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Dipping Vat for Hogs and Dips
Hog Worms, Lice and Mange
Hog Lots, Houses and Water Supply

By

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HOG, CALF, SHEEP AND GOAT DIPPING VAT.

LOCATION: Select a place where the surface drainage can be controlled and the inlet and exit chutes and the retaining or holding pens can be easily constructed.

THICKNESS OF WALL: Usually a reinforced wall four inches (4") thick will make a strong permanent vat, but vats can be constructed 2 and 3 inches thick in soils where the ground does not crack very much. As a rule the 4 inch reinforced wall is the best and safest.

GROUND HOLE, AND SIZE: If the vat is for hogs alone, it may be only 7 feet long at the top and $3\frac{1}{2}$ feet to 4 feet at bottom. For calves and sheep it should be 8 to 9 feet long on top and 4 to $4\frac{1}{2}$ feet at the bottom.

The hole in the ground should be dug carefully and accurately as long and as wide as the desired length and width, plus twice the desired thickness of the wall. For example: if the top length is to be 8 feet, the bottom 4 feet, the top width 20 inches and the bottom 10 inches, the depth is to be 4 feet and the walls are to be 4 inches thick, then the hole should be carefully dug:

Top Length	8 feet 8 inches
Bottom Length	4 feet 8 inches
Top Width	28 inches
Bottom Width	18 inches
Depth	4 feet 4 inches

In order to make the hole regular and uniform, make one brace-like form of 2x4 pieces, measuring from outside to outside at the top, 28 inches, and at the bottom, 18 inches and 4 feet 4 inches from top to bottom. Lay off the top dimensions of vat on the ground with lines or straight edged plank. Dig down in the middle according to the form brace; then dig toward each end, being careful to dig out the incline exit even and straight. Note particularly that evenness and regularity of the ground hole saves cement and this decreases the cost of the vat.

FORM BRACES: Braces (3) are made as shown in the figure of 2x4 pieces. The top cross piece is 18 inches, and the bottom cross piece is 10 inches so that when nailed to the upright 2x4 side pieces the top measures (at the cross piece) from outside to outside 18 inches and at the bottom 10 inches. The cripple braces (2 to 3) are made of corresponding size for the incline. These braces are suspended in the hole at the proper places by being nailed to a 2x4—4 to 8 feet long, the ends of which are nailed to a stake that has been driven in the ground at the proper place. When all of these braces and cripples are fixed, the concrete may be placed in the bottom and on the incline; (if concrete is not too wet or soft), then 2 pieces of plank 2 feet long and 10 inches wide may be placed over the cement on the bottom and under the lower end of the braces. If these

planks are not under the lower ends of the braces they could be made a little shorter and weighted down with rock.

The side plank, 1 inch thick, are placed beginning at the bottom. Adjust the woven wire for re-inforcing and fill in the cement on the sides. If the boards are even and fit well, the concrete mixture can be rather wet and soft. Some claim that very wet concrete makes better walls than slightly wet concrete. The plank for the end and side walls may be placed as the concrete mixture is put in. Some let the cement in the bottom and on the incline partly set before the side and end walls are built. When this is done place the re-inforcing wire in the bottom and incline concrete at the borders where the woven wire for re-inforcing will extend up into the wall. Also make the place rough where the walls rest on the bottom and incline.

The side plank for the wall of the deep part and the incline join on the brace that stands at the bottom of the incline. It is best to run the side walls 1 to 2 feet above the ground and bevel the top so as to catch the splash and save using splash boards.

MIXING THE CONCRETE: Do this in a mortar box or upon a mortar platform (on the ground), 6x8 or 8x10. Use 1 part cement to 2 to 3 parts good, clean sand and 5 parts of gravel: measure each accurately and mix cement and sand thoroughly before wetting them. It is best to wet the gravel before emptying them into the wet sand-cement mixture; then mix until the gravel is coated with the cement. The concrete is now put in and tamped to get out all air and make the wall solid. The concrete will run out cracks and holes in the form if too wet and may not be so hard and good if too dry. Be careful to get in 2 layers of hog or chicken woven wire. Use the woven wire 1 to 2 feet high that has close or small meshes.

The forms should not be removed for 1 to 5 days, depending upon the weather. In very dry times 1 to 2 days, and in wet times it may take 6 days for the cement to set. If weak cement issued, or the inside of the vat is rough, plaster it with a mixture consisting of cement 1 part and sand 1 part. When nearly dry paint it with hot tar 1 part and gasoline 1 part. Apply several coats.

THE INCLINE: The incline can be made in cement steps, but these wear off and may become smooth. Better have two bolts imbedded in the cement near the top and two bolts near the bottom. These bolts will hold down cleated plank or planks that may be replaced when necessary.

THE SLIDE: Some do not make a slide, but force the hogs or sheep to jump off into the vat. However, a smooth slide 2 feet long with a 1 foot drop will be of use.

