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COMMON DISEASES
OF PIGS

AND THEIR DIAGNOSIS

E. PEACEY

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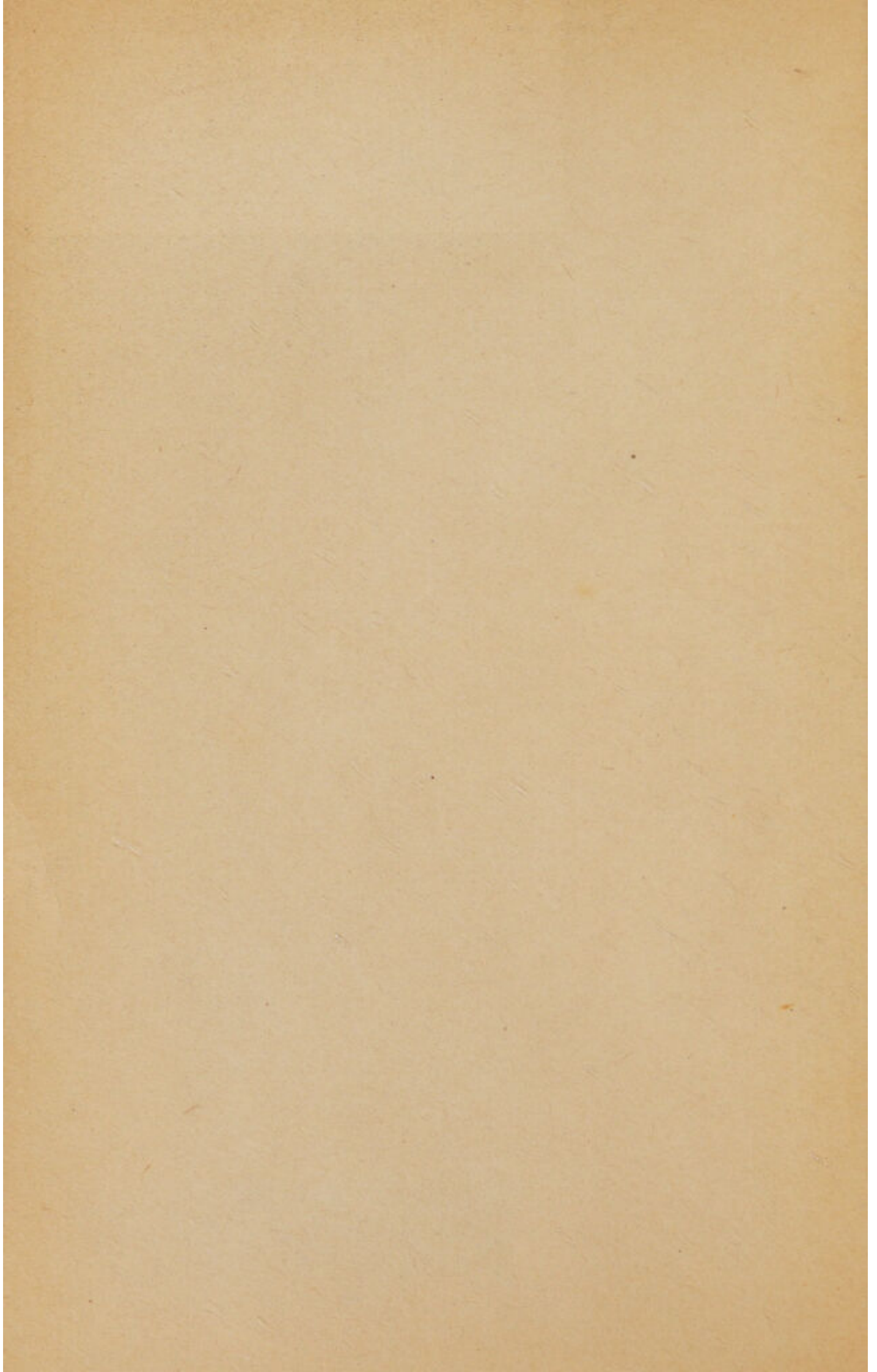
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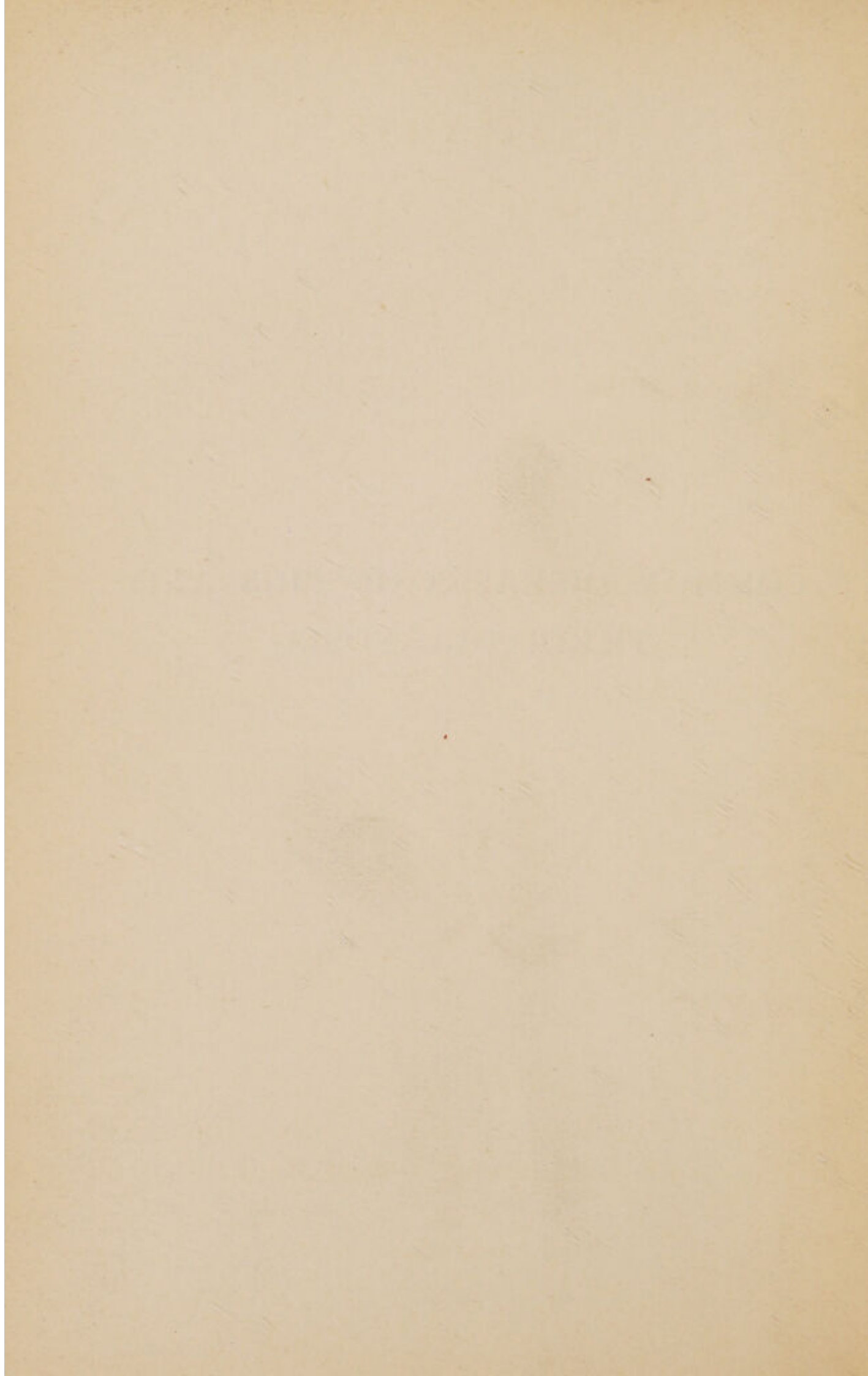
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COMMON DISEASES OF PIGS AND
THEIR DIAGNOSIS



COMMON
DISEASES OF PIGS
AND THEIR DIAGNOSIS

INCLUDING SWINE FEVER AND ITS
TREATMENT WITH SERUM

BY

ERNEST PEACEY, F.R.C.V.S.



