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WHAT YOU SHOULD KNOW ABOUT HOG CHOLERA

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WHAT YOU SHOULD KNOW ABOUT HOG CHOLERA

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DEFINITIONS

LIVE VIRUS—A living filter-passing agent.

VIRULENT VIRUS—Full strength live virus causing hog cholera.

MODIFIED LIVE VIRUS—A virus that has been reduced in its ability to produce disease ranging all the way from a little less than fully virulent to a point where, while still living, it has lost its property of causing the disease in hogs. Modified hog cholera virus vaccines are practically non-virulent.

DEAD VIRUS—One that has been killed and incapable of causing disease.

INCUBATION PERIOD—The time between the initial exposure to hog cholera and the first signs of disease.

ANTISERUM—The liquid part of blood (blood minus the solid elements such as red and white blood cells) from hogs highly immune to hog cholera.

VACCINATION—The injection of a hog with virulent, live, modified or killed virus vaccines for purpose of inducing resistance.

SERUM-VIRUS VACCINATION—(Simultaneous method) A method in which hogs are injected with virulent virus and antiserum at separate sites at or near the same time.

IMMUNITY—A state, natural or acquired, in which a hog is resistant to hog cholera.

PASSIVE IMMUNITY—The short term or temporary protection given either by injection of an antiserum or through drinking the first milk (colostrum) of immune sows.

ACTIVE IMMUNITY—A state of resistance resulting from an animal's own reaction to infection or vaccination.

IMMUNIZATION—The process whereby an animal becomes resistant or immune.

WHAT YOU SHOULD KNOW ABOUT HOG CHOLERA

I. WHAT IS HOG CHOLERA?

Hog cholera is a deadly, contagious disease that attacks swine only.

The disease is caused by hog cholera virus, an agent so small (1/250,000 of an inch) that it can even pass through a fine porcelain filter.

How do hogs act when they get the disease? They lie around "hiding in their nest," have high fevers, are extremely weak and "sick all over." They have little appetite, and often stand in a "thinking" attitude—motionless, tail relaxed, ears hanging limp, and the head slightly lowered as if in deep thought.

Very few hogs ever recover.

II. HOW IMPORTANT IS HOG CHOLERA?

Hog cholera is the most important disease of hogs in the United States today. Farmers lose millions of dollars worth of hogs from cholera each year. And the expense of annually vaccinating millions of hogs costs even more. Many foreign markets are closed to pork from the United States because of the fear of importing hog cholera.

The disease is important enough so that both state and federal governments have enacted regulatory measures and classed it as a reportable disease. In addition, the United States Congress has authorized the Secretary of Agriculture to enter into a marketing agreement with the hog cholera serum-virus industry. The original act was intended to provide that there should always be enough anti-hog cholera serum on hand to safeguard against sudden widespread outbreaks of the disease. Nevertheless, stocks of antiserum are being reduced every year.

What other countries do:

A number of countries control the disease by eradication, and by prohibiting the use of live hog cholera virus. These countries slaughter infected and exposed animals, and for prevention use anti-hog cholera serum or a killed-virus vaccine. Canada, for example, controls the disease by slaughter and indemnity, rigid quarantine, prohibition of the use of live virus and by banning the feeding of raw garbage. In the years 1904-1905 to 1951-1952 Canada destroyed 168,200 hogs at a total cost to the nation of \$1,061,402. The average total annual compensation was only \$22,112. In the United States, it is conservatively estimated that hog cholera costs the swine industry \$50,000,000 annually. The cost of the Canadian control has been small compared to our own system of attempting to live with the disease by following a large-scale vaccination program.

III. HOW HOG CHOLERA STARTED.

We are quite certain that there was no hog cholera in early times. The disease is so severe and highly fatal—and spreads so rapidly—that it could not have existed, even in backward countries, without being recorded somewhere in history.

It is somewhat arbitrarily stated that the first evidence of the disease appeared in southern Ohio in 1833. Following this, one county in South Carolina reported cholera in 1837. The next year it popped up in Georgia; and in 1840 a disease thought to be hog cholera broke out in Alabama, Florida, Illinois, and Indiana.

In the first twelve years, there were only 10 reported outbreaks of cholera. But after 1845 cholera spread at an alarming rate. During the next 10 years, 93 more outbreaks were reported, many of them in new areas. By the 1880's the Bureau of Animal Industry estimated the annual loss from cholera at 10 to 25 million dollars.

Thus from a small beginning in the Ohio River Valley, hog cholera had—in less than fifty years—become one of the nation's most costly livestock diseases.

Where did the cholera come from in 1833?

Even to this day the source of infection in the original outbreak is unknown. Some said from Europe; but this hardly could have happened. Cholera was not recognized in England until 1862, and not on the European continent until 1887, when it broke out in Sweden and Denmark. Shortly after this it appeared in France, Spain, and Italy. It supposedly did not reach Germany until 1893, and the Balkans until 1895.

Then where did it come from? The disease as we know it must have begun right here in the United States. How the virus came into being is unknown. But once started, it must have found conditions very favorable, for it eventually invaded every section of this country and most of the world.

The disease had everyone baffled in its early days.

Some thought this devastating disease was caused by peculiarities of the soil and weather, or by the way the hogs were raised. Others blamed rotten vegetable matter, green corn, stagnant water, and dirty pig pens.

About 1850 Dr. George Sutton, from Aurora, Indiana, showed that cholera could spread by contact with sick hogs. This proved that it was a contagious disease.

We thought we had tracked down the cause of the trouble before we actually did. In 1878, Dr. H. J. Detmers blamed a specific germ which he called *Bacillus suis* (meaning—a hog germ). Then in 1885 Drs. D. E. Salmon and Theobald Smith of the Bureau of Animal Industry blamed yet another organism—which they named *Bacillus suipestifer* (a germ pest of hogs). For nearly 20 years, this germ, which came to be known as the hog cholera bacillus, was generally accepted by scientists as the cause of hog cholera.

In 1903 we unearthed the real culprit.

This time, two other Bureau of Animal Industry investigators—Drs. de Schweinitz and Dorset—proved without doubt that hog cholera was caused by a virus. The so-called cholera bacillus (now called *Salmonella cholerae-suis*) played only a secondary role in the disease. This bacillus may flare up and spread through the blood when hogs sicken from cholera.

After we discovered that a virus caused hog cholera, we made rapid progress for a few years. In 1908, Dorset, McBryde and Niles developed anti-hog cholera serum which would protect hogs from cholera for a few weeks, and when used simultaneously with the virus would produce a long-lasting immunity to hog cholera.

IV. THE CAUSE OF CHOLERA.

The infective virus that causes hog cholera is so small it will pass through the pores of a porcelain filter—which is capable of trapping any but the tiniest forms of germ life. You can put the hog cholera virus in the same broad classification as the viruses which cause smallpox, infantile paralysis, measles, foot-and-mouth disease and equine encephalomyelitis.

Where hog cholera virus hides or exists in nature between outbreaks is not known entirely.

We know this:

When an unvaccinated pig is exposed to the hog cholera virus—the pig definitely will sicken with hog cholera in 4 to 14 days.

When the blood of a sick pig is injected into a healthy one, he will develop a fever in as little as three days—and you will see the beginning signs of cholera from four to six days after the injection.

Hog cholera virus is weak, yet tough.

If the virus is exposed to direct sunlight, it dies within an hour. Temperatures used for pasteurizing milk will destroy it completely. It is easily killed by many antiseptics and disinfectants. Yet, when present in blood or tissues, it can live for months at temperatures below freezing.

Carcasses of dead hogs in the hot summer rarely carry deadly virus for more than a week or two. But during the winter, the virus may stay fully virulent, and ready to kill, for weeks or months in frozen carcasses. The virus can also stay alive for variable periods of time in the soil of hog lots, pens and pastures.

Few diseases are as highly contagious as hog cholera.

You can put a single drop of cholera virus in five gallons of water and still kill a susceptible pig by injecting 30 to 60 drops of the solution. The 2 cc dose of virulent virus ordinarily used with serum in vaccinating is enough, if diluted and divided, to kill 3 million susceptible pigs.

The small amount of hog cholera virus that can be carried on the feet of a fly is enough to cause the disease.

All scientists agree that an infective amount of virus can be carried from sick to healthy herds of hogs by any and all types of contact.

In recent years we have come to think that certain strains of cholera virus may exist that vary in killing power and which are not neutralized by the usual protective dose of serum. This "variant" condition may be similar to that in certain plants or animals that turn out to be radically different from their relatives. More information about these variants is needed.

V. HOW HOG CHOLERA SPREADS.

The blood, organs and tissues of a hog sick with cholera are seething with hog cholera virus. The virus is shed with bowel movements, urine, nasal drippings, saliva, and eye secretions of cholera-sick pigs.

The disease spreads rapidly from sick to well hogs by contact. Once started in a group, the disease will infect every susceptible hog.

It takes from four days to two weeks for a hog to sicken from cholera. This period between exposure to the virus and appearance of visible sickness is called the *period of incubation*. During most of this time the virus is being shed in the urine and feces. Thus it is possible for a healthy-looking pig to be shedding virus which can infect other pigs. During the incubation period most of the infection probably is passed from hog to hog through the mouth or nose.

The disease gets started on a farm in the following ways:

Direct contact with hogs sick from cholera.

Contaminated sales barns and stock yards. Animals exposed in such places can carry cholera to farms on their bodies; and healthy susceptible hogs can sicken with cholera a week or so after they are bought.

Uncooked garbage that contains pork trimmings from infected hogs is a common source of cholera infection.

Hogs vaccinated with virulent live virus and serum may spread the virus up to three weeks or longer after vaccination.

It can be carried from an infected area on footwear.

Conveyances that have hauled infected animals can spread it.

The carcasses of hogs that have died from hog cholera can spread the disease—as can birds or animals which may feed on those carcasses.

Drainage from cholera infected premises may carry the virus.

Careless use of virulent virus when vaccinating, or giving too little serum, can cause outbreaks.

The hog cholera virus lives in contaminated soil or water for varying lengths of time. In cold weather, pens and water remain infective for longer periods of time. Direct sunlight and putrefying processes kill the virus and are nature's ways of destroying it.

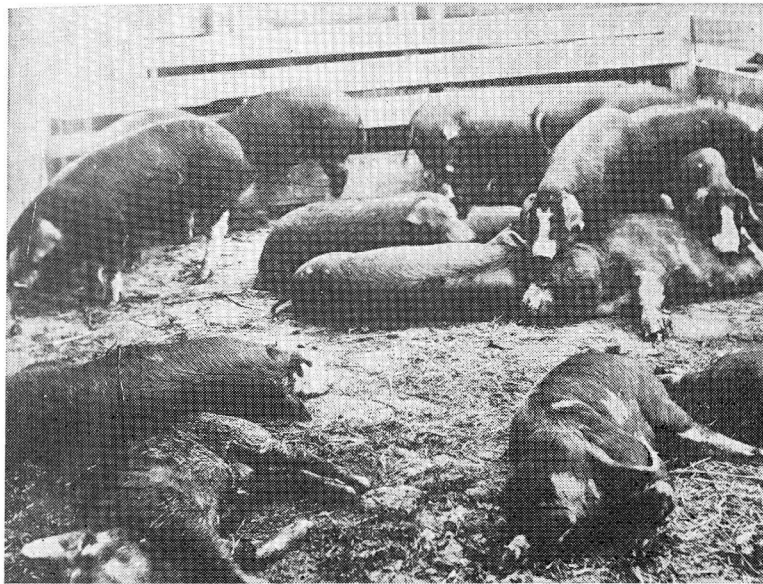
“Natural” hog cholera.

Although infected hogs are usually responsible for the spread of cholera, there is an occasional outbreak which cannot be traced. Any infected or exposed susceptible pig, or unprocessed products from such pigs is a source of danger. Anything that may carry the excretions from infected pigs can spread the disease.

“Natural” outbreaks have most often occurred during the late summer and early fall months. Events such as sudden changes in the weather, changing pigs from one lot or pasture to another, or hogging down corn have been blamed for this—but it is doubtful if these events are in any way responsible.

VI. HOW THE DISEASE ACTS.

Hog cholera is found throughout the entire United States, but is most common in areas where there are many hogs.



Hogs sick with cholera.

—Courtesy U.S.D.A.

A few hogs may be naturally immune, but it is practical to say that all hogs in the United States that have not been immunized against hog cholera are susceptible to the disease—regardless of size, age, breed, color, sex, and the season of the year. The most vigorous or fastest-growing hogs are often hardest hit.

Hog cholera is most common from July through November. But hog cholera does break out in all months of the year.

Whenever susceptible hogs come in contact with the hog cholera virus, they readily become infected through the nose or mouth.

This is how the disease usually starts out:

One or more hogs in the herd suddenly sicken. They appear to be sick "all over." They have a high body temperature (105° or above) for a few hours before they show other signs of illness. The temperature remains above normal (103-104°F) throughout the entire sickness until near death (usually 4-10 days) when it drops quickly to below normal. Death follows very shortly.

In rare instances—especially in old sows—the disease lasts for longer periods of time, and the temperature may occasionally drop to normal or only slightly above normal.

Other signs of the disease:

Look for loss of appetite. Inactivity—the hogs "hide in their nest." Gummy eyelids. Weakness. Vomiting sometimes. When the sick hogs move, they sway and stagger with their legs half bent. When they lie down, they collapse in any position. Fits or convulsions. Reddening of the skin. Diarrhea, which usually comes on after a day or so of sickness and often gets progressively worse. Abortion occurs. Practically all sick pigs die in 4 to 10 days—some last 21 days, but rarely longer.

Here is what you will often find in sick herds:

The herds are usually unvaccinated.
Raw pork scraps may have been fed.
Hog cholera is present in the neighborhood.
Hogs have been bought recently.
There is sudden sickness without any obvious cause.
One or two pigs have died 10 days previously.
The sows usually sicken before their suckling pigs.
The disease spreads rapidly and progressively.
A hog is sick from 4 to 21 days before he dies.
Very few hogs recover (rarely more than 1 or 2 percent).
Only the immunized hogs remain well.
All ages are affected.
It takes 6 to 15 days after exposure before the hogs get visibly sick.

Here is what veterinarians expect to find in post-mortem examinations of hogs that have died from hog cholera:

Small red spots (hemorrhages) on the kidneys. The spots vary in size from a pinpoint to a pinhead.

Reddening of the lymph nodes (kernels) due to congestion and hemorrhage.

Congestion and hemorrhage of the inner surface of the bladder.

Congestion and hemorrhage on the lungs.

Hemorrhage on the larynx, voice box.

Small raised rounded ulcers (true button ulcers) in the large intestine, mainly cecum.

Dark purple or pale areas—as much as an inch across—along the borders of the spleen or melt. The spleen may be congested but not especially enlarged.

Inflammation of the intestines (enteritis).

Reddening of the inner lining of the stomach.

Small rounded hemorrhages on the outer surface of the intestines, and heart.

Small to very large hemorrhages in the lungs, even some inflammation.

A majority of the sick hogs have a decreased number of white blood cells, as well as inflammation of the brain and a slight anemia.

No one of these signs is sure evidence of cholera.

Veterinarians may have a difficult time telling for sure whether it is a true case of hog cholera. In diagnosis, all these points are carefully considered. For a final, definite diagnosis a sample of blood is taken from the sick hog. The blood freed of all bacteria is injected into several susceptible hogs and into several immune hogs. If the condition is hog cholera, the susceptible test hogs sicken and die and the immune survive. However, because of expense and technical difficulties, tests of this type are not practical except in special instances.

Can you treat hog cholera after it breaks out?

Large doses of hog cholera antiserum may be injected into hogs that are in the very early stages of the disease, or those which have not yet shown signs of the disease. Even then many of these may die.

The use of other materials, such as sulfa drugs, and antibiotics, may control some of the secondary infections so that the animal lives a little longer, but the final outcome is the same—death.

Where hog cholera is suspected, the best rule is to immunize immediately. “He who hesitates is lost.” To postpone action in case of hog cholera may mean loss of the entire herd.

All details of treatment and control should be left to the judgment of trained personnel.

VII. WHAT TO DO IN A CHOLERA OUTBREAK.

Call a veterinarian as soon as any disease is suspected. It is his responsibility to diagnose and advise.

If it is cholera, no hogs should be moved off the farm without a permit until the infection is eliminated.

All outbreaks of hog cholera should be reported promptly to the official state livestock sanitary authority.

Neighbors should be told that there is cholera nearby. (You would expect them to tell you if their hogs get the disease.)

Those who work with sick hogs should not visit other farms where hogs are raised, and visitors should be kept away from infected quarters.

Act quickly to save the healthy animals and those that have been exposed, but do not yet show symptoms. The veterinarian will use the method of prevention that best suits the particular situation.



Vaccination of swine.

—Ft. Dodge Co.

Dispose of dead animals quickly by burning, deep burial with quick-lime, or send them to rendering plants in leak-proof vehicles. These vehicles should be cleaned and disinfected after carrying such animals.

All hog houses, equipment and buildings, etc., should be cleaned and disinfected under supervision.

VIII. PREVENTING HOG CHOLERA.

Losses from hog cholera can be prevented. Records show that most of the losses are in swine that have not been immunized against cholera.

Before anti-hog cholera serum was available, we had to depend on quarantines and strict sanitation to stop cholera from spreading. Despite these precautions, widespread outbreaks occurred annually.

Susceptible pigs need to be guarded just as closely today, for we have even more movement of hogs from farm to farm, and more traffic between farms that might possibly carry the disease.

The following are essential for the most satisfactory prevention of cholera.

1. Vaccinate. Your veterinarian can advise which of the several methods and products is best for your herd. There is no substitute for vaccination until we succeed in eradicating this disease. It is customary to immunize against hog cholera in the major hog-raising areas and wherever the disease threatens.
2. Avoid unnecessarily bringing new hogs into a herd.
3. Provide a separate quarantine or isolation quarters for any newly acquired hogs, including a returning show herd. Hold them here 10 to 30 days for observation before putting them in the main herd. These quarters should be such that they can be cleaned and disinfected easily.
4. Be certain that conveyances for hauling hogs are cleaned and disinfected prior to use.
5. Avoid all contact with hogs that have been fed raw garbage. Do not feed home garbage to hogs.
6. Learn and comply with the health requirements for exhibition, movement, and importation of hogs.
7. Do not put hogs into your herd unless they have been vaccinated for cholera sufficiently far in advance (3 weeks) to develop resistance and not spread cholera.
8. Discourage all visitors from contact with your hogs and hog-raising facilities.
9. Stay away from herds that are diseased.
10. Control rodents and other wild animals which may carry infection on the farm.
11. Consult your local veterinarian for help.
12. Keep rendering plant trucks away from your hog lots and pastures.

IX. IMMUNIZATION.

Passive or temporary immunity.

Anti-hog cholera serum used alone will produce a passive immunity that will last only a few weeks or less.* This is the safest method to use when you want a short period of protection. No adverse reactions are set off by its use. For baby pigs, the first milk from sows highly immune to cholera is high in immune bodies. On nursing such sows, pigs are passively immune for the first few weeks of life.

Active or long-lasting immunity.

Long-term protection against hog cholera can be conferred by living vaccines. Some modified living vaccines can be either given alone or with serum. Active immunity of this type is of two years or more duration. The inactivated or killed virus vaccines are also used to produce active immunity. A common fault of all vaccines is that they sometimes fail to stimulate immunity.

* Many authorities state that protection from serum alone may last as little as 14 days.

Fully virulent virus with serum, the simultaneous method, was the only way of vaccinating swine against hog cholera for many years. It was this method of vaccination that made possible the huge swine industry in the presence of hog cholera (see chronology). Because of its disadvantages or dangers it has been outlawed in many states, it is currently being replaced by modified virus-vaccines.

The simultaneous method has the following advantages and disadvantages:

1. It gives the strongest and longest lasting immunity of any vaccine. An animal that develops immunity following such vaccination is usually fully immune for life.
2. More is known about this method so that one can predict average results both good and bad.
3. Vaccinated pigs shed fully virulent virus for a time after vaccination. Premises become infected. Such vaccination sometimes produces hog cholera so that the vaccination spreads hog cholera.

Modified live-virus vaccines have opened up a new approach to active immunization of hogs. The virus is modified to such a degree that its virulence (killing power) is drastically reduced; however, its ability to produce immunity is largely maintained.

Serum can be used with these vaccines, thus giving the advantage of immediate protection against cholera, which lasts through the few days it takes for the vaccine to develop active resistance in the hog.

The modified live virus vaccines have certain advantages:

1. There is less risk of fatal reactions than with the use of full-strength virulent virus.
2. Extensive experimental and field tests indicate that the protection conferred by live modified virus vaccine is of long duration—as long as twenty-four months after vaccination.
3. The keeping qualities of the modified virus vaccines are relatively good.

“Dead virus” or inactivated vaccines are also available. These vaccines *must* be used without serum. They produce an active immunity lasting several months.

They have the following advantages and disadvantages:

1. They are entirely safe—can be used on pregnant sows and unthrifty pigs if the need is great.
2. They should not be used on pigs until at least two weeks after weaning from immunized sows. They can be used at an earlier age when the pigs are from sows which have not been immunized. (Immune sows pass along some resistance to their suckling pigs—to get maximum immunity from dead virus vaccines, pigs must be fully susceptible.)

3. It takes upward of three weeks following vaccination with killed-virus vaccines before the pigs are protected against hog cholera.
4. These killed-virus vaccines should not be used on hogs which may have been exposed to cholera.

X. PROBLEMS OF VACCINATION.

What about vaccinating pregnant sows?

Pregnant sows, if handled carefully, can be vaccinated with reasonable safety by serum and virus or by the modified virus method, except during the first 30 days after breeding. According to recent advice from the Agriculture Research Service, U. S. Department of Agriculture, use of live modified virus vaccines, with or without serum, should be avoided on sows in any stage of pregnancy, when possible.

If it is necessary to protect sows during the above mentioned periods, it is advisable to give serum alone.

What is the best age to vaccinate pigs against hog cholera?

Most authorities advise that suckling pigs should be five weeks old if vaccination is to be successful with modified live virus vaccines, either with or without serum. If pigs are nursing nonimmune sows, this age can be reduced.

Care of herd before and after vaccination.

Unless necessary, do not vaccinate unthrifty pigs. Pigs that have just been weaned, castrated, or treated for worms are not entirely "healthy." It's best to carry out these operations at least one week before or two weeks after vaccination. Use good husbandry and feeding practices with no drastic changes immediately before or after vaccination. Avoid heavy feeding. Keep hogs in sanitary areas both before and after vaccination.

When it becomes necessary to immunize a herd of hogs a part of which is affected with hog cholera use any of the living vaccines in conjunction with large doses of serum.

All products for the prevention of hog cholera are produced under license of the United States Department of Agriculture. Such products are released for sale only after compliance with mandatory safety and potency tests.

Some causes of adverse results following vaccination against hog cholera.

1. *Concurrent diseases may appear.* These include swine influenza, bacterial pneumonia, swine dysentery, malignant edema, swine pox, erysipelas, enteritis, rhinitis and other diseases.
2. *Parasites may cause trouble.* Pigs carrying heavy loads of one or more types of internal parasites may respond poorly to vaccination. These parasites include lungworms, roundworms (ascarids), kidney worms, stomach worms, and thornhead worms.

3. *Feeding errors may upset things.* Such errors may include a gorging on rich protein, excess corn intake, an oversupply of salt, etc.
4. *Environment may play a part.* Faulty ventilation of hog houses, piling at night and chilling in the morning, confinement to contaminated yards, etc., may cause trouble.
5. *Unsatisfactory products.* (Non-virulent virus—impotent serum.)

XI. FUTURE GOALS AND OBJECTIVES OF CONTROL AND ERADICATION.

All thinking farmers and veterinarians agree that putting up with the multimillion dollar losses from hog cholera is needless. We have ample scientific knowledge about the disease and fifty years of experience in combating it. Other progressive nations have either eradicated hog cholera or so effectively controlled the disease that it exists as a minor problem.

Our nation has been a leader in control and eradication of such plagues as animal tuberculosis, contagious pleuropneumonia, glanders, brucellosis, and foot-and-mouth disease. With hog cholera, we have maintained a continued attitude of compromise and a willingness to suffer recurrent losses. Continuance of such a viewpoint is untenable, and especially so if our swine industry is to compete with that of other countries.

What then are the "weapons" and "battle plans" that we can and should use in a finish fight against this No. 1 enemy of swine husbandry?

All who have studied the problem agree that the distribution, sale and use of fully virulent commercial hog cholera virus must cease. The chief reason is that the pigs given virulent virus with serum shed infective virus after vaccination, setting up a potential source of infection.

It has also been proven, time and time again, that hog cholera is readily spread to healthy swine through pork scraps or trimmings in raw garbage. The feeding of raw garbage, either commercially or household garbage on farms, is not only a means of transmitting hog cholera but is also a means of spreading vesicular exanthema, foot-and-mouth disease, and dreaded trichinosis. Mandatory cooking of raw garbage at commercial feeding plants and planned educational campaigns on eliminating raw pork scraps from household garbage must be an essential part of a cholera eradication campaign.

In control or eradication of all human and animal plagues—just as in fighting any war—it is absolutely essential to know *where the enemy exists*. For this reason all state laws should make mandatory, under legal penalty, the immediate reporting of all real or suspected cholera outbreaks to responsible officials. Likewise, the long-proved and valuable weapon of quarantine must be instituted and rigidly enforced on all farms or premises where hog cholera is present.

Vaccination of swine at community sales and stockyards with serum and virulent virus has been practiced for many years. This method carries heavy hazards because pigs that are shedding vaccination virus or are possibly developing hog cholera are scattered to many farms. When planned

control is instituted, no swine should be accepted for public sale or for exhibition at fairs and shows unless accompanied by a certificate of vaccination. Such certificates must show that vaccination was completed long enough before sale or show so that full immunity has had time to develop.

Intensification and amplification of research must also be launched as an approved weapon in the war against hog cholera. There are still some "blind spots" in our cholera war intelligence system. We need more information on the hidden reservoirs of the disease; more information on variant strains and how to immunize against them; more study on quick tests or sure, quick laboratory methods of differentiating hog cholera from other contagious hog maladies. Another need is a better killed or dead vaccine—which is surely possible. Knowledge gained by such research will be of inestimable help in furthering our working knowledge of many other livestock contagions.

Well-informed troops and civilians are essential in warfare against virus diseases. History has shown that American farmers not only approve, but actively cooperate and support, eradication activities if they have a full knowledge of the problem. A broad-coverage, well-planned educational campaign about all phases of the hog cholera problem should be integrated into the "long pull" planned fight against hog cholera. The lessons learned in the battle against bovine tuberculosis and brucellosis can well be utilized in eliminating forever this preventable menace to our vast swine industry.

These then are the objectives for future action:

1. Eliminate the sale and usage of fully virulent virus for vaccination.
2. Prohibit the feeding of raw garbage to swine.
3. Mandatory reporting of known or suspected outbreaks of hog cholera.
4. Strict quarantine and veterinary supervision of infected premises.
5. Broaden the use of "new type" vaccines with serum to get a maximum number of immune animals.
6. Permit no swine to go through sales or fairs, or sales from farms, without proper certification of vaccination.
7. Transport swine in cleaned conveyances.
8. Intensify and amplify hog cholera research.
9. Start a long range public education program about the disease.

Good teamwork between swine raisers and veterinarians—if backed by public understanding—can eradicate hog cholera. Complete eradication can save the swine industry upward of \$50,000,000 in annual losses and expense. The goal is most worthwhile and we can get there through group action.

CHRONOLOGY

- 1833—Supposed first appearance of hog cholera anywhere in world in southern Ohio.
- 1845—By this time 10 outbreaks had occurred in United States.
- 1850—Sutton demonstrates contagiousness of hog cholera.
- 1855—By this time 93 more outbreaks had occurred in United States.
- 1862—Hog cholera is recognized for first time in England.
- 1878—Detmers isolates *Bacillus suis* thought to be cause of disease.
- 1885—Salmon and Smith isolate *Bacillus suispestifer* thought to be cause of disease.
- 1887—Hog cholera recognized for first time in continental Europe (Sweden and Denmark).
- 1889—United States Bureau of Animal Industry places annual losses from hog cholera at \$10,000,000 to \$25,000,000.
- 1895—Hog cholera recognized for first time in Balkans.
- 1903—De Schweinitz and Dorset demonstrate hog cholera caused by a virus.
- 1908—Dorset, McBryde and Niles develop simultaneous serum-virus method of immunization.
- 1910—Simultaneous serum-virus vaccination gaining wide use.
- 1913—Great epizootic.
- 1926—Hog cholera epizootic year and serum famine.
- 1933—Boynton develops tissue vaccine for hog cholera.
- 1936—McBryde and Cole develop crystal violet hog cholera vaccine.
- 1947—Baker and Cox, James and Koprowski develop non-virulent live virus vaccines.
- 1949—Serious hog cholera losses occur in Midwest due to variation in hog cholera (variant virus).
- 1950—First committee (U. S. Livestock Sanitary Association) formed to plan for the eradication of hog cholera in the United States.
- 1951—First modified live virus vaccines released for commercial use (rabbit adapted).
- 1952-1953—First tissue culture modified live virus vaccine released for commercial use.
- 1953—County-wide pilot test area established in Florida for the study of control methods.
- 1954—Alabama outlaws use of virulent virus in vaccination.

1955—Seven states outlaw virulent virus in vaccination.

1957—Bill introduced in Congress to prevent the interstate shipment of virulent virus for use in vaccination of hogs.

1957—Sixteen states outlaw virulent virus in vaccination.

1959—Total of 28 states now prohibit the use of virulent virus in vaccination.

PLAIN FACTS ABOUT HOG CHOLERA

It kills more hogs in the United States than any other one specific infectious disease of swine.

It is widely prevalent where hog numbers are high.

It is highly contagious and spreads from herd to herd.

Sanitation alone cannot be relied upon to keep hog cholera off your farm.

Between 50 and 60 pigs can be vaccinated at or near weaning age for the value of one market hog.

Cholera can "wipe out" an unvaccinated herd almost "overnight."

The choice of vaccination products is best left to competent veterinary advice.

Eradication is the best answer to the hog cholera problem.