THE DRIPPING PEN: May be 5 ft. by 5 ft. or 3 ft. by 5 ft. It should be made so that the drip from the animals will all drain back into the vat through a small pipe or gate way

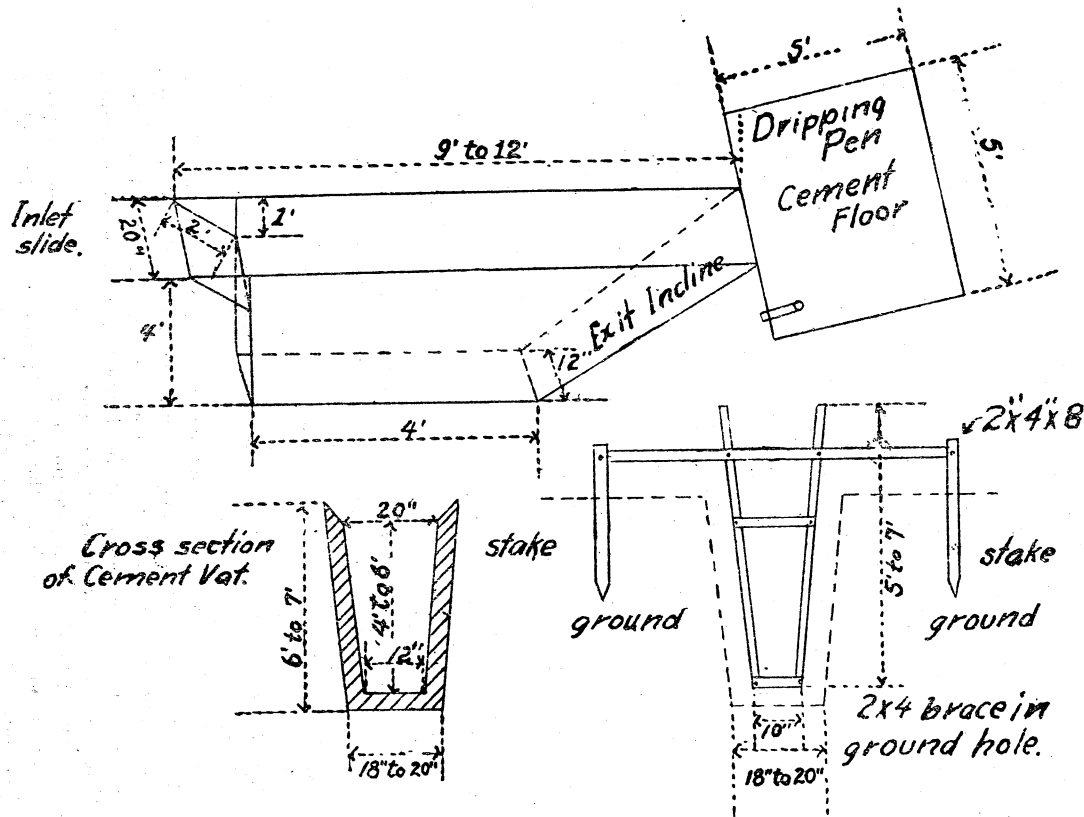


FIG. 2

next to the vat incline. The foundation ground for the dripping pen should be firm and well tamped. Raise the outer borders of the dripping pen 2 inches to prevent wasting of the drip.

The dipping pen and vat should be covered to keep out rain and prevent excessive exaporation.

THE CHUTE: This is to connect the receiving pen with the vat. It should not be less than 10 feet long and about 15 inches wide.

The pens for holding the animals before dipping should be substantial, strong, pig tight, and large enough to hold 100 or more hogs; and if arsenical dips are used, the receiving pens should have troughs for watering the animals just before dipping them. The retaining pen should be as large as the receiving pen and be free of grass or other feed upon which the dip may drop.

The lumber required for the forms, cover and fence, can be easily calculated. For the form it would be well to have about 150 to 200 feet of 1x12 or its equivalent in 1x10, 1x8 or 1x6; and it should be planed on one side and be some multiple of 4 feet in length so that it will cut without much waste. The posts, nails and 4 bolts can easily be determined.

Cover the vat and dripping pen with plank, shingles or galvanized iron.

It will require to build the vat:

Portland Cement	7 to 12 sacks
Sand	2 to 3 cubic yards
Gravel or finely broken rock.....	2 to 5 cubic yards

The quantity will vary with the size of the hole and the evenness of the walls.

How to calculate the contents of this vat in cubic inches and gallons: Multiply the average length in inches by the average width and this by the depth and divide this number of cubic inches by 231, the number of cubic inches in a gallon. The result will be the number of gallons that the vat will hold: Ex.

8 plus 4 equals 12; this divided by 2 equals 6 ft. or 72 inches, the average length.

20 plus 10 equals 30; this divided by 2 equals 15 inches—or the average width.

4 ft. deep, but the vat should not be filled to the top—3½ feet is sufficient.

3½ times 12 equals 42 inches—depth.

72 times 15 times 42 equals 45,444 cubic inches; this divided by 231 equals 196 gallons. This will fill the vat a little above the 3½ foot mark because the top length at the 3½ foot mark is not quite 8 feet and the top width at the 3½ foot mark is not quite 20 inches. In fact, 185 to 190 gallons would fill this vat up to the 3½ foot mark.

Kerosene or crude oil emulsion makes an excellent dip for killing lice on hogs and calves and colts and goats. It is not best to apply this to sheep unless the wool is short and they have just been clipped and the weather is warm.

To make this, take 1 pound of soap and cut it up fine and dissolve it in 1 gallon of warm or hot water. Then mix it thoroughly with 1 gallon of the oil, and then add three gallons of warm or hot water. This will make a total of 5 gallons ready for use.

To make large quantities get a kerosene oil barrel or other large barrel and take 9 pounds of soap, cut it up and dissolve it in 9 gallons of hot water, then add 9 gallons of the oil and mix thoroughly, then add 27 gallons of warm or hot water and mix well. This will make a total of 45 gallons. Pour this into the clean vat and make 3 more batches just like it and the vat will be ready for dipping. Just before each dipping stir thoroughly the dip in the vat.

This dip will cost about as follows:

36 bars of Soap @ 3 cents each.....	\$1.08
36 gallons of oil (Kerosene @ 15c).....	5.40
	<hr/>
Total	\$6.48

OR

36 bars of Soap at 3c each.....	\$1.08
36 gallons Crude Petroleum @ 10c.....	3.60
	<hr/>
	\$4.68

It is possible that crude oil might cost a little more or less in barrel (50 gallon) lots.

The Lime-Sulphur Dip may be used on all the small animals for scab, mites and lice. To make it take 8 pounds of unslaked lime and 24 pounds of Sulphur. Put into large kettle, cover with 20 gallons of water and boil for not less than 2 hours. Add a little hot water occasionally while boiling to take the place of the water that evaporates while boiling. Take off the fire and let the sediment settle and strain through a fine seive and cloth; then add sufficient warm water to make the whole measure 100 gallons, and put into the clean vat. Make another batch and the vat will be a little too full. This will cost about as follows:

16 pounds of Unslaked Lime.....	\$0.10
48 pounds of Sulphur @ 3c.....	1.44
	<hr/>
	\$1.54

SCLEROSTOMA PINGUICOLA
OR
STEPHANURUS DENTATUS.

Commonly called the Kidney Worm or Kidney Fat Worm.

LIFE HISTORY: The eggs pass out with the urine and in 4 to 7 days (varying with the temperature) develop embryos that break through the egg shell. The free embryos may be swallowed along with the food or water or they may penetrate the skin. The embryos may pass into the circulation from the intestines or into the blood vessels of the skin. From the intestines the embryos may pass into the portal vein and thence to the liver. From the vessels in the skin they may pass to various organs. The larval forms of this worm are found mostly in the portal vein and liver while the adult forms are found in the kidney fat, the kidney and ureters. The cysts are found chiefly in the kidney fat. Each cyst is connected by fine canals with the ureters and each cyst contains a pair of worms. The eggs are passed along the canals into the ureters and thence with the urine into the bladder and then to the outer world. Just how the embryos select the liver, the kidney fat, kidneys and other parts as preferred places of development is not known. It is not conclusively known how the embryos get into the body of the hog or how they migrate from place to place or reach their places of development.

**LESIONS OR ABNORMAL CHANGES PRODUCED IN
THE BODY.**

The larval worms in the blood vessels of the liver cause obstruction of vessels and destruction of cells. Thus the secretion of bile may be decreased. The cysts in the kidney fat injure it. The cysts in the kidney by pressure destroy portions of the kidney. This may materially decrease the excretion of urine and retention of urine or urea, etc., in the blood may produce uremia—a toxic or poisonous condition. Occasionally larval forms are found in the lungs.

The worms sometimes get into the sublumbar muscles and occasionally into the spinal column where they may injure the spinal cord and may thus cause paralysis of the hind limbs.

The passage of these worms (embryos) into the skin may cause some local changes not yet known by actual observation. One recent authority states that the parasites that penetrate the skin are the ones that reach the kidneys, the kidney fat and mature, give off eggs and perpetuate the species.

SYMPTOMS: The infested hog or pig may first show a weakness in the loins or hind limbs; move with a staggering or wabbling gait and when down have great difficulty in rising to its feet. Later complete paralysis of the hind limbs

and some times paralysis of all parts of the body behind the loins. The animal continually drags the hind limbs around on the ground.

PROGNOSIS: As a rule the hog or shotes that are paralyzed rarely if ever recover. This is most common in the hogs over one year old, but may occur at 6 to 12 months older, but rarely do symptoms appear in shotes.

FREQUENCY IN THE SOUTH: A large majority (90 to 95 per cent) of all the hogs over one year old are infested. Nearly every hog killed for pork has larval forms in the liver and mature forms in the kidney fat.

PREVENTION.

Keep hogs and pigs away from barns and small lots that are not regularly cleaned and disinfected once a month. See directions for disinfecting in another part. Keep them out on permanent or temporary pastures and change them from one place to another once a month. Low wet swampy permanent pastures will be infested and help propagate these parasites. Better have well drained pastures and supply water from deep wells or pure and protected sources for drinking and wallowing.

Dip all hogs and pigs regularly once every two weeks in vat as previously directed. Keep lime, charcoal and hardwood ashes mixture in a dry place within reach of hogs and pigs.

Curative treatment is not safe or certain. In fact, it is usually ineffectual if the hog or pig has the worms in the liver, kidneys or kidney fat. Some advise giving one-half to two teaspoonfuls of turpentine in fresh gruel or slop made of bran and shorts. Repeat this in two to four weeks if hog improves. The use of Areca-nut, santonin, pumpkin seed, copper sulphate, iron sulphate and other drugs for killing worms in the stomach or intestines may do some good in destroying the larvae forms, but such remedies do not affect the parasites in the liver, kidney or kidney fat. The safest and most certain things for the farmer is prevention, cleanliness, disinfection of lots and pens and rotation of pastures and regular dipping.

Some authorities advise the use of $\frac{1}{2}$ to 2 grain doses of pulverized nux vomica, given once or twice a day for 1 to 2 weeks or until the hog shows signs of nervousness. Then omit it for 1 to 4 weeks and repeat the course if necessary. This treatment may be of value when the nerves or nerve centres are involved.

LARGE THORN-HEAD WORM.

Technically this worm was known as *Echinorhynchus Gigas*. Now scientists call it *Gigantorhynchus Hirudinaceus*.

These worms are found in all countries where pigs and May beetles are found. The male is two to four inches long and

the female is seven to twelve inches long. If not well filled it may be somewhat flat and appear segmented like a tape worm, but usually it is round like a fish worm. The front or anterior end bears a globular or conical protractile proboscis which is covered by a large number of recurved hooklets. This gives it the name "Thorn-head." The ovum or egg is somewhat elongated with round ends and has three transparent coats or walls. The embryo can be seen, through the transparent coats, as an elongated cone. The embryo has four hooklets on its anterior or head end.

The ova are laid in the intestines of the pigs; pass out with the feces and are swallowed by the larvae of the May beetle or June bug, and by gastropod molluscs and by the rose cockchafer. The eggs hatch in the intestines of the molluscs or other animals and the embryo is said to bore its way to the muscles under the skin and there the embryo becomes encysted. Larvae have been found in the liver of one of these hosts. It seems probable that the larval stage may occur in a number of invertebrates and that there is yet much to learn about the larval stage in the life history.

When the pig or hog eats the infested grub or mollusc or cockchafer that contain encysted larvae, these larvae are turned loose in the stomach or small intestine and the thorn head is deeply buried in the walls of the small intestine. Here the worm develops to maturity. They live by absorbing nutrition from the intestinal contents of the pig and possibly secure some nutrition at the place of attachment from the intestinal wall.

The hooked or thorn head usually penetrates the mucosa and the muscular coat of the small intestine of the pig. This place first becomes inflamed and later dead cells, cheesy material, etc., collect and push out the serous or outer coat of the pig's intestine. This gives rise to small pus-like enlargements or papules. If the thorn head lets loose or is removed a deep ulcer is left which may heal. In rare cases the papule may erupt or break through the serous or outer coat of the intestine and its infected contents escape into the abdominal cavity and cause peritonitis and death.

Positive evidence of the presence of these worms in the intestine can only be determined by finding the eggs or the worms in the feces or the worms in the intestine upon post-mortem examination. The worms will cause intestinal indigestion in degree according to the number present. Large numbers of them will cause considerable intestinal change; such as: loss of appetite, constipation or diarrhoea, emaciation, unthriftiness. It is probable that these worms excrete or secrete a toxic material that may cause intoxication or convulsions when absorbed by the pig or hog. In very rare cases they may cause peritonitis as above stated. It is very probable that hog cholera virus or other infections may enter the body or circulation at

the ulcer or place of penetration of the intestine by the thorn head.

TREATMENT.

These worms are very widely distributed and cause much damage to swine husbandry. The careful use of the ordinary vermifuges, as santonin, areca-nut, copper and iron sulphate and arsenic will destroy these worms in the intestine if properly given, as directed elsewhere in this bulletin.

But prevention must also be considered. Rotation of temporary and permanent pastures must be practiced. Drain low and wet places and see that water supply is pure. Keep lots and pens clean by removing manure to cultivated fields where hogs do not graze. Disinfect with lime and copper sulphate and crude coal tar creosote solutions applied with spray pump. Plow and cultivate lots and pens and keep hogs away from old barns and sheds; and, do not permit hogs to run at large and live by rooting and eating infested grubs (Beetle larvae). Keep the charcoal, lime and wood ashes mixture in a dry place where hogs can get at it at least once a day.

LARGE ROUND WORM FOUND IN INTESTINES OF HOGS.

This worm is scientifically known as *Ascaris Suum* or *Suis* or *Suilla*. It is a large worm that resembles the fish worm and the male is 6 inches to 10 inches long, the female 10 to 12 inches. The body of the worm is white, rather firm and larger in the middle, tapering toward each end. The body is segmented or striated. The mouth is at the anterior or head end, somewhat triangular with three projecting lips that have papillae at their base. The tail end of the male possesses seventy to seventy-five papillae.

The eggs pass to the ground in the feces and develop embryos in one to several months according to temperature and moisture. The eggs are swallowed with food or water and the embryos are liberated when the gastric juice dissolves the shell. The development occurs without an intermediate host.

This parasite infests the small intestine, but may be found in the stomach and quite frequently in the gall ducts obstructing the flow of bile. They are very widely distributed and found most everywhere that hogs are raised. This worm does little harm where only a few occur, especially are they less harmful in grown hogs than in young pigs. Quite frequently in young pigs they are so numerous as to fill up the space in the small intestine and invade the liver ducts and seriously obstruct the flow of bile. This causes indigestion, disease of the liver, absorption of bile and yellow coloration of the tissues and fat, intestinal indigestion, emaciation and sometimes convulsions.

Occasionally these worms when small invade the pancreatic duct and obstruct the flow of the pancreatic juice into the intestine. This seriously interferes with intestinal digestion and produces progressive emaciation.

These worms are usually very numerous in lots, pens and small pastures which are continuously used for pigs or hogs.

Prevention may be secured by rotation of permanent and temporary pastures, drainage, keeping hogs away from old barns and pens, supplying them with a mixture of charcoal, lime and hardwood ashes.

Curative Treatment consists in giving Santonin, Areca Nut, Arsenic and other vermifuges, but reinfestation readily occurs if rotation of pastures is not practiced or treatment is not repeated once a month when the pigs are growing.

LUNG WORMS.

These worms are found in the smaller air passages and were commonly known under the name *Strongylus paradoxus*, but now this species has been divided into two separate species, *Metastrongylus apri* and *Metastrongylus brevivaginat*, spicules on the former being 4 m.m. long and on the latter 1.5 m.m. long.

The life history of these parasites is unknown. The eggs oviposited contain embryos 220 to 250 μ s long. The embryos soon emerge from their shells and have been seen to molt and at this stage show great resistance to extreme drying and to freezing. It is uncertain whether the hog becomes infected by swallowing the larvae or whether they first enter the body by some other host. After entering the body along with food or water, or some other host, the parasites begin to migrate and pass by way of the pharynx, larynx and trachea into the bronchial tubes or they get into the blood stream and finally around this into the smaller air passages of the lungs.

LESIONS.—The parasites are found in the posterior lobes and the superior part of these lobes. They may, however, be found in other parts of the lung. At first the infected parts are cone shaped and the part involved contains no air. It is usually whitish gray in color and of doughy consistency. Later the involved parts may contain purulent, muco-purulent or caseous materials and few or many of the small thread worms and their eggs. The males are $\frac{1}{2}$ " to $\frac{3}{4}$ " and the females 1" to $1\frac{1}{4}$ " long. The worms and eggs, mucous, pus and caseous material may also be found in the bronchial tubes and sometimes in the trachea. Sometimes the disintegrated worms and eggs may be found in the expectorations.

SYMPTOMS.—The period of incubation may vary from four to ten weeks. The primary symptom is a cough and it usually occurs in several animals at one time, and these animals have usually been exposed to infected dust. The cough becomes

worse as the disease progresses. In badly affected cases the animals may fall to the ground from exhaustion and lack of air. The discharge from the nose is sticky and adheres to the nostrils. The breathing becomes difficult and a distinct wheezing sound may be heard. The temperature may rise one to three degrees Fah. The animal may gradually become poor and emaciated. The affected pig may become weak and sometimes dependent parts may swell and the animal may die from exhaustion. The disease may last from one to three or four months. A positive diagnosis is made by post-mortem examination and finding the parasites and no other disease present in the body.

PREVENTION.—Dusty places are frequent sources of eggs and possibly embryos. Damp and wet places may also be infested; hence, hogs should be kept away from such dusty beds, under houses and in sheds and barns. They should also be kept away from low wet pastures and wallows. The best place for them is out on well drained pastures, and shift and rotate them from place to place as often as is convenient and possible. Also remove the manure and secretion from places where hogs are confined out into open fields and use disinfectants; such as lime, copper sulphate, creosote and liquor cresolis.

TREATMENT.—Inhalations or steaming with medicated vapors and intra tracheal injections are suggested. The steaming method is the one most suitable and easily carried out on the average farm. Confine all infected pigs or hogs in a rather close box stall or large box and put medicated steam in there with a small boiler or in the following manner. In one corner or part of the box place a kettle or bucket one-half full of hot water. Put into this one to four teaspoonfuls of creolin and one to four teaspoonfuls of turpentine. Then put into this red hot irons or stones to make it boil. Be careful to place the vessel where the hogs cannot get into the hot water or have it splash on them and scald them. Let them breathe this steam for ten to twenty minutes, being careful not to suffocate them. This should be done once or twice a day and always with watchful care.

HOG LICE.

The Hog Louse is a blood sucking parasite and is the largest known louse. It is technically known as *Hematopinus suis*. The female cements the ova (nits) on the hair and the ova hatch in ten to fourteen days. These lice suck blood and irritate the skin. The irritation makes the hog or pig restless. It is also probable that these blood sucking lice may transmit cholera virus and germs of other diseases.

The dipping vat is the surest and cheapest method of eradicating hog lice. The dip should be crude oil or crude oil emulsion or kerosene oil emulsion. The hog should be dipped once

every ten days for three to four times and thereafter once a month is sufficient. Where a few hogs are to be treated, then the spray or hand swabbing may be used. The rubbing post is said to be useful, but it will not get the oil all over the body of the hog, and, hence, cannot be as efficient as the dipping vat. A rubbing post is made by applying rope, a cloth or any material that will hold oil, around a post about two feet from the ground: this rope, etc., is saturated from time to time with crude oil. There should be several posts in a pasture or one in each pig or hog lot.

Fleas will breed in dusty, dirty pens and places where hogs sleep. To eradicate and prevent them, avoid dusty places, and old decaying beds by cleaning and disinfecting and frequent transfers to new, clean pens and regular dipping.

SARCOPIC MANGE.

This kind of mange is caused by *Sarcoptes scabiei*, var. *suis*. The female burrows into the skin making galleries in which she deposits eggs generally about fifteen in number. The ova hatch in five to ten days into asexual six legged larvae that may remain in the galleries or pass out under the scales and scabs and in two to three more days moult and become nymphae. Each nymph has four pairs of legs and is without sexual organs. In two or three days the nymphae moult and form sexually mature males and females: then they mate and three to five days later the ovigerous female is found in the galleries of the skin depositing eggs or ova. The life cycle varies from ten to twenty-five days. In each brood there are about five males and ten females. Starting with one ovigerous female, and with favorable conditions for three months the total number of parasites would approximate 1,500,000. The adults are scarcely visible to the naked eye. In order to find them, scrape off some of the affected skin or scabs and examine with small hand lens or put under low power microscope.

LESIONS: The parasite or mite pricks the skin with its stylet to get tissue fluid: this injury at first produces a red spot that is followed by a vesicle that ruptures and forms a scab under which the mites may be found. The formation of galleries in the skin also irritates the skin. The scabs may crack and damage the hair and the pig will rub off the hair. The irritation may result in fibrous thickening of the skin. This thick, leatherly skin may become dry, hard and cracked. In old standing cases the affected hog or pig may become emaciated.

SYMPTOMS: There may be intense itching at first around the ears and eyes and soon there will be vesicles, papules and scabs. The loss of hair, thickening and cracking of the infected skin will later appear. Scrapings from old affected parts

of the skin may be examined with a hand lens for the parasite. Finding the parasite makes a positive diagnosis. As a rule this parasite will infect all the swine in a given lot or herd.

TREATMENT: Apply the lime-sulphur or nicotine dip once every ten days for three dippings. Before each dipping wash the infected hog or pig with soap and water and brush to remove the scabs and scales. If the skin is very thick and wrinkled it may be necessary to prolong the preliminary washing and scrubbing and repeat it and the dipping every ten days for five to ten dippings. It is also essential that the pens and lots and hog houses shall be cleaned and thoroughly disinfected with lime-sulphur or the coal tar creosote-copper sulphate spray, and if possible remove the hogs to a new place after each dipping.

DEMODECTIC MANGE.

Demodectic or red mange is not common and is caused by the *Demodex folliculorum*, var. *suis*. It belongs to the same family as the *Sarcoptic* mange parasite. It cannot be seen with the naked eye. To see it requires a low power microscope. Its body is somewhat long, and its legs are very short. It resembles a small worm with head end blunt and tail end somewhat pointed. It lives in the sebaceous or oil glands of the hair follicles, where the eggs are deposited and the parasite develops.

LESIONS: The parasites cause irritation and inflammation of the hair follicles and the hair drops out. It first appears on the legs but may involve the under parts or nearly all of the body. The inflamed follicles give the skin a red color: hence, the name red mange. In old cases the skin is thick, wrinkled and may be cracked. Small pustules may project above the surface. These may be opened and the cheesy, dry pus-like material may be placed on a slide and a little weak solution of carbonate or hydrate of soda added to it. Tease out the mass and put under low power microscope. Then the parasite can be readily seen. This form of mange extends very slowly over the body and often is confined to one or two pigs or hogs in a herd.

TREATMENT is ineffectual: it is incurable. Infected animals should be sent to slaughter and skinned instead of scraped and the hide should be tanked or burned.

WATER SUPPLY.

This is one essential or indispensable requisite to hog husbandry. The best and purest water comes from deep wells that are thoroughly protected from surface infection. The water should be pumped from the well to distant tanks and piped from the tanks to all lots and pens. In no case is it safe to

have troughs near the well. Protect the well by good surface drainage and have it surrounded by a strong, high, tight close mesh fence that will keep out dogs, chickens, hogs, cattle, mules and horses. In no case permit a privy, manure pile or garbage within 300 feet of the well and never have the drainage from such places run toward the well.

If springs or surface wells are sources of water, protect them by surrounding with side hill ditches and good strong fences. Pools and surface water holes are very dangerous, but if they are the only means of securing water, surround the pool or pond with good high side hill ditches and animal tight high fences. The ditches and fence should enclose all the ground surface that catches water which runs into the pool or pond. If a pond, run a pipe through the dam and run the water from the pond to troughs some distance below the dam; or put in a pump run by gasoline engine or other power, to raise the water to tanks located on some high place where water will gravitate through pipes to all pens and lots. If a pool or pond must be made and used, never leave them open so that cattle or other animals can wade into them and never leave the soil surface that drains into them unprotected by ditches and fences.

It might be that no infectious or contagious germs would be carried into the pool or pond; yet there would be urine and manure which contain animal excretions that are always injurious to the animals from whence they come. It is generally conceded that the excretions of an animal are toxic or injurious if fed or given to that animal. Moreover, these excretions containing organic and mineral matters that furnish media for the growth of a large class of germs, some of which may produce disease, that multiply outside of the animal body. It is also inadvisable to permit trees, shrubs, weeds or other vegetation to grow in the pool or pond. Some fish may be kept in a pond, depending upon its size and also upon how they are fed. Throwing bread, worms and other feeds into the pond for fish is adding more organic matter that will also feed germs, but some fish eat up the larvae or young of mosquitoes and other small animals.

Some advise the use of hypochlorite of lime, or copper sulphate to purify the water, but such chemical cannot be safely used by the layman. In fact, it is doubtful if drugs can be safely used by any one to purify water in pools or pond.

HOG HOUSE, LOTS, PENS AND PASTURES.

The location, arrangement, drainage, care and water supply of hog houses, pens, lots and pastures may determine the success or failure in the hog industry.

Location of lots or pens, from a sanitary standpoint is very important. For breeding purposes each lot should have at least

one-fourth to one acre in it. In it should be some shade or a small movable hog house, and a good supply of pure water. The lay of the land should be so that it would drain well and there should be no low, wet places or dust beds. This lot should be well covered with Bermuda, with Spring vetch, bur clover or some other winter legume. If not in Bermuda or other permanent pasture grass, keep it growing some temporary food crop, such as rape, oats, wheat, rye, vetch or sorghum. This will necessitate deep plowing the land at least twice a year and keeping the sow and pigs out of it until the crop is large enough for grazing. The plowing and removal of the hogs tends to eradicate parasites and disinfect the soil, especially so if the undecomposed litter is raked up and burned and lime is spread over the ground a few days before the lot is plowed. To do this it requires a number of extra lots and the larger the lots (other things being equal and good) the safer and better for feed, growth and health of the sow and pigs, or other breeding hogs.

As a rule it is best not to have one lot or pen up against or join another one because the sow and pigs of one pen will worry, fuss and fight along the partition fence and if one lot becomes infected the other will also become infected. Separate the lots by twenty to one hundred feet. The space between lots or pens can be utilized for grazing purposes or for soiling or other crops and for drive ways. One of the greatest defects on most hog farms consists in poor, weak and improperly put up fences. Woven wire hog fence should be thirty to forty inches high, with large wire and close mesh (not over 6 inches, better 4 inches) and have a good barb wire at the bottom and two to four wires on top. The woven wire and barb wire should be relatively well stretched and well stapled to good posts not over eight feet apart. Remember that poor hog fences permit good hogs to get out and thus irritates the hands or owner, and chasing hogs in hot weather kills some, injures others, and causes sows to lose their pigs. Breeding hogs should be kept quiet, and feeding hogs are not supposed to develop speed.

The hog houses should never be large or permanent. Small, light, movable houses can be cleaned, disinfected and moved. They can be burned up without much loss if conditions demand it. If hog houses can not be cleaned, disinfected and moved, it will be better to get along with shade and rain hoods that can be moved or have a few shade trees or oaks. Avoid too many trees as they will keep grass or other crops from growing and retain too much moisture.

Feeding and watering troughs are sources of trouble, annoyance, expense, filth and infection. Simple, plain, light galvanized iron troughs are best for the breeding lots and pens.

They are easily moved and easily cleaned. Cement or concrete troughs are heavy and difficult to move and clean. They are durable and can be used if frequently cleaned and disinfected. Any kind of a trough should be movable and frequently cleaned and disinfected.

MIXTURE FOR PREVENTING WORM INFESTATION IN PIGS.

Pulverized Charcoal	2 parts or 10 pounds
Air Slaked Lime	2 parts or 10 pounds
Hardwood Ashes	2 parts or 10 pounds
Common Salt	1 part or 5 pounds
Sulphur	1 part or 5 pounds
Pulverized Sulphate of Iron	1-5 part or 1 pound.

Mix very thoroughly and put in a dry place where pigs or hogs may get at it at will.

The following is the mixture that has been recommended by some Government authorities as a remedy for preventing cholera and for preventing or eliminating intestinal worms in swine.

Pulverized Wood Charcoal	1 pound
Pulverized Sulphur	1 pound
Pulverized Sodium Sulphate	1 pound
Pulverized Antimony Sulphide	1 pound
Pulverized Sodium Chloride	2 pounds
Pulverized Sodium Bicarbonate	2 pounds
Pulverized Sodium Hyposulphite	2 pounds

Mix thoroughly and give a tablespoonful in ground feed once a day to hogs weighing 200 pounds and to others in proportion to their weight.

Permitting the hog to eat pumpkin seed tends to keep down tape worms. The active vermicides are not much used in hogs on account of the difficulty of administering them.

Dr. Graham of the Kentucky Station gives the following as a vermifuge for hogs:

Santonin	2½ grains
Areca Nut	1 drachm
Calomel	2 grains
Sodium Bicarbonate	2 drachms

Give as one dose. Do not repeat for one to four weeks and not then unless more worms are found in dead pigs or hogs or worms are seen to pass in the feces. Dr. Graham also advises putting one pint of turpentine into one barrel of slop. Mix it well. Starve all the hogs for twenty-four hours before giving the vermifuge to them. Turpentine may be given to pigs and hogs in doses of one to two teaspoonfuls in slop after the hogs have been starved for twenty-four hours. Do not repeat under one to four weeks.

DISINFECTING BARNs, HOUSES, PENS, LOTS, ETC.

Clean up or rake up all the loose trash and litter and burn it. Then remove all the manure to cultivated fields or pastures where no hogs are permitted to run or graze. The manure from pens infected with cholera should be mixed with unslaked lime or with strong acid phosphate and composted before it is scattered on the fields. Then spray the ground, fences, walls, ceilings, troughs, hog houses, etc., with the following:

Copper Sulphate or Blue Stone.....	5 pounds
Dissolve in water (1 barrel).....	50 gallons
Add crude coal tar creosote.....	2 to 4 quarts

Mix with spray pump and agitate while spraying with ordinary spray pump over ground, walls, etc. In one or two days, white wash walls, fences, and houses with spray pump and cover the ground with a thin layer of lime.

Crude coal tar creosote may be bought in the Birmingham district for 12c to 15c a gallon by the barrel.

The above disinfectant is cheap and should be applied liberally.

Some advise spraying with a mixture of 1½ pounds of lime and 4 ounces of strong carbolic acid to each gallon of water or with a solution of 4 ounces of chloride of lime to each gallon of water. But these mixtures are expensive.

CONCRETE FEEDING FLOORS.

Where hogs are fed concentrates in winter or summer in more or less small lots or large pens or even in pastures a concrete feeding floor or platform is useful. Such a feeding place is very essential in lime land where mud is deep and very sticky during the rainy seasons of winter. This concrete feeding floor could be located so that hogs in pasture or pens or lots could reach it. It should be kept clean and the soil around it should be kept free from mud holes and filth. Pigs or hogs should be held on this cement floor only during the time of feeding.

HOG WALLOWS.

The ordinary or common hog wallow is a filthy, dangerous place. It should be avoided or rather drained and abandoned. If the hogs must bathe and wallow in water make a concrete wallow about ten feet by twelve feet and have it so it can be washed and cleaned as often as it becomes filthy. It is an excellent place for bathing and washing pigs and hogs and every hog farm should have at least one and as many more as may be necessary and useful.

SOME THINGS TO AVOID.

- (1) Have only one breed of hogs and stick to that breed.
- (2) Get a new registered boar every year, at least every two years.
- (3) Grade up the herd but do not mix or cross-breed. It takes a long time, and it is usually impossible, to fix or make a fixed type of animal by cross-breeding.
- (4) Keep the lots and pens for hogs away from mule and horse barns, or cow barns and sheds. If hogs are to follow cattle, put fattening hogs into the cattle feeding lots or pens, but do not let breeding hogs into cattle pens.
- (5) Never let hogs follow cattle that are being fed cotton seed meal. As a rule it does not pay and it sometimes kills a number of the hogs or pigs.
- (6) Feed cotton seed meal to hogs only during the last 20 to 30 days of the feeding period. Then feed it with corn.
- (7) Feeding cotton seed meal mixed in a weak solution of iron sulphate will prolong the feeding period with less danger of loss.
- (8) Some makes or batches of cotton seed meal are more toxic than others. Spoiled meal or very old meal is usually very poisonous.
- (9) The younger the pig the more susceptible it is to the toxic or poisonous effects of cotton seed meal. Or the older the hog the less liable it is to die from eating cotton seed meal.
- (10) Cotton seed meal fed in a thin slop or gruel is less liable to be poisonous than when fed slightly moist or dry. In no case is it safe or wise to feed cotton seed meal to breeding hogs.
- (11) Young cockle burs are said to be poisonous to pigs, but our feeding tests disprove it. We could not kill pigs by feeding them young cockle burs. Jimson weeds often grow with cockle burs and jimson weeds are very poisonous.
- (12) China berries produce constipation and also irritate the intestines and sometimes kill pigs. If the china berries are fermenting they produce intoxication and fatty degeneration of the liver and kidneys; hence, they are more or less dangerous according to their condition.
- (13) Kitchen slops may contain wash powders that are made up of soap and impure lye. They also contain much undigestible waste and often contain scraps of uncooked meats and cholera virus. Kitchen slops may contain ptomaines or poisonous products found in decomposing organic matter. Uncooked meat in kitchen slops may

contain trichina or tape worm cysts and sometimes such slops may contain dead mice or rats that may be infested with trichina or tape worm cysts. Hence, kitchen slops or restaurant, or hotel slops are dangerous feeds for hogs.

- (14) Spoiled, decayed, moldy, rotten feeds of any kind are liable to produce "forage" poisoning.
- (15) Old rotten meal, rotten milk, rotten butter milk may contain very active poisons and should not be fed to hogs.
- (16) Burn every dead hog or any dead animal before dogs or buzzards get to them. The Regulations of the Live Stock Sanitary Board require it.
- (17) It is quite dangerous to the hog to drench it. In most cases the drench goes down the wind pipe into the air passages of the lungs and produces broncho-pneumonia and death.
- (18) Better give medicines in the feed or if the dose is small put it on the pig's or hog's tongue.
- (19) Most farmers give too much medicine, especially when they do not know how the drugs act; consequently, the medicine often does harm instead of good. It is safest and best to give no medicine unless a graduate veterinarian advises it.
- (20) Too much peanuts and soy beans are detrimental to breeding hogs. Pea nut oil makes the body fats soft and possibly degenerates muscles, and softens the bones and may injure the nerves or nerve centres. To say the least it is not wise to feed peanuts as a single ration to breeding hogs. Better balance the ration with rape or other pasture and corn, bran, etc. Peanut fed sows and boars tend to become impotent, non-breeders or shy breeders. Sometimes this may be a result of getting brood sows too fat and insufficient ash or mineral matter in the ration.
- (21) Permitting hogs to run at large spreads cholera, parasites and other infectious diseases.

HOW HOG CHOLERA IS SPREAD.

1. Cholera may be spread by driving or shipping infected hogs. They carry the infection and may infect the wagon or car, or they may distribute it along the way by their excretions. When a new hog is received on the farm it should be kept entirely separate from all other hogs for at least three weeks. Then the hog should be dipped or sprayed with some weak antiseptic, such as weak creolin.
2. Those who visit cholera infected places often carry infection on their shoes.

3. Dogs and cats carry the infection on their feet or by eating infected carcasses.
4. English sparrows and pigeons may eat grain in infected lots and carry the infection from farm to farm.
5. Buzzards feast on infected carcasses, fly great distances, and infect pastures with their feet and their excretions and also infect the water supply in feed lots.
6. Wind may carry infected dust for a short distance, possibly across the road or farther.
7. Running water may be infected by flowing through an infected pasture, by carcasses being thrown into it, by buzzards and dogs bathing in it, or by sewers.
8. Kitchen slops may contain scraps from pork that is infected with cholera and other diseases.
9. Failure to burn or bury dead animals helps to spread cholera and other diseases.
10. The careless handling of virus by men not qualified to use it may spread cholera.
11. Improperly made serum and virus may spread cholera. Serum and virus should be bought from the nearest State Serum Laboratory or from a firm which has Government supervision and a Government license.
12. Permitting hogs to run at large spreads cholera.
13. Contaminated or infected public roads, streets or drive-ways spread cholera.
14. Public stock yards are all infected with cholera virus.
15. Show hogs at fairs often distribute cholera. All show hogs should be inoculated and held in quarantine for four weeks and then disinfected before they go to the show; and when they leave the fair they should again be disinfected and held in quarantine before they go back to the farms.

CONTROL OF HOG CHOLERA.

Avoid all the means and ways of transmission.

When cholera once gets into a herd and a farm becomes infected, keep the hogs away from horse or cow barns or sheds. Keep them in lots, pastures or fields by themselves and drain all mud holes or wallows. See that hogs get an abundance of pure water in clean troughs. Clean feed troughs once every day and do not permit feed to remain in them to sour and decompose. Feed only fresh, pure feed, and if possible cook it just prior to feeding it. Cholera infected hogs are usually over-fed. Avoid over-feeding.

A highland pasture containing some shade is a good place for them. If weather is warm no other protection is required. If

cold and rainy, small houses or shed shelters should protect them. Never permit hogs to sleep in dusty places, old decomposing litter, straw, hay or manure. Feed and nurse cholera hogs as a typhoid human should be. Give fresh anti-hog cholera serum in large doses to all sick hogs. To the hogs that are exposed and apparently well give large doses of fresh serum and small doses of fresh hog cholera virus.

Clean up and disinfect lots, pens, etc., as previously directed.