LONDON
BAILLIÈRE, TINDALL AND COX
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1918

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INTRODUCTORY NOTE

FOR some time past the want has been felt of a handy volume devoted to the diagnosis of the diseases which ravage the pig-stye.

The following notes are the outcome of more than twenty years' practical experience, and I have reason to hope that they may help the veterinary practitioner to arrive at a solution of the many problems which confront him in the exercise of his profession, and that they may be of equal assistance to the veterinary student and the stock-owner.

The data contained in the following pages are based upon personal observation and deduction. Laboratory practice has received only a passing mention. My aim has been to present a condensed account of the various diseases of swine as encountered in ordinary practice.

Some of the diseases are described more fully than others, the object of the writer being to save the reader the unnecessary trouble of going through pathological details in some of the simple diseases already well known to him, such, for example, as cirrhosis of the liver, dropsy, mammitis, etc., reference being confined to the prominent abnormal appearances and symptoms.

Owing to war conditions, and on account of the scarcity of paper, labour, etc., it has not been possible to include any illustrations with the first edition, but it is hoped that the usefulness of the book will be extended in this direction in any subsequent editions.

I have no knowledge of any publication dealing with the differential diagnosis of the diseases of swine, so that I venture to hope that these notes will be found of value, many of the data given being absent from the ordinary textbooks.

I do not claim infallibility ; but I can honestly say that I have scrupulously avoided any distortion of facts, and that all I have written is based upon long practical experience.

E. PEACEY.

LONDON,
August, 1918.

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COMMON DISEASES OF PIGS AND THEIR DIAGNOSIS

HINTS ON PIG-KEEPING.

THE pig is instinctively a very clean animal, and does not require any elaborate premises for housing. The essential conditions are that the premises shall be dry and free from draughts. They should preferably face due south.

The *sleeping-quarters* should not be cramped, but should be of sufficient height to enable a person to stand up in order to clean them out.

The *roof* should consist either of tiles or boards, covered with tarred felt, or corrugated iron with a layer of felt beneath it.

Bricks are preferable to concrete for the *walls* and *sides*, as they are much warmer and cosier than cement. For an inexpensive sty^e wood answers the purpose very well; the only drawback is that it is not so easy to keep clean, while its advantages are that it is usually warm and dry.

In cold weather, if the sleeping-quarters are sufficiently lofty, a few boltens of straw spread on a rack of temporary

rafters, between it and the roof, keep the place snug and warm. It is astonishing to see the progress made by pigs when comfortably housed.

Ventilators, consisting of air-bricks or louvre boards, should be provided in the upper part of the wall, so devised that they can be closed during cold weather, if needful.

The *floor* should be impervious to moisture, and should consist of cement, bricks, or other suitable material. It should be laid upon a gradual slope, the fall being from within outwards, in order to favour surface drainage.

The floor of the sleeping-quarters should be covered with a detachable wooden platform (disused railway sleepers make an excellent floor) for the animals to sleep on. The floor of the exercising yard should be traversed by shallow grooves, herring-bone fashion, as these prevent slipping and the occurrence of such accidents as sprains and broken limbs.

Drainage.—Surface drainage is the best, the drain always opening on the outside of the sty. On no account must the surface drainage of one sty pass through that of another, because if one pen of pigs contracts a disorder there will in this case be a risk of infection spreading to the other animals, particularly if the illness be of a highly contagious or infectious character, such as swine fever.

It will therefore be readily understood that the surface drain outside the sty should be of the nature of a covered gutter, opening into a cesspool or other receptacle, so

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should be in good health, and free from colds or chills. If possible, a nice dry day should be selected for the operation; cold wet weather should be avoided. The flesh of uncastrated pigs, when fried, emits an unpleasant urinous odour, and the meat is tainted with a similar flavour.

The *food* to be given in normal health depends upon the age and size of the pig. Young pigs which are just weaned require their food in a sloppy condition, and in cold weather it should be heated to about the temperature of new milk. Young pigs should be fed regularly—three times a day. Don't overfeed or gorge them; if they are properly rationed, the trough will be cleared before the next meal is due.

In the early days the pigling usually receives middlings, sharps, or pollards, and in normal times it is useful to add a little separated milk, which favours growth and development. If this cannot be obtained, or if in war-time its use is not legal, a little sweet clean swill may be used for mixing with the meal, but strong, stale, sour, or rough swill should be avoided. In the final stages of fattening barley meal is best, or a mixture of cereals, such as pea meal, maize meal, barley meal, a little bran, and a small portion of bean meal.

The flesh of pigs fed on swill is not so rich or firm as that of those fed on dairy produce (milk and meal). To produce prime bacon or pork, bacon-curiers and butchers prefer that the pig shall be finished off with meal, preferably barley meal, or something similar in character.

All cereal foods should be soaked for twelve hours in water before being given to the pigs.

When feeding pigs on swill collected from several premises, it is advisable to have it sorted by hand, in order to eliminate foreign substances which might choke the animal, such as bones, skewers, hair-pins, corks, and scraps of wire. Avoid putting into the swill-tub slops containing soda or salt or salted fish, and see that no soap accidentally gains access to it. Eliminate lemon-peel, orange-peel and tea-leaves, also rhubarb-leaves.

Swill is often fed to pigs in the raw state; but it is safer to cook it by boiling or steaming, especially when it is given to young pigs.

Feeding Troughs.—There are many varieties; the expensive ones are provided with a flange which prevents the pigs from gaining access to the trough while it is being filled. Iron is probably the best material; ferro-concrete or wood may be employed, but the animals occasionally eat the sides of a wooden trough, unless these are covered with strips of tin. The trough is best divided into compartments, so that only one animal can feed at the same spot.

Needless to say, it should be so fixed that it cannot be overturned, and it should admit of being thoroughly cleansed at intervals.

Pigs which are kept in styes should occasionally be given a little coal, or a few sods of turf, or some charcoal should be thrown into the pen, as these favour digestion.

Pasturing and Stubbling.—This is an excellent method; it promotes development, encourages growth,

and keeps the animals in healthy condition, while at the same time it supplies a certain amount of useful food. It is also a safeguard against the bane of pig-keeping—namely, Swine Fever and other diseases. If pigs are turned out for manuring purposes, they should be given a large fold to roam over, or they will deposit their fæces along the sides of the paddock or pound in which they are confined. They should be ringed before they are turned out to pasture.

Pigs may usefully be turned into an orchard, in order to grub up the weeds, in late autumn or early spring; and during the present scarcity of labour they have been in great demand for the cultivated soil in the Kent orchards. As previously explained, the open-air treatment of running pigs on pasture, so ably advocated by Mr. Edge, favours growth and the general health, the green-stuff acting as a corrective to the digestive system. In running large herds on pasture-land great care must be exercised in their supervision, and if a pig is seen to be unwell it must be strictly isolated. Should the ailment prove to be Swine Fever the rest of the herd should be treated with serum. It is most important that the use of serum should be resorted to without delay, as success depends upon promptitude.

Roots and potatoes are most useful food for pigs. Even damaged potatoes are eaten with impunity. Swedes and mangolds are usually given raw, as are other roots, including potatoes; but the latter are more nourishing if boiled or steamed.

When feeding pigs on swill try to supplement it with

a little cereal flour or meal, as it is then more satisfying and nourishing.

As is well known, pigs are exceedingly fond of acorns ; during the autumn they will wander considerable distances searching for the fallen nuts, which are a most valuable adjunct to the diet, and may be consumed with impunity. If the acorns are gathered, and fed to pigs kept in the styes, they are best given in moderation, together with other foods, because of their tendency to produce constipation.

Pigs with large ears drooping over the eyes have less tendency to stray, and make good grazers, while animals with long snouts and short ears make good foragers, and are more prone to wander. It is, comparatively speaking, less economical to feed and fatten pigs during the winter than during the spring and summer, because a larger proportion of food must be given during the winter, in order to maintain the natural heat of the body.

Inexperienced persons starting to keep pigs for the first time should endeavour to purchase strong stores, not less than fourteen or sixteen weeks old. It is a wise practice to see the animals before you purchase them, and to remember the old adage, "Never buy a pig in a poke." The glowing description of some pigs offered for sale is not always confirmed on the arrival of the animals, and often enough the buyers would not have agreed to buy could they have seen the animals before they were forwarded. It is nearly always safe to leave the selection in the hands of a breeder with a good reputation.

When selecting pigs from a litter, choose the strongest and best; they will well repay the extra cost of two or three shillings per head. Never buy a thin pig with sides like a board, and with legs that appear too long. More often than not such an animal is the subject of disease, or in the convalescent stage, or affected with worms, etc.

Select a plump, chubby, bright animal, with a clean skin, covered with fine glossy hair. The body should be long in form, with a good deep chest and short straight legs. The head may be either short or long, depending on the breed, with a broad forehead and eyes set well apart.

It is best to avoid purchasing pigs which are in poor condition, stunted in growth, and unthrifty. Breeding sows are often kept in "store" condition until they are ready for stock purposes—that is, the sows are not permitted to become fat during the barren interval.

During the hot summer weather efficient ventilation is most essential, and the feeding-yard of the sty should be shaded by means of an awning of rough canvas or other suitable material, pigs, especially fat animals, often being affected by sunstroke, with disastrous results.

Scraps of waste food material should not be allowed to accumulate either in the sty or in its immediate surroundings, as they attract vermin, especially rats, and act as breeding-places for flies in the summer weather. Cereal foods should, if possible, be stored in a corn-bin, to prevent damage by vermin.

Keep the skin of the pig clean and free from lice, which in severe cases of infestation cause the pig to become unthrifty.

Also at intervals thoroughly cleanse and wash the sty, troughs, and utensils with water, and flush the drains. The owner's neighbours will then have no excuse for referring to the premises as "a pestilential, foul-smelling pig-stye."

Breeds.—The black *Berkshires* with white feet and a white tip to the tail are small and plump. They fatten and mature very quickly.

Middle Whites and *Large Blacks* are long and round in body; they develop quickly, and commonly do well. The *Gloucester* type, black with white spots, and the *Lincoln* pig, with curly coat, are robust of constitution, and usually do very well.

The large black *Suffolks* are also a good breed, and the sow produces an excellent cross when mated with a large white boar. The bulk of the offspring will be white if the breeds are true. They grow well and fatten quickly.

Another good cross is to mate a *Berkshire* boar with a *Middle White* sow, the offspring of which grow quickly, and when ultimately fattened finish off as a prime little pig most suitable for bacon-curing.

Another excellent cross is to mate a pedigree *Middle White* boar with a pedigree *Large Black* sow; the latter makes the best of mothers, and is prolific. The colour of the litter of pigs is usually black and white, but black is said to preponderate. The offspring, when mature and fattened, represent a type of pig most suitable for either pork or bacon.

Tamworths are brownish-red in colour; they are very hardy, and are preferred by some because they are less liable than other breeds to become grossly fat, and when cured for bacon there is a larger proportion of an admixture of fat and lean than is yielded by the majority of other breeds.

Pigs with a white skin are more susceptible to heat-stroke and red cutaneous discoloration due to sunburn than are black pigs.

Gestation.—The average period of gestation is about four months, or 110 to 114 days. Pigs which are carried over this time often have sharp milk-teeth, which frequently injure the teats and udder of the sow, making her restless; in such a case she may refuse to suckle her offspring sufficiently. The needle-points of the teeth should be removed by breaking them off with a pair of forceps; for if allowed to remain they impair the health of the young pigs, and cause sore teats and ulcers on the udder of the sow.

A sow ought not to be excessively fat when used for breeding purposes. A good sow does not, as a rule, carry too much fat.

Some sows are clumsy, and accidentally injure the pigs by overlaying them. This can to a great extent be prevented by fixing a stout pole along each side of the sleeping-quarters of the sty. It should be placed about 15 inches from the ground, about 6 or 9 inches from the sides of the sty. Avoid giving pregnant sows frost-bitten food or roots or green-stuff, as these sometimes cause colic and produce abortion.

Bedding.—Short straw, wood wool or shavings, sawdust, dried leaves, or dried bracken, make very good litter. The best of these is straw.

Hay is not good; the pigs frequently eat or nibble bits of it, which leads to digestive troubles, constipation, etc.

A gilt or young sow pig should not be mated before it is eight or ten months old. The most suitable months for farrowing are February and early in August, as they afford the litters favourable weather, conducing to growth and development, especially after they are weaned.

Winter Pigs.—This term is applied to animals born and reared during the late autumn. They do not thrive so well as those which are born in the early part of the year. They are frequently a constant source of trouble and anxiety to the feeder, the cold, wet, sunless weather retarding growth and being unfavourable to satisfactory progress.

Gilt pigs, or the first litter of a young sow, are often stated not to do so well as the second or subsequent litters. The mother, being young, should not be allowed to rear more than eight or nine pigs. If a sow rears twelve in each of the following litters it is quite enough; larger litters unduly tax the system, unless the sow is exceptionally strong.

The birth and rearing of a first litter is attended by more risk than is the case with the following litters, a young sow being more excitable.

Inbreeding, or the mating of animals which are too

closely related, predisposes to weakness, sterility, and disease, particularly Tuberculosis. One of the most striking *visible* signs of inbreeding is the deficiency of hair all over the body, the hair becoming scanty and falling off before maturity is reached, causing the animal to present a semi-bald appearance.

The skin of the pig is also thinner than the normal, and the animal is more susceptible to the adverse effects of cold weather.

The practice of speying sows, or removing the ovaries, is carried out at the same age as that recommended for the castration of hog pigs.

The operation is quickly performed by an experienced person, generally with amazingly satisfactory results. Speying favours fattening and early development. It is recognised that a young fat sow while at œstrum or use—a condition which occurs about every three weeks in a non-pregnant animal—loses flesh. It is also said that slaughtering a sow for food while “at use” or on heat slightly interferes with the setting of the flesh, and that the latter does not take the brine well.

To obviate loss of condition when fattening sows during the period of œstrum, the sow is occasionally mated with a boar about a month before finishing the fattening process. This procedure is described as “settling.” It is not commended; it is discouraged by buyers, and the fact should be declared by the vendor.

Sows at œstrum should be enclosed in strong secure premises, as they become restless, break out of the sty, and travel long distances.

A sow is usually ready for mating for stock purposes about five days after the sucking pigs have been weaned. The period lasts about three days. A sow is more likely to prove pregnant if stocked or served late on the second day or early on the third day.

If a sow is allowed to farrow, without being provided with plenty of bedding, in a bleak cold sty or shed, there is a danger during cold frosty weather of the pigs being frozen to death at birth. To prevent this, sometimes the little pigs are dried with a small piece of flannel and seen to suck before the attendant leaves the premises.

This should, if possible, be done by the person who looks after the pigs, as the sow resents interference by strangers when farrowing.

A few days before the sow is expected to farrow a little exercise is beneficial, and the food should be of a laxative nature.

When selecting a sow pig for breeding purposes see that it has not less than twelve teats; some sows have fourteen and others sixteen. The sucking pigs usually keep to the same teats, and if the number of pigs in a litter at birth exceeds the number of teats, the excess should be destroyed, the small weakly pigs being selected for slaughter.

Weaning.—Pigs should not be weaned before they are eight weeks old if the sow is robust, and they amply repay suckling for two to four weeks longer. When the sucking pigs are four weeks old they should be encouraged to supplement the mother's milk; they may

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at this stage be given access to pasture, or may be provided with a trough of their own. The strongest pigs of the litter are usually those which have access to the front teats.

Administering Medicine.—The contrariness of the pig is proverbial, and is especially noticeable during sickness, when efforts are made to drench it. The best method of giving drugs, including oil, etc., is to mix the medicine with a small quantity of appetising liquid food, and to try to induce the ailing animal to drink or suck it up from the trough, which often succeeds, because any derangement of the system is usually accompanied by thirst. If it refuses to take the remedy, forcible means must be taken to drench the patient. These must be carried out with great care. As a preliminary arrangement the animal needs to be secured. This can be done by using a long *thin* rope, which should be secured to the upper jaw by means of a loop or two half hitches; the making of a running loop is facilitated by splicing a small ring on one end of the rope (an iron ring about the size of a shilling answers the purpose). Having secured the pig by roping it, as it is termed, the head is then slightly raised, and the mouth is kept open by inserting—on one side of the mouth between the two rows of molar teeth—a few inches of the end of a stout stick about 12 or 15 inches long and 6 inches in circumference; some hard material should be used, preferably oak or ash. The wood serves as a mouth gag, and is held in position by the attendant, who then proceeds gradually to pour small quantities of the

medicine into the mouth. If during the process the animal starts coughing, the head should be lowered, even if it necessitates wasting some of the medicine, for if this rule is not observed there is a considerable risk of the remedy going the wrong way—down the windpipe into the lungs—which may lead to the animal being choked, causing convulsions and rupture of the pulmonary blood-vessels, and such accidents may have a fatal termination.

Sulphur.—A small dose of sulphur is a favourite remedy of pig-owners for the treatment of minor ailments, on account of its alterative and anti-parasitic properties. In such circumstances care should be taken to avoid giving food containing traces of brine before the sulphur is eliminated from the animal's system, or reactions may occur resulting in the production of poisonous irritant products.

Pig Population.—The rise and fall in the number of pigs kept varies considerably in each year, the fluctuation being largely influenced by economic factors, such as the cost of feeding stuffs, labour, and the law of supply and demand.

The number returned in June, 1917, was the lowest since 1880 (*vide* Agricultural Statistics, 1917).

In pre-war times, about ten years ago, pigs were very cheap, and mature breeding sows were often sold at £3 each; this discouraged breeding for a little while, for it scarcely repaid a breeder to buy meal for them, but those who had pasture and roots available for feeding were in a more fortunate position, being able to retain their breeding stock over the period of depression.

The price of pigs is always variable, and fluctuates considerably in the course of a year. However, store pigs sell best in the early months of the year, the demand being greater, but there is always a good demand for fat pigs during the autumn and winter months. It will generally be found that in this country the production of "pork" pays better than converting the animal into bacon, owing to the competition of imported foreign consignments of bacon. Bacon, as will be recognised, is a better article for transit and distribution than fresh pork, only a small quantity of which is imported. Of course there are plenty of vessels engaged, with suitable plant, for the conveyance of chilled or fresh meat.

It should be added that there is always a good demand among bacon-curers at home for prime fat hogs.

The number of swine on June 4, 1917, and June 5, 1916, on holdings exceeding one acre (*vide* Agricultural Statistics, 1917) in Great Britain were :

		1917.		1916.
Sows kept for breeding purposes	...	269,085	...	300,585
Other pigs	... ..	1,782,401	...	2,013,746
Total	... ..	<u>2,051,486</u>	...	<u>2,314,331</u>

NUMBER OF SWINE EXPORTED FROM IRELAND TO GREAT BRITAIN DURING EACH OF THE FOLLOWING YEARS.

Year.	Fat.	Stores.	Total.
1913	187,422	12,874	200,296
1914	146,458	1,464	147,922
1915	171,963	7,093	179,056
1916	263,989	14,158	278,147
1917	185,958	13,373	199,331

There are no live pigs imported, other than in exceptional circumstances, into this country from foreign countries, but there is a big trade in the importation of swine from Ireland ("Swine exported from Ireland to Great Britain," *vide* Annual Report of the Assistant Secretary, A. W. Anstruther, Esq., C.B., Board of Agriculture and Fisheries).

NUMBER OF DECLARED OUTBREAKS OF SWINE FEVER IN GREAT BRITAIN FOR THE YEAR 1917.

England	...	...	...	...	1,970
Wales	...	...	...	...	65
Scotland	...	...	...	...	69
					2,104
Total	...	...	...	...	2,104

NUMBER OF OUTBREAKS OF ANTHRAX DECLARED IN 1917 AMONG ANIMALS (INCLUDING SWINE).

England	...	...	...	...	197
Wales	...	...	...	...	0
Scotland	...	...	...	...	224
					421
Total	...	...	...	...	421

DISEASES OF ANIMALS ACTS, 1894 TO 1914. SUMMARY OF RETURNS FOR GREAT BRITAIN.*

Period.	Anthrax.		Swine Fever.	
	Out-breaks Confirmed.	Animals Attacked.	Out-breaks Confirmed.	Swine slaughtered as Diseased or exposed to Infection.
	No.	No.	No.	No.
Week ended June 29, 1918 ...	2	2	53	16
Corresponding week in {				
1917	5	11	43	25
1916	9	10	120	274
1915	7	12	120	543
Total for 26 weeks, 1918 ...	143	161	719	260
Corresponding period in {				
1917	293	336	1,412	609
1916	318	376	2,615	8,085
1915	358	401	2,332	10,777

NOTE.—The figures for the current year are approximate only.

* Board of Agriculture and Fisheries, July 2, 1918.

NUMBER OF DECLARED OUTBREAKS OF ANTHRAX IN GREAT BRITAIN DURING THE YEAR 1917, IN WHICH PIGS WERE ATTACKED BY THE DISEASE.

County.	Number of Outbreaks.
England :	
Devon	1
Essex	1
Hants	1
Huntingdon	1
Notts	1
Suffolk	1
Yorkshire (West Riding) ...	1
Scotland :	
Nairn	1
Total	8

NUMBER OF OUTBREAKS OF ANTHRAX IN GREAT BRITAIN DURING THE YEAR 1917, IN WHICH A PIG WAS THE ORIGINAL DISEASED ANIMAL.

County.	Number of Outbreaks.
England :	
Essex	1
Huntingdon	1
Notts	1
Suffolk	1
Scotland :	
Nairn	1
Total	5

NOTE.—Under an Order made by the Board of Agriculture and Fisheries, dated September 2, 1911, known as the Swine Fever Order of 1911 (8184), full registers must be kept by pig-dealers, castrators, and owners of boars used for service of sows other than the owners', all dates and other details of sales, castrations, services, etc., being noted. These registers are subject to official inspection. The Order contains other sanitary regulations, with which the pig-keeper should make himself familiar.

SYNCOPE.

The usual history of cases of syncope is that the animal fed well at its last meal, and was unexpectedly found dead.

The stomach, as a rule, is impacted with food. There are no lesions in any other part of the body, except that the interlobular septa of the lungs are distended with an œdematous transudate which gives the septa a glassy appearance. This condition is also pronounced in cases of death due to verrucose endocarditis and heat-stroke. Gastritis is usually absent.

Heat-Stroke.—Syncope is also likely to ensue during very hot summer weather, large fat pigs which are exposed without any protection from the sun's rays being the most likely victims. The ears and withers usually assume a pink discoloration, and the animal becomes listless and dies suddenly. At death the lungs are found to be œdematous; the other internal organs appear healthy, but sometimes cerebral apoplexy occurs as a complication.

CHOKING.

Here, again, the history is one of sudden death. Post-mortem examination reveals no lesions, and not infrequently the cause of death is found to be the bolting of a large piece of meat, bone, or other substance contained in the swill, which is too big to be swallowed.

This obstruction causes temporary paralysis of the pharynx and paroxysms of coughing, leading to the passage of the piece of meat or other foreign body into the larynx. In exceptional cases the lungs will be found bespattered with drops of blood, varying in size from a pea downwards, due to the rupture of one of the pulmonary blood-vessels, in consequence of which the blood has been aspirated, as in the case of a pig which has not been properly stuck at slaughter; but the amount of blood thus aspirated is, of course, much less considerable than in the latter case.

An identical condition of the lungs is also met with in animals which are choked by the inspiration of remedial agents when being drenched, choking occurring during the fit of resentful squealing and struggling

RHEUMATISM.

RHEUMATISM should be regarded, not as a specific disease, but as chiefly dietetic in origin. It may be due to a variety of causes which operate adversely on the animal economy, leading to the production of toxins, and to consequent functional derangement. The toxins, which are elaborated in the intestinal canal, from which they are absorbed, have a predilection for the fibrous tissues surrounding the joints, several of which may be affected at one and the same time. The toxins may also affect the muscular system.

Any factor which tends to derange the functions of the body may be regarded as a predisposing cause; for rheumatism is most frequently observed in animals which are housed in cold, dark, damp styes, especially styes constructed with a north or east aspect—above all if they have a cement floor. The type of disease occurring in these surroundings is usually of a chronic nature; moreover, not infrequently all the pigs housed under these unfavourable conditions are affected at one and the same time, sometimes as many as ten, fifteen, or twenty animals kept on the same premises showing unmistakable symptoms of rheumatism.

Symptoms.—The affected animals are disinclined to move; if disturbed, their reluctance to move is obvious,

and they emit painful squeals. They are lame, moving with a stilted, pottering, shuffling gait; more often than not they walk on their knees. When at rest they stand with all four legs gathered under the body.

The tissues immediately surrounding the joints are usually swollen, and the joints enlarged. In the acute form the swelling is hot, tender, and painful to the touch. In the chronic form of the disease the swelling is hard, and the affected joints become deformed.

Curiously enough, the painful movements of the animals are more pronounced in the chronic stage. The facial expression in severe cases of old standing indicates physical suffering; the eyeballs are protruded from their sockets, the white of the eye being particularly pronounced, and the painful squealing and difficult movements of the victims excite the pity of the onlooker.

Post-mortem Examination.—In the *acute form* of the disease the swollen joints reveal a straw-coloured, gelatinous, inflammatory exudate, and a similar exudate is occasionally present in the abdominal cavity.

In *chronic cases* there is an increased formation of fibrous tissue surrounding the affected joint. The large intestine is usually found to be impacted with fæces, a condition which is occasionally accompanied by eversion of the rectum. The wall of the bowel is also considerably attenuated.

While several animals are affected by the chronic form, it will generally be noticed that they are in poor condition, although they usually display good appetites and the temperature is normal.

Acute rheumatism is most frequently seen in small store pigs or unweaned animals, while *chronic rheumatism* is chiefly met with in larger and older pigs.

Muscular rheumatism may exist with or without swelling of the joints. The disease is not associated with the formation of *pus*, in either the acute form or the chronic form involving the joints.

The heart, in both forms of the disease, is usually normal, a strange contrast to the conditions commonly observed in the human subject.

Symptoms of a rheumatic nature are occasionally associated with the specific disease of swine erysipelas, particularly in the acute form as affecting young pigs, where swollen joints are observed; but these symptoms are due to a definite cause, and are referred to under the heading of Swine Erysipelas.

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The chief lesions associated with dietetic errors are those of Gastro-Enteritis, which vary in intensity and extent.

In many instances these alterations of structure are accompanied by *fits*. Dietetic errors are also a frequent cause of *disorders of the liver*.

The practice of allowing swine to pick up a living by roaming over refuse heaps, containing, as they do, every variety of garbage, including vegetable and animal matter, and the miscellaneous waste material collected from towns, is a dangerous proceeding. Although the animals will for a time obtain sufficient nutriment, and may even grow fat, there is a great risk that sooner or later this method of feeding will be attended by disastrous results, such as the development of Swine Fever and other disorders, the etiological agent of Swine Fever being probably contained in the odds and ends of infective material which find their way into dust-bins, such as scraps of pork or bacon, viscerae, faecal matter, blood, or offal from a pig which has been slaughtered while ailing. Such an animal is usually fat and apparently in good condition, but may be suffering from Swine Fever of the acute septicæmic form in an early stage of development. Slaughter takes place as soon as it is noticed that the animal is unwell, and before the disease has rendered the carcass unmarketable.

A case is recorded in which five extensive outbreaks of Swine Fever occurred on one and the same refuse heap during a period of three years.

LIME-BURNING.

THIS condition is frequently seen in fat pigs, and is due to the caustic action of quick-lime. It is rarely suspected during life, but its effects are usually very visible after the carcass has been through the process of *scalding*, a stage in the dressing of the carcass for food.

It has been the subject of much controversy among bacon-curers, for it leads to the discoloration and disfigurement of what appears to be a sound healthy carcass.

The injury to the skin is most frequently caused by the sprinkling of powdered dry quick-lime on the floor of the sty.

When this becomes moistened by liquid food, urine, etc., and the pig's skin comes into prolonged contact with it, an erythema or rash is produced on those parts of the skin which touch the floor when the animal is in a recumbent position. Consequently, it most commonly affects the under surface of the abdomen and the buttocks or hams. The action of moisture or water on quick-lime converts it into calcium hydrate— $\text{Ca}(\text{HO})_2$ —which in itself is alkaline. The admixture of this hydrate with urine gives rise to fumes of ammonia, the hydrate becoming chalk or calcium carbonate. Both the alkaline hydrate and the ammonia act as irritants.

Where animals are crowded together, lying on a sort of poultice of dung, urine, earth, and hydrate of lime, which generates ammonia, the process being accelerated by the heat of the creatures' bodies, it is easy to see that highly irritating conditions are produced.

Lime-burning should be differentiated from Chronic Dermatitis, which is frequently seen in fattening pigs which are not provided with litter for the stone floors of the styes. It is readily detected during life, affecting the hams or buttocks, which are devoid of hair, while an accumulation of dense layers of epithelium is observed. This disorder is the result of the continued irritation caused by a bare floor, or one covered with dried excreta. As in lime-burning, the condition is more plainly apparent when the carcass is being dressed for food, particularly during the stage of scalding the carcass; for owing to the chronic nature of the complaint the surface accumulations of epithelium and other débris cannot be removed without blemishing the outer surface of the carcass.

All cases of suspected lime-burning and other similar conditions need to be investigated and judged on their merits, for there are other obscure diseases which are capable of setting up congestion and cutaneous discolorations of the extremities, and thus of confusing the issue. Such conditions are seen in latent heart disease, chronic liver disease, and some forms of Pneumonia of long standing.

These diseases may sometimes exist in a latent form in apparently fat and healthy hogs.

BRINE-POISONING.

As previously mentioned, this disorder, in my experience, is not very common. Genuine cases, however, do sometimes occur. On my calling to investigate a suspected case of Swine Fever, the owner informed me that four large strong pigs and one store had died, and that there were eight strong pigs and four stores ailing, in a herd consisting of eighty-six swine.

General inspection of the ailing animals led me to believe that Swine Fever existed, for nearly all the classical symptoms of that disease were exhibited by the affected pigs, including what at first sight appeared its most essential feature—namely, contagion and infection. The general appearance of the victims resembled that of animals suffering from this disease, but there was an absence of diarrhoea. The animals appeared intoxicated, showed signs of extreme emaciation, were listless, refused food, and stood huddled together in a corner of the sty. The prominent symptoms were fits, giddiness, and coma, and the general diagnosis was apparently that of Swine Fever.

A post-mortem examination was held on the five dead pigs, but there were practically no gross lesions in the stomach or bowels, and all the other organs appeared healthy. There was, if anything, a tendency to enter-

itis, but of such a mild character that it could well be excluded, and might almost be said to be non-existent. Strange to relate, the intestinal lymphatic glands were normal in size and appearance. The clinical appearances were so very much like those of Swine Fever that after making a very careful post-mortem examination I was not quite satisfied that Swine Fever did not exist. I therefore had three of the ailing swine slaughtered, but was still unable to obtain any suspicious lesions, or any evidence, on post-mortem examination, which could be said to afford absolute proof of the existence of Swine Fever in the early acute stage. The case was revisited in the course of a few days, in the hope that if Swine Fever were present some definite evidence in the form of gross lesions would have developed. During the interval between the first and second visits three more pigs died, and these revealed appearances similar to those observed at the time of the first visit. The affected swine were so visibly and seriously ill at the time of the first inquiry that the owner was anxious to destroy them, for he had no hope of their recovery. It was advised that they should still be kept isolated, for the illness seemed to be confined to several styes which were in close proximity.

After the inconclusive results of the post-mortem examinations, inquiries were made with regard to the food. It was ascertained that the owner suspected salt-poisoning, and he admitted that he had collected sweepings from the grocery stores which he thought might contain salt. I examined a sample, and found that it

consisted of about 80 per cent. of common pulverised salt mixed with sweepings of wheat flour.

The sweepings were mixed with swill, and fed to the pigs, and it was evident that they would be sufficient to account for the illness, the nature of which was suspected at the time of the first visit. The clinical symptoms (excepting lesions, which were practically absent) so closely resembled those of Swine Fever, and yet so many animals escaped, that one had to decide whether Swine Fever co-existed. That it did not was made abundantly clear on further inquiry in about three weeks' time, when I was pleased to see that the ailing animals had made a quick and complete recovery.

It should be added that the temperatures of the ailing animals were only slightly raised (103° to 103.5°), and illness was noticed about thirty-six hours after feeding.

In this connection I will mention another case of poisoning, where the owner gave one pound of sulphate of soda to six strong stores, with disastrous results: five of the six died within forty-eight hours of absorbing part of the salts. The clinical symptoms and general conditions were similar to those described in the previous case of brine-poisoning. In some cases of brine-poisoning without complications the temperature will be often found to be subnormal (99°), and frequently does not exceed the normal (102.5°). In cases with a higher temperature other factors may be accountable, such as drenching, or latent disease of another type.

MAMMITIS.

Inflammation of the mammary gland is frequently seen in sows which have recently farrowed. A common predisposing cause is a chill contracted at a very susceptible period. The sow shows signs of acute pain, and the inflamed mammary glands, several of which are usually affected, are hot and painful when manipulated. The diseased glands are harder than normal, and extremely sensitive.

The sow's temperature is raised, and the milk secretion in the normal glands is partly arrested. There is also a loss of appetite, and the animal breathes hurriedly, the systemic disturbance being very marked.

Mammitis may also occasionally be due to other causes, such as mechanical injury, the most frequent cause being the abnormally sharp milk-teeth of the sucking pigs; these lead to injuries of the teats, which become sore, and in consequence of contamination by foreign matter, such as dirt, ulcerations develop.

The constitutional disturbance in the latter cases is not so extreme as that met with in sows immediately after farrowing.

ULCERATION RESEMBLING FOOT AND MOUTH DISEASE.

THIS is an exceedingly rare disease of swine, but cases occasionally arise. It is chiefly to be observed in young pigs, although animals of all ages are susceptible.

Symptoms of lameness exist, and several animals in a herd or a litter will often reveal structural alteration affecting the mouth and feet.

Lesions.—On the lips, the tongue, and the mucous membrane of the mouth, there are numerous well-defined circular ulcerations, varying in size from that of a shilling downwards, but lesions about the size of a threepenny-piece usually preponderate. The central area of the ulcer contains a necrotic slough or core, which is of a dirty-grey colour.

The base of the ulcer is tough and leathery, indicating a slowly-acting organism, and pointing to a disease which has a tendency to become chronic. The margins of the erosions or sores also become considerably thickened, and resemble a ring of dense fibrous tissue, due to the long-standing irritation of the local lesion.

Lameness is not very pronounced, and occasionally there is a tendency to malformation of the affected foot, producing a stumpy club foot. In severe cases the horn is shed, occasionally from the entire foot. In the milder

form of the disease the horn is stripped with a well-defined margin from the coronet to the sole, stripping being generally limited to the sides of the heel at its posterior third.

The supernumerary digits may be similarly affected. The exposed area of the sensitive laminae is red in colour, but not the bright red associated with a burst vesicle of genuine Foot and Mouth Disease.

Post-mortem examination reveals supporting evidence in the liver, which will be found studded with numerous semi-solid circular areas of dirty-white necrotic tissue.

This disorder is differentiated from Foot and Mouth Disease by the fact that it is not highly contagious or acutely infectious. The lesions of the mouth and feet are *not* associated with the formation of vesicles, but are more of the nature of a chronic irritating sore, leading to the formation of cicatricial tissue at the base and around the periphery of the ulcerations.

The lameness is not associated with any great amount of pain, and is largely of the mechanical type.

The death-rate is very low as compared with that of Foot and Mouth Disease, death occurring most frequently among very young animals.

The disease is caused by the bacillus of necrosis, and is identical with the lip and leg ulceration encountered in sheep and goats, except that the margins of the lips in swine are free from warty ulcerations.

CASTRATION—SEPTIC POISONING.

SEPTIC poisoning sometimes occurs as a sequel to the operation of castration, with the formation of an abscess and necrosis of the tissues immediately surrounding the operation wound. In chronic cases it is accompanied by a considerable production of cicatricial tissue around the abscess cavity. The surface of the wound is usually scabbed over, and incision of the underlying tissues is followed by the escape of a dirty-brown pus.

There are cases, however, of acute septicæmia following upon the operation, associated with acute enteritis and petechiæ in the kidneys, together with a general enlargement of the lymphatic glands of the body. This condition, which not infrequently proves fatal, is confined to those animals which have recently been operated on, and there is no conveyance of the disorder by infection to other animals.

The affected animals occasionally show symptoms of intoxication, lose flesh, and fail in their appetite, but the primary source of the trouble will be found in the unhealed operation wound.

The operation of castration is often a predisposing factor in the development of Swine Fever, as it lowers the vitality, and thus renders the animal more susceptible to the disease. This does not imply that infection is

introduced by the operator, who may, as a rule, be trusted to take every precaution to avoid contamination, and the operation is so general and so commonly attended by success that when Swine Fever follows a visit its occurrence should, except in very rare instances, be regarded as a coincidence.

In most counties, if not in all, a castrator is required by the authorities to keep a record of his operations in a book set aside for that purpose.

Under the heading of castration the operation of speying might also be included. This, as a rule, is not followed by any bad results, but occasionally we may observe a slight localised peritonitis, with or without the formation of a small accumulation of pus. This may lead to a local chronic peritonitis, with adhesions between the bowel wall and the flank of the animal. The mucous membrane of the intestinal wall is usually normal, the localised peritonitis failing to cause a reaction of an inflammatory exudate on the inner surface of the bowel. The adhesions, in severe cases, may lead to perforation of the bowel wall, but this is very rare.

The post-mortem appearances associated with Acute Septicæmia are readily differentiated from those of Swine Fever; for example, the enteritis is not of an intense character, nor is it diffuse, and both the enteritis and the petechiæ of the kidney soon fade on exposure to sunlight. There is also a marked absence of infection in contact animals which have not been castrated.

Castration should not be performed upon swine on infected premises while Swine Fever is in the active

stage, for the wounds do not, as a rule, heal quickly, and are very prone to necrosis and abscess-formation. It should be added that it is contrary to the rules relating to infected places for anyone other than the person tending the swine to enter the premises upon which a diseased or suspected animal is kept, unless authorised by an Inspector or Officer of the Board of Agriculture, or by an Inspector of the local authority.

PERITONITIS.

THERE are two varieties of this disorder, the Acute and the Chronic. Both are due to a variety of causes. The acute form more often exists as a primary condition. A common predisposing factor is sleeping on cold damp floors—of stone or concrete, for example—which have not been provided with a wooden platform for sleeping purposes, or sleeping on floors unprovided with an air course. The acute form is chiefly encountered in small young pigs.

Symptoms.—The affected animals stand with their backs arched, and shiver. The temperature rises to 105° or 106°. The appetite is variable, and an intermittent non-fœtid diarrhœa is present. The animals present a shrinking, cowering appearance; they seek out sheltered spots for warmth, and huddle together. The condition is aggravated by injudicious feeding, and particularly by food of an indigestible nature. There are also indications of colicky pains, while uneasiness and paddling of the feet may be observed.

The acute form of the disease is often fatal, and complications are occasionally found to exist, such as Pleurisy and a slight degree of Enteritis.

Chronic Peritonitis is very frequent, and in the

majority of cases is the result of continued Acute Peritonitis.

In aggravated cases whole loops of the large intestine may become adherent, and it is often impossible to separate the folds without breaking the wall of the bowel. Chronic cases of this kind are a very frequent result of long-standing cases of Swine Fever. When the bowel wall in such cases of Swine Fever is slit open the mucous membrane is invariably found to be considerably thickened by a thick, creamy-yellow mass of diphtheritic deposit, in appearance not unlike crumbling layers of cheese. The intestinal wall is thickened, and is usually very brittle. This form of Chronic Peritonitis is a sequel to the extensive lesions of Swine Fever. In some instances there is a well-marked peritonitis over the area of an old circular button ulcer, definitely restricted to the area of the latter.

This form of peritonitis is occasionally attended by perforation of the wall of the intestine, and a fatal termination. It is often encountered in animals which are nearly fat, and is rarely suspected during life.

This chronic form frequently leads to adhesion between the abdominal wall and the intestine.

Local Peritonitis arising as a primary condition is sometimes associated with partial necrosis of the underlying area of mucous membrane, which might be mistaken for the lesion of Swine Fever.

The difference is that the intestinal mucous membrane is not thickened, but rather resembles a piece of parch-

ment in appearance and in colour, with a tendency to attenuation of the bowel wall.

The acute and chronic forms of peritonitis are frequent sequels to the operation of castration, but in these cases the lesion is usually localised, and seldom leads to widespread alterations of structure.

KIDNEY DISEASE—NEPHRITIS.

DISEASE of the kidney chiefly exists in the form of an acute petechial nephritis, with numerous small hæmorrhages scattered throughout the kidney. It has been referred to under the heading of Swine Fever lesions. These petechiæ or spots vary in dimension from the size of a pea downwards, the most usual size being about that of a dot made with an ordinary lead pencil. They are sometimes very numerous, and are best seen when the peritoneal covering of the kidney is stripped off. Petechial nephritis seldom exists as a primary condition, and is for the most part encountered as an early acute lesion of Swine Fever, and sometimes as the only visible lesion in the acute, virulent, septicæmic form of this disease. The hæmorrhages are of the persistent type, and do not fade on exposure to sunlight. Petechiæ are also met with in other diseases, particularly in the chronic form of Swine Erysipelas, but they are paler in colour than those found in Swine Fever, and fade on exposure to daylight.

The colour of the urine, curiously enough, is usually normal, but in the acute virulent form of Swine Fever it is sometimes red, as though the organisms of Swine Fever were contained within the red corpuscles, eventually leading to hæmorrhage and hæmolysis.

In cases of this character the temperature is high (105° to 107°); the animal refuses food, and is very thirsty. There are also signs of extreme depression and general collapse, while the high mortality and the sudden development of symptoms often cause the attendant to suspect mineral poisoning.

Chronic Nephritis is occasionally met with. The organ is harder than the normal, and the peritoneal capsule is with difficulty removed, being adherent to the kidney substance. This form is most often found as a complication of Verrucose Endocarditis, and is rarely suspected during life. Pieces become detached from the thrombus, and when arrested in the kidney as emboli produce dirty-white areas of necrosis in the kidney, which appear as streaks or irregular patches.

Cystic Kidney is common in mature swine; it results from the distension of the pelvis of the kidney; at other times there are small white bladder-like structures distributed throughout the kidney, which are cysts produced by the distension of Bowman's capsules. These, when punctured, allow a small jet of watery fluid to escape.

Pyæmic Nephritis is sometimes the cause of a sow proving barren. The disease may exist without being suspected during life. It does not necessarily lead to wasting, having been observed in swine which were apparently healthy and in fat condition.

The affected organ is enlarged, and on section reveals distinct accumulations of pus or abscesses in the pelvis of the kidney, and also small abscesses throughout the cortex of the kidney. The disease may react on the

heart, leading to hypertrophy, and also to chronic venous congestion of the liver.

PERICARDITIS.

This is a common disease of the pig, but it seldom occurs as a primary condition, being more frequently met with as a sequel to pleurisy and pneumonia. It is by far the most frequent complication of Verrucose Endocarditis.

In the acute stage the outer surface of the pericardial sac is covered with flakes of dirty-white fibrinous lymph, which causes it to present a roughened surface resembling tripe. Coexisting with this condition there may be some degree of acute pleurisy and of pneumonia. Occasionally the inflammatory processes become so extensive that adhesions are found between the sac and the heart wall. This latter condition, however, is most frequently observed as a secondary factor following a case of Verrucose Endocarditis. The adhesions interfere with the functions of the heart, leading to hypertrophy and dilatation of its cavities.

When death ensues from the chronic form of pericarditis, with complications of warty growths on the valves, the interlobular septa are distended with lymph, a condition which gives the lungs a characteristic marbled appearance.

LIVER DISEASES.

THE normal liver of a pig is distinguished from that of other healthy animals by the presence of a larger amount of interlobular connective tissue, which forms a whitish ring around each lobule, plainly defining its boundaries.

Cirrhosis of the liver is the most frequent of liver diseases. It often leads to an increase in the size of the organ, but in cases of very long standing the latter is, on the contrary, decreased in size.

The substance of the liver is very hard, tough, and leathery, owing to the formation of an excess of fibrous or cicatricial tissue. Cirrhosis seldom affects pigs under eight weeks old.

It is constantly associated with stunted growth, loss of flesh, and general unthriftiness. Several pigs in a litter may be affected, and the presence of the disorder in a pen of swine is often suggested by the absence of any signs of acute illness.

The temperature is usually normal, the appetite is capricious, and occasionally a cough is noticeable.

Although the disease usually attacks two or three pigs in a litter of average number, in exceptional instances as many as a dozen pigs in one herd may show extreme signs of unthriftiness, such as is met with in long-stand-

ing chronic cases of Swine Fever. In these cases nothing short of a post-mortem examination will reveal the true nature of the complaint.

The cause is probably to be found in a variety of conditions, but the disorder frequently arises as a sequel to some other disease, as in animals which have recovered from an attack of chronic Swine Fever.

More often the cause is to be found in errors of feeding, and the question of diet should always be investigated.

Cirrhosis of the liver is more commonly seen alone than in conjunction with other diseases; the probability is that the animal has recovered from an attack of some toxic illness, the cirrhosis existing as a sequel. It is always preceded by a chronic venous congestion of the same organ.

Cirrhotic livers do not point to any specific disease, and are frequently revealed quite independently of such.

Complications are heart disease (hypertrophy) and a dropsical condition of the abdomen, leading to a pendulous condition.

Sometimes the disease extends to the peritoneal covering of the liver, and leads to chronic hepatitis, with adhesions to the walls of the diaphragm.

Fatty Degeneration.

This condition is frequently seen in unweaned pigs, which show symptoms suggestive of pneumonia, accompanied by irregular respiratory movements, pneumonia being absent. The illness is often associated with the so-called white scour, the excreta being of the well-known

creamy colour. The condition gives rise to slight unthriftiness, and the affected animal is usually tucked up in the abdomen.

The complaint is not very serious, and readily responds to slight medicinal treatment, together with a change of the sow's food, and the small pigs usually recover.

Enlarged Liver—Chronic Venous Congestion.

This is due to some interference in the circulation. The liver is considerably enlarged, and on section presents the well-known nutmeg appearance.

It occasionally exists as a primary condition, being largely due to some irritant factor in the food supply. More often it is encountered as a sequel to Verrucose Endocarditis. Complications are hypertrophy of the heart and hepatic peritonitis, with adhesions to the diaphragm.

It is seldom diagnosed during life, there being no definite diagnostic symptoms.

In some instances there is an accumulation of dropsical fluid in the abdomen. Symptoms likely to be shown are : cough, irregular appetite, a slight temperature, and constipated fæces.

It occurs in some cases without any apparent cause, and is a constant precursor of cirrhosis of the liver.

Echinococcus or Hydatid Cysts.

Small white cysts are frequently seen within the liver of the pig. They appear to cause the animal no serious inconvenience, and are commonly seen in swine which

appear healthy. The cysts assume the form of small white bladders, containing a watery fluid. The wall of the cyst on its internal surface shows a white spot, which is the elementary stage of the head of the parasite. A small piece of the cyst wall, when examined under a low power of the microscope, presents a characteristic laminated appearance, as though composed of thin plates or scales, resembling the concentric layers of the external surface of an oyster-shell. This appearance helps to differentiate the hydatid cyst from areas of necrosis such as might be anticipated in chronic nodules of Tuberculosis, or areas which have undergone necrotic degeneration in bacillary necrