Slide

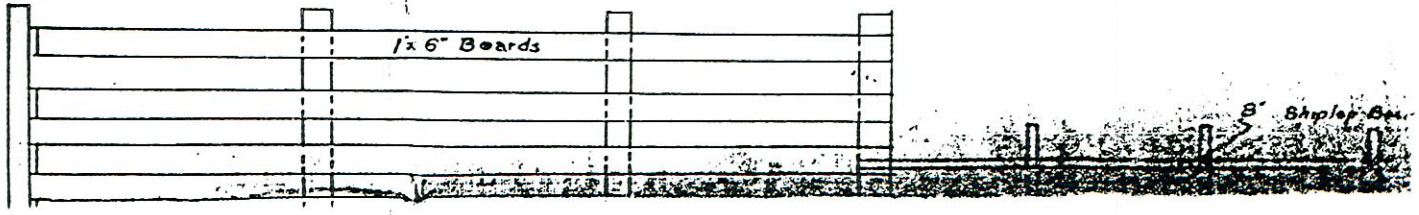


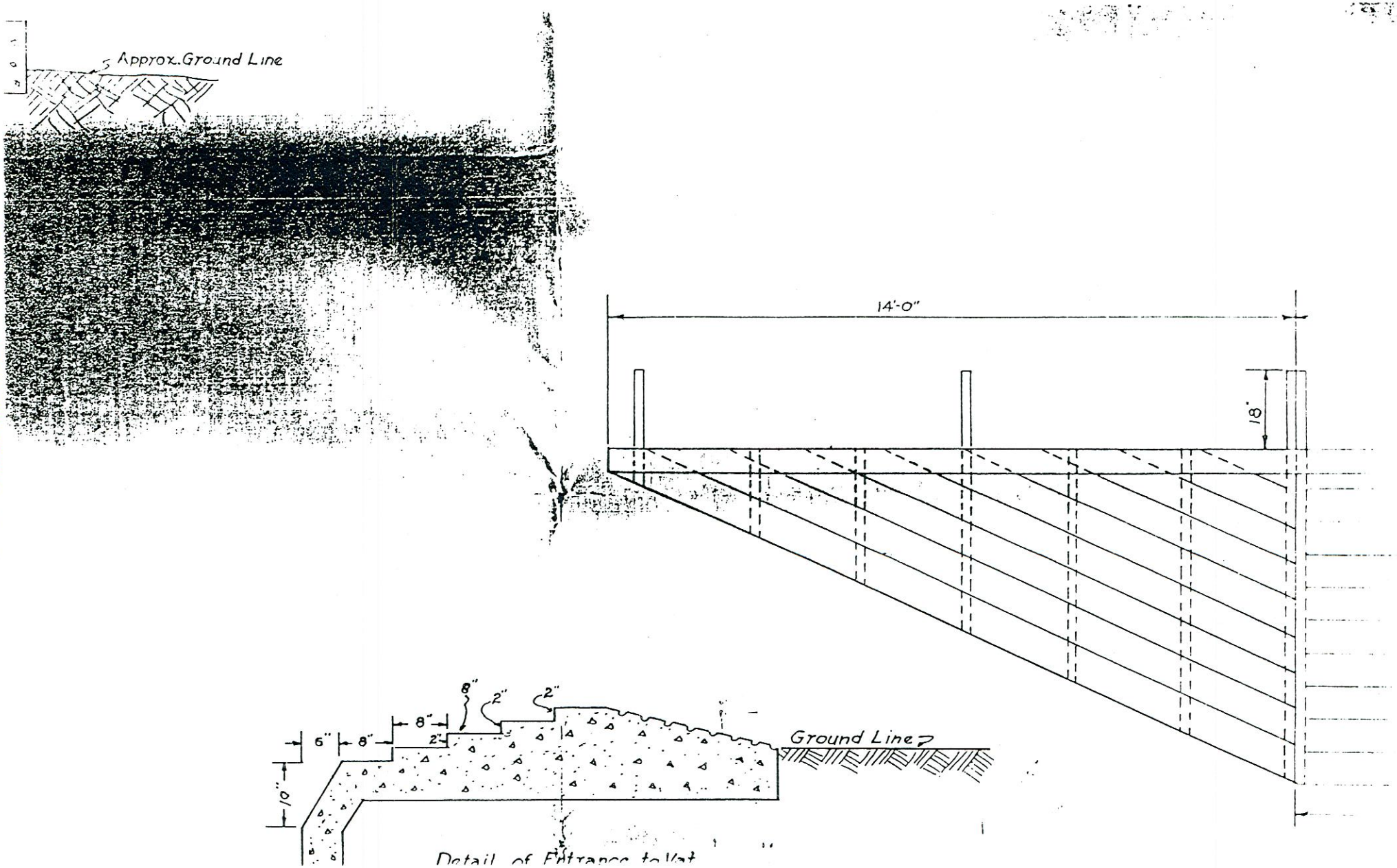
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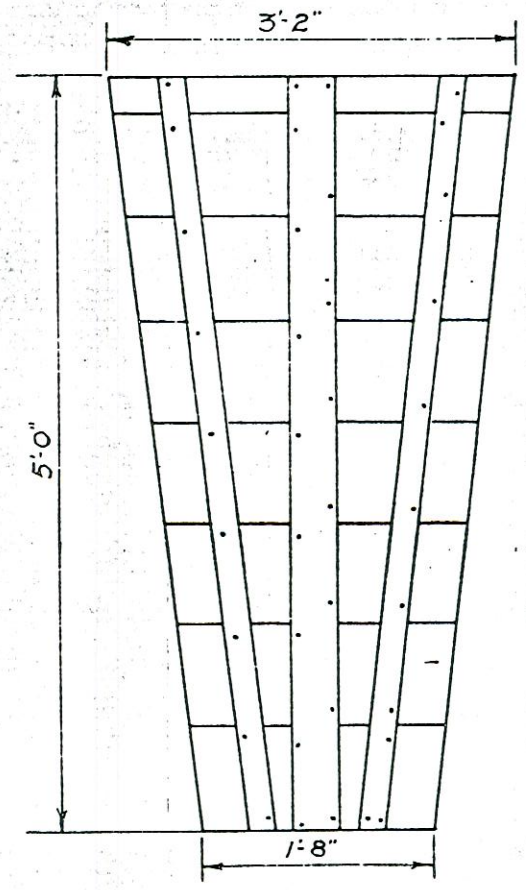
Detail of Entrance to Vat
Showing Kickers and Slide
3/4" = 1'-0"

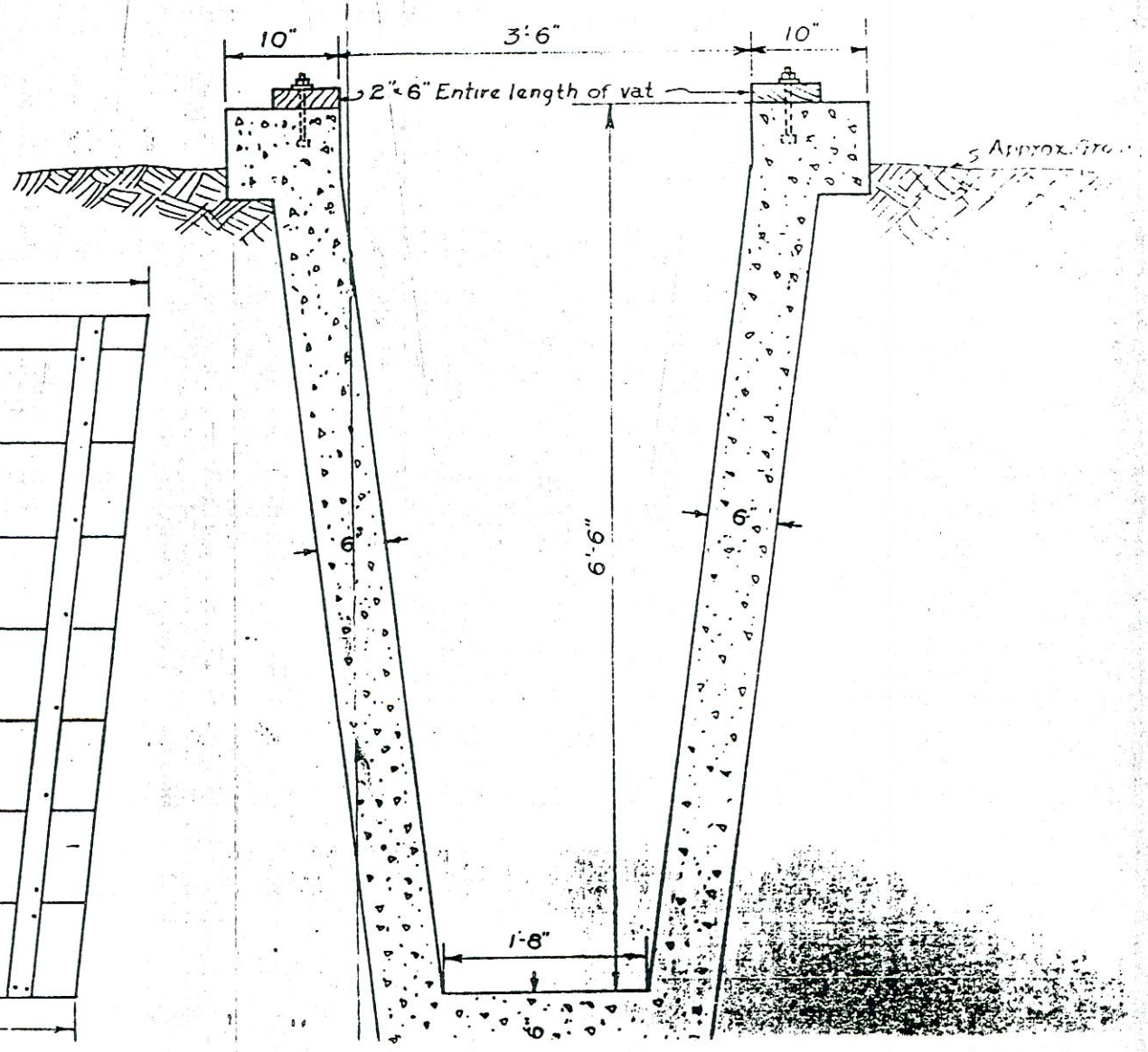






Detail of Entrance to Vat


3'-2"
5'-0"
1'-8"


10"
3'-6"
10"
2"x6" Entire length of vat
6'-6"
6"
6"
1'-8"
6"

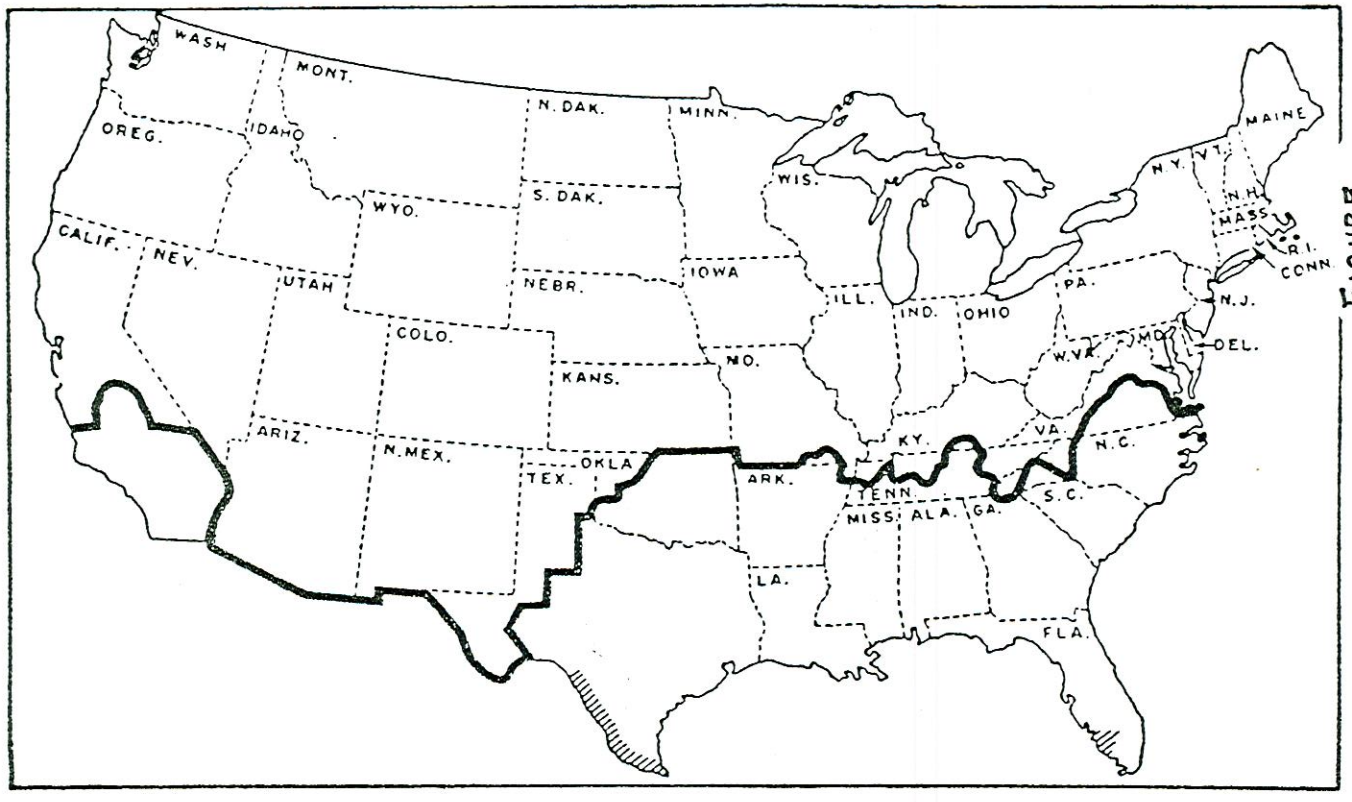


FIGURE 1

FIGURE 1.—The beavy black line shows the northern boundary of the tick-infested territory at the beginning of tick eradication in 1906. The shaded patches in Florida and Texas indicate the location of quarantined areas December 15, 194..

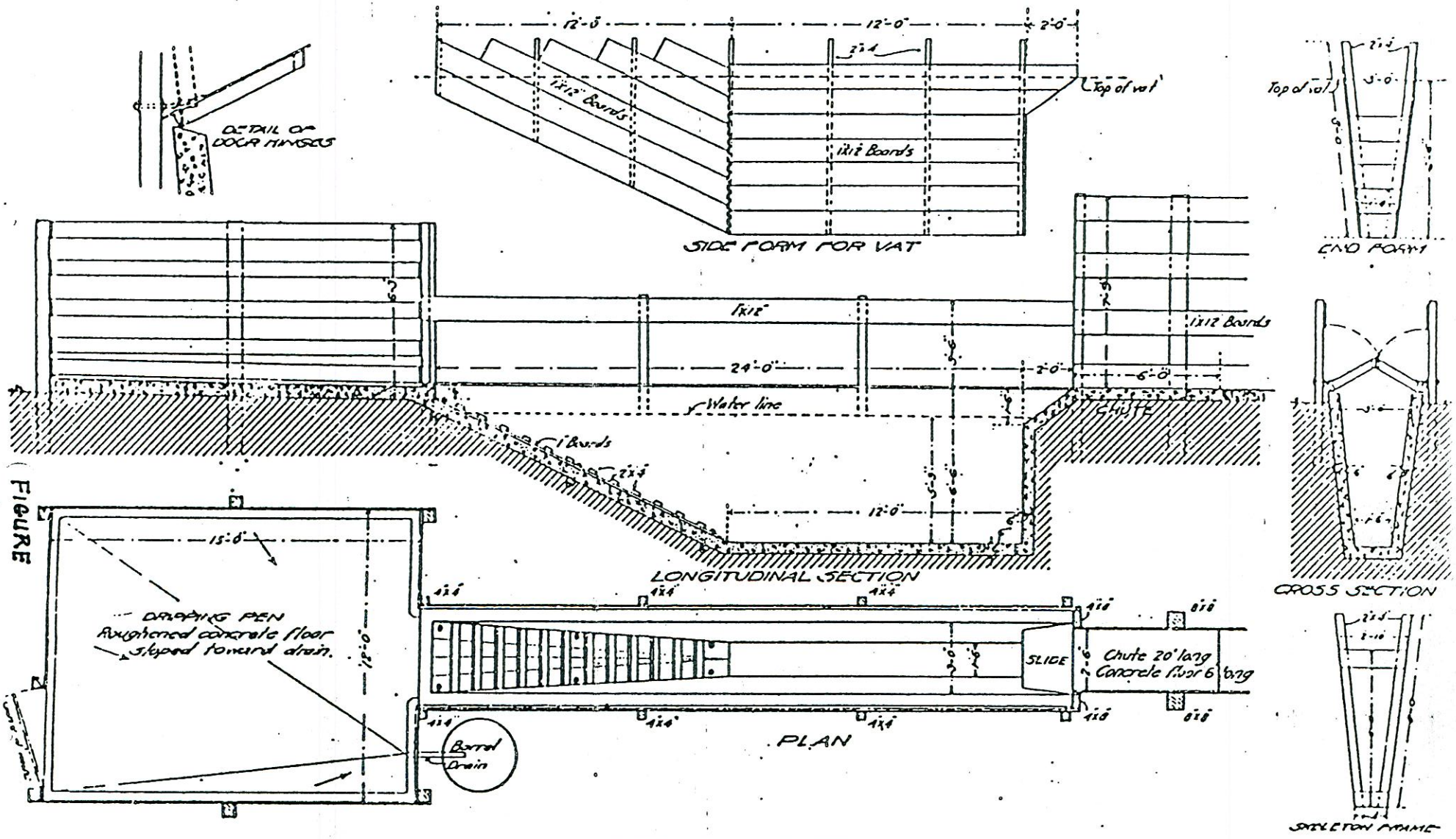

DETAIL OF DOOR HINGES
12'-0"
2'-0"
2x4
Top of vat
1x12 Boards
SIDE FORM FOR VAT
Top of vat
3'-0"
END FORM
1x12
24'-0"
Water line
1x12 Boards
6'-0"
2'-0"
2'-6"
1 Boards
2x4
12'-0"
LONGITUDINAL SECTION
CROSS SECTION
15'-0"
DRIPPING PEN
Roughened concrete floor
Sloped forward drain.
12'-0"
4x4
4x4
4x4
4x4
4x4
4x4
4x6
6x6
6x6
SLICE
Chute 20' long
Concrete floor 6' long
3'-0"
2'-6"
Barrel Drain
PLAN
SKELETON FRAME

FIGURE 2