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THE 1932 OUTBREAK OF FOOT-AND-MOUTH DISEASE IN SOUTHERN CALIFORNIA

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DISCOVERY AND DIAGNOSIS OF THE DISEASE IN ORANGE COUNTY

Knowledge of the heavy losses that foot-and-mouth disease causes among livestock has created a strong sentiment for prompt and vigorous resistance to invasions of this malady into the United States. In April 1932 the tenth outbreak of foot-and-mouth disease occurred in southern California. This publication is a record of the manner in which the infection was detected, diagnosed, and eradicated.

On April 22, about noon, the Los Angeles County Livestock Department received a telephone call from George Bailey, the owner of several hundred hogs on the garbage-feeding ranch of H. F. Biedleman, near Buena Park, in the northwestern part of Orange County, Calif. He reported that four of his hogs were dead, that several were lame, and that a considerable number belonging to other owners also were lame. Altogether there were on the ranch about 3,600 hogs, which were being fed on a share basis. Within about a quarter of a mile of this plant there were five smaller establishments engaged in feeding garbage to hogs, and at a distance of 2 miles was another large one.

In view of the nature of the report, which suggested the possibility of foot-and-mouth disease, L. M. Hurt, E. T. Conti, and J. G. Townsend, veterinarians of the Los Angeles County Livestock Department, arranged to inspect the hogs at once. Arriving at the ranch about 2 p.m. of the same day, they found lame hogs in practically every pen. The lameness appeared to be caused partly by tenderness of

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the foot pads and partly by swollen joints. A number of the pigs also had sore snouts. No typical vesicles (blisters) containing fluid were found, although many recently broken vesicles were noted. One pig examined had a tongue lesion suggestive of a large broken vesicle. Practically all hogs were eating at the time, and their condition was not painful enough to cause squealing. Examination of the pigs and premises continued until dark.

The next morning, April 23, Drs. Conti and Townsend returned to the ranch to conduct further examinations. Meanwhile, Dr. Hurt notified the California State Department of Agriculture, the Los Angeles office of the United States Bureau of Animal Industry, and H. F. Wilkins, county veterinarian of Orange County, Calif., in which the ranch was situated. Jacob Traum, in charge of the division of veterinary science of the University of California, at Berkeley, likewise was notified.

Soon after arrival at the ranch, veterinarians representing several of the agencies mentioned examined a number of suspected hogs which Drs. Conti and Townsend had isolated. These animals had on their snouts and feet vesicles highly suggestive of foot-and-mouth disease. Several of the animals had temperatures ranging from 104° to 106.5° F. In anticipation of the visit of Dr. Traum, who had conducted diagnostic tests in two previous outbreaks in California, a number of guinea pigs, calves, horses, and apparently healthy pigs were obtained for test purposes.

The conditions, so highly suggestive of foot-and-mouth disease, also were reported by telegram to the Chief of the Bureau of Animal Industry, Washington, D.C. He immediately telegraphed Rudolph Snyder, veterinary inspector of the Bureau temporarily at Fort Worth, Tex., to proceed at once to Los Angeles, Calif., and take charge of the situation on behalf of the Federal Government. Dr. Snyder, who had directed field operations against foot-and-mouth disease in several previous outbreaks, boarded an airplane for Los Angeles, and promptly on arrival went to the ranch where Drs. Traum and Conti meanwhile had been conducting inoculation tests.

RESULTS OF INOCULATION TESTS

Dr. Snyder examined many infected hogs and observed the results of tests. Sufficient time had not yet elapsed, however, to warrant a diagnosis. Meanwhile the premises were kept well guarded, and no individual or piece of equipment was permitted to leave them without disinfection under official supervision. The quarantine established on the Biedleman ranch was very effective, as was proved by the absence of any spread of the disease after the quarantine was imposed. As stated later, however, some infection had been carried from the premises prior to the date of quarantine. This infection was responsible for the subsequent spread of the disease to several other herds. Fortunately, the hog-feeding ranches in the locality were rather isolated from other livestock and market centers, and there was comparatively little traffic owing to the semimountainous character of the district.

The final results of the inoculation tests are of particular interest in view of the unusual type of virus encountered. Dr. Traum describes his observations as follows:

> On three successive days Dr. Conti and I obtained what we thought was excellent material and injected, all told, 6 hogs varying in weight from 30 to 125 pounds; 5 cattle (2 young calves, 2 beef heifers, and 1 dairy cow); and 24 guinea pigs. Two horses were scarified on the tongue and viruses from different animals applied to each. The net results of all these inoculations were: Guinea pigs, negative; horses, negative; cattle, negative; and swine, 100 percent infection. * * * I know of no other condition in hogs which might have resembled this except that of vesicular stomatitis, which was ruled out for two reasons: First, no actual epizootic of vesicular stomatitis had ever been reported in hogs, and, more important, the horses failed to develop the disease.

The foregoing description concerning the character of the virus is paralleled by observations of two former outbreaks of foot-and-mouth disease in Germany, in which practically all the cases were confined to swine. This species of livestock is especially susceptible to the disease. Furthermore, it has been a matter of field observation in the United States that the first animals infected in an outbreak that is detected promptly, offer difficulties in diagnosis. Seemingly the virus is at first attenuated or otherwise weak. On the other hand, when infection has been present for a considerable time and has passed from one animal to another, the virus has appeared to increase in virulence, or, in field vernacular, is said to "get hot."

In view of the outcome of the tests and prior experience, there was a unanimous decision that the malady was foot-and-mouth disease, and public announcement of the findings was made on April 28. The affected premises and the surrounding territory within a radius of about 3 miles were placed under Federal quarantine. The State of California likewise promptly issued supplemental quarantine regulations.

ERADICATION WORK ORGANIZED

By telegraphic orders the United States Bureau of Animal Industry directed 43 veterinary inspectors and other employees, largely from nearby States, to aid in suppressing the outbreak. These men were selected because of former experience in such work or because of special qualifications. The Bureau also notified its veterinarians at public markets and seaboard stations concerning the outbreak, likewise the proper veterinary officials in Canada and Mexico, so that appropriate safeguards might be established. State and local officials also detailed men to aid in the emergency.

Meanwhile on the afternoon of April 28, the discovery of the infection in the feed lots of John A. Kazaroff and J. O. Holmes, near the Biedleman ranch, confirmed the belief that all neighboring feed lots had been exposed, and, if given a little time, the infection would spread to the entire local colony of hog ranches. Consequently a prompt decision was reached to hazard no chances and, without delay, orders were issued to dig two trenches for the disposal, by slaughter and burial, of all infected and exposed hogs.

Plans were formulated also for an organized campaign of inspection and eradication. All hog lots in the infected section were placed under the supervision of experienced veterinarians, and large areas of dairy territory were divided into districts for intensive examinations. Steps likewise were taken to appraise diseased and exposed animals, and arrangements were made for their prompt slaughter and burial.

In previous campaigns it was customary to place an absolute quarantine on infected premises, a closed quarantine on the immediate surrounding territory, and a modified or less drastic quarantine on another zone of territory surrounding the closed quarantine area. This last zone acted as a buffer between the infected and free areas. In the present outbreak it was decided for added safety to place an absolute quarantine on the exposed as well as on the infected premises, with a small closed quarantine zone surrounding them. A systematic inspection was made of all feed lots within both areas. No hogs were allowed to leave any premises until they had been inspected and a permit issued for their removal.

FIRST HERD BURIED MAY 1

Although steam shovels were put into operation on April 28 to provide burial trenches for the large number of infected and exposed hogs, the heavy adobe soil with underlying hardpan retarded digging operations so much that dynamiting the soil to loosen it became necessary. As a consequence the burial of the carcasses was delayed until May 1.

SPREAD OF INFECTION TO LOS ANGELES COUNTY

On the previous day, April 30, an inspector, in making his daily visit to feed lots in Los Angeles County, discovered some suspiciously lame hogs on the ranch of Tom Kitahata. A positive diagnosis was made the following day. This feed lot, like those on the Biedleman ranch, is one of several closely grouped hog ranches. Without delay, trench-digging equipment was ordered to the infected premises. Before the trench was completed other infected hogs were found in the feed lot of K. Sakoda, which adjoins the Kitahata premises. Consequently, the trench was enlarged to provide for the burial of both herds. The animals were slaughtered May 3 and 4, and burial operations were completed by May 5.

In tracing the infection in the Kitahata and Sakoda feed lots, the fact seems to be established that on April 22 Tom Kitahata, after making a visit, stopped on his way home to examine some lame hogs on the Biedleman ranch. In this manner he became a carrier of the virus. Eight days elapsed, however, between the time of the visit and the appearance of the infection in the hog lots of Tom Kitahata.

By May 4 the infection had spread from the Tom Kitahata and Sakoda feed lots to the ranch of George Kitahata, located about 200 feet west of the Sakoda premises. Adjoining the pens of George Kitahata were the feed lots of two other owners, and since the hogs there were close to the diseased area, they were killed and buried

the same day, May 4. When the men reported for work that morning, cattle also were discovered on the premises. An investigation revealed that during the night 33 heifers and dry cows, which were being pastured nearby, had broken through a fence and strayed into the hog lots. These animals were appraised as exposed, subsequently slaughtered, and buried with the hogs.

ADDITIONAL OUTBREAK IN ORANGE COUNTY

On May 3 foot-and-mouth disease was discovered on the hog-feeding premises of Irwin Stewart, in Orange County, about 2 miles north of the Biedleman ranch. Investigation showed that on April 22 Stewart unloaded some garbage in the feed lot at the Biedleman ranch, driving at the time onto the feeding floor. From that ranch he returned home, where he unloaded the remainder of the garbage onto his feeding floor. While at the Biedleman ranch he helped the owner catch and examine several lame pigs. Eleven days after this visit, May 3, as already noted, foot-and-mouth disease was diagnosed in the Stewart feeder hogs and the herd was slaughtered and buried the following day.

INFECTION DISCOVERED IN SAN BERNARDINO COUNTY

An inspection of hogs belonging to Susie Yamamoto, in San Bernardino County, revealed, on May 5 and 6, a number of suspiciously lame hogs and erosions around the coronary bands. On May 7 the character of these foot lesions resulted in a diagnosis of foot-and-mouth disease. This ranch is about 40 miles northeast of the group of ranches on which the first infection was found.

LAST HERD BURIED MAY 8

The appraisers were at once notified and arrangements made for the slaughter and burial of the herd, which took place the following morning, May 8. This herd was the last found to be infected, and with its destruction the disease was stamped out.

CLEANING AND DISINFECTING PREMISES AND EQUIPMENT

The cleaning and disinfection of infected premises and of trucks and trailers used for livestock, livestock products, and feed were carried out in a manner similar to the procedures in previous outbreaks. The Los Angeles County Forestry Department and agricultural commissioner supplied power-spraying apparatus. The use of this splendid equipment, as well as the services of men trained in handling it, was of great aid in restricting the spread of foot-and-mouth disease and entirely suppressing it.

In the disinfection of garbage trucks, a spray of lye solution under high pressure proved to be very efficient in removing the accumulations of garbage and grease. It was surprising to note how thoroughly these deposits were removed. The lye affected the paint somewhat, but since the owners of the trucks did not object, its use was continued.

With the exception of the Biedleman ranch and adjoining premises, which were about 20 acres in extent, the cleaning did not present any special problem. In that case the problem was chiefly one of size. Fully 2,000 loads of manure had accumulated in the Biedleman feed lots, and it was necessary to use 40,000 pounds of chloride of lime to disinfect the manure and accumulated debris (fig. 1). In the disinfection of hog lots, a heavy stream of lye solution under pressure was used on the feeding floors, troughs, and salvaged lumber to remove grease and filth. As in the use of this chemical for trucks, it proved highly efficient (fig. 2). An attempt was made to use a lye solution also as a spray on fences, sheds, and interior floors, but owing to its caustic reactions on the operators, the method was discontinued. Although the men wore rubber coats, boots, gloves, hats, and masks, and also bathed later in a weak vinegar solution

FIGURE 1.—Hog ranch of H. F. Biedleman, where the first affected hogs were discovered. This view was taken during cleaning and disinfecting operations. Note piles of manure, removed from hog pens, mixed with chloride of lime. The manure was removed to citrus groves where no livestock had access to it.

FIGURE 2.—Hog-feeding lots on the Yamamoto ranch. This view shows the appearance of the premises after the slaughter of the hogs and cleaning and disinfecting operations.

to neutralize the alkali, they developed badly cauterized patches on the skin and on the mucous membrane of the mouth and nasal passages. Thus, though lye solution is practical for use in a stream where the operator is not sprinkled with the chemical, its use as a spray has the serious disadvantage mentioned.

To prevent laborers, working on the infected premises, from carrying the virus on their persons, a 2-tent system was used as in prior outbreaks (fig. 3). A so-called "dead line" was established at the entrance to each premises, and a fence with a small gate was built on the line. The tents faced each other, with the openings fronting the gate. Men were required to disrobe in the outer tent and, after passing through the gate to the inner tent, were furnished with work clothes. No street clothes were permitted to be taken across the dead line. On their way out from work the system was reversed. After their work clothes were removed the men were disinfected before being allowed to pass through the gate to the outer tent, where their street clothes were kept.

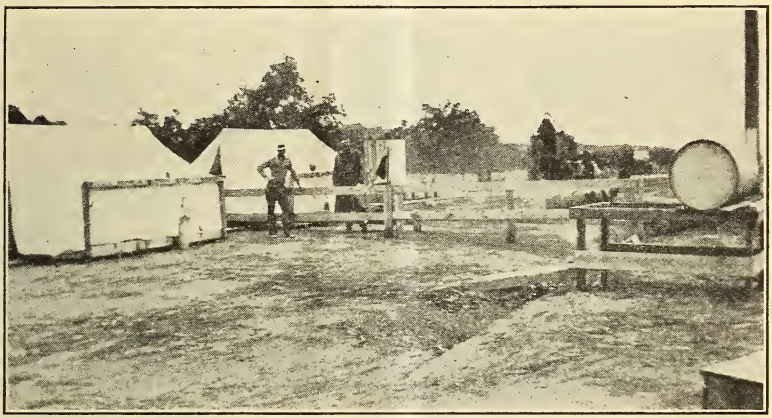

FIGURE 3.—Arrangement of tents, used for changing clothes, on each side of "dead line", a system used to prevent the possible spread of infection on the garments of employees.

Following the cleaning and disinfecting operations all livestock were excluded from the premises for at least 30 days. After this period the introduction of test animals was permitted. As none of these developed symptoms of the disease, the premises were declared safe, and after August 24, when all Federal quarantines were withdrawn from the entire area, general restocking of all the premises was authorized.

MAN POWER ENGAGED

The total Bureau force was made up of 31 veterinarians, 11 lay inspectors, and 1 clerk. The State contingent consisted of approximately 35 veterinarians and a number of quarantine officers, and Los Angeles County had approximately 10 veterinarians and 1 layman in the field. Orange and San Bernardino Counties supplied 1 veterinarian each. In addition, all three counties furnished a number of guards.

In contrast with the 1929 outbreak of foot-and-mouth disease, when difficulty was encountered in obtaining suitable manual labor, men of many classes and races begged for jobs, illustrating the effect that general economic conditions may have on a disease-eradication campaign. There were so many applicants that it was essential to establish an outer guard, remote from the inner guard line, to keep the job seekers at a considerable distance from the infected premises. Many of them were so undernourished that they were hardly able to do any work until after they were given satisfactory rations.

To insure laborers' remaining on the infected premises during the working day, box lunches were served at noon. It was detected that more lunches were called for than there were men. A check-up disclosed that many of the men were so hungry as to consume 2 or 3 lunches. Others attempted to conceal food to take home to their families.

Many of the men engaged had performed little manual labor. The fatigue and blistered hands and feet of the laborers, in a courageous effort to conquer hunger and want, presented a pitiable sight. The wages represented the first money they had earned for some time and, in addition, they had hungry families to feed. To alleviate the suffering of these men, a first-aid tent, where minor injuries were treated, was established at each unit. After the men received adequate food and became accustomed to the work, they proved to be the best labor crews employed in any outbreak.

SOURCE OF INFECTION INVESTIGATED

The source of the outbreak is still undetermined, though indications point to infected garbage as the probable cause. An extensive investigation was conducted by T. B. Hamilton, of the Bureau, who participated in successfully tracing the source of the 1929 outbreak. All possible clues in the present outbreak were followed to the end but produced no conclusive results.

EXTENT AND NATURE OF QUARANTINE

Owing to its limited extent the outbreak interfered only slightly with stock raising, agriculture, or commerce in southern California. The largest area under quarantine at any time comprised about 54 square miles. During the outbreak the Bureau issued five quarantine orders, as follows:

B.A.I. Order 336, effective April 29, 1932, announcing the presence of the disease and quarantining about 5 square miles in Orange County, Calif.

B.A.I. Order 336, amendment 1, effective May 4, 1932, announcing that the disease existed outside of the area originally quarantined and extending the area to include an adjacent portion of Los Angeles County.

B.A.I. Order 336, amendment 2, effective May 9, 1932, increasing the quarantine area to include a portion of San Bernardino County.

B.A.I. Order 336, amendment 3, effective June 8, 1932, revoking the quarantines established by B.A.I. Order 336 and its amendments, except as to limited areas comprising the premises upon which animals infected with the disease had been found.

B.A.I. Order 338, effective August 24, 1932, entirely revoking the quarantines established by B.A.I. Order 336 and its amendments. This order was the official announcement that the disease had been eradicated.

APPRAISALS AND INDEMNITY PAYMENTS

As in previous outbreaks, the United States Department of Agriculture and State authorities compensated owners for livestock slaughtered and property destroyed, on the basis of full appraised value. The Federal Government and State shared equally in paying the indemnities.

As shown in table 1, eight infected premises were involved in the outbreak. Four were in Orange County; 3 just over the line in Los Angeles County; and 1 in San Bernardino County. The eradication work involved the slaughter of 18,747 swine, 46 cattle, and 24 goats, in 37 different infected or exposed herds. The appraised value of these animals was $203,328.60. In addition, material, equipment, meat, and milk, appraised at a total of $1,950.86, were destroyed in the course of eradication activities.

TABLE 1.—*Statistical summary of the outbreak of foot-and-mouth disease in California, 1932*

Owner or operator and location of premises	Herds involved	Date of diagnosis of outbreak	Animals infected or exposed				Date of slaughter	Date of completion of disinfection	Appraised value of animals slaughtered
			Cattle	Swine	Goats	Total			
Orange County:	*Number*		*Number*	*Number*	*Number*	*Number*			
H. F. Biedleman, Buena Park	6	Apr. 28	------	3,610	------	3,610	May 1	May 26	$27,562.32
John Kazaroff, Los Angeles	2	---do----	------	737	------	737	---do----	May 13	6,715.77
J. O. Holmes, Los Angeles	1	---do----	------	143	------	143	---do----	---do----	2,358.50
Irwin Stewart, Long Beach	3	May 3	------	1,465	------	1,465	May 4	May 16	16,455.41
State of California	[1] 1	----------	[1] 5	[1] 13	------	[1] 18	May 1	----------	----------
Los Angeles County:									
Tom Kitahata, Los Angeles	1	May 1	------	2,920	------	2,920	May 3	May 26	29,462.23
K. Sakoda, Los Angeles	1	May 2	------	2,209	------	2,209	May 4	---do----	23,967.71
Geo. Kitahata, Artesia	1	May 4	------	1,547	------	1,547	---do----	---do----	20,191.04
San Bernardino County:									
Susie Yamamoto, Long Beach	1	May 7	------	2,386	------	2,386	May 8	May 22	23,787.96
20 owners of exposed livestock in vicinity of infected premises in the 3 counties	20	----------	41	3,717	24	3,782	----------	----------	52,827.66
Total	37	----------	46	18,747	24	18,817	----------	----------	[2] 203,328.60

[1] Test animals.

[2] In addition, owners were reimbursed for property to the extent of $1,950.86, destroyed chiefly in cleaning and disinfecting operations.

COOPERATION FROM STATE AND LOCAL AGENCIES

Dudley Moulton, director of agriculture, California State Department of Agriculture, and J. J. King, chief, Division of Animal Industry of that department, cooperated in a most excellent manner, and the livestock owners generally were anxious to aid in bringing the disease under control promptly.

The county officials of the three counties involved, the Los Angeles County livestock and forestry departments, the Los Angeles Chamber of Commerce, and other local agencies likewise aided greatly. The prompt action of State and local officials, at a time

when delay in detection or diagnosis might have resulted in severe livestock losses, was a most fortunate circumstance. Had the discovery been delayed for 48 hours longer many hogs from the Biedleman ranch would have been shipped to Los Angeles markets, with the possibility of a widespread epizootic.

PRESS RELATIONS AND RADIO

To keep the livestock industry and the public informed concerning the outbreak and progress in suppressing it, the Department issued several statements to the press, giving the essential facts. Some further publicity was handled locally. In addition, several announcements were made by the Department through a chain of radio stations. These official statements, dealing largely with the limited extent of the outbreak and prospects for prompt eradication, constituted the principal publicity. There was a gratifying lack of sensational news.

CONCLUSIONS

Scientific knowledge concerning foot-and-mouth disease, supplemented by the experience in the present and previous outbreaks, shows the extreme importance of early discovery and diagnosis of this infection as factors in prompt eradication.

Suspicious cases should always be reported *at once* to veterinary officials by *telephone or telegraph* as was done in the present instance.

The cooperation of livestock owners and handlers in maintaining established quarantines is essential to early eradication of this disease. They should be requested to report at once any unauthorized movement of livestock or mingling of stock with animals on infected or exposed premises.

The success in eradicating the 1932 outbreak of foot-and-mouth disease in the short period of 10 days after its diagnosis is attributable to observance of the foregoing points as well as to continuance of the time-tried policy of quarantine, slaughter, and burial of infected and exposed herds.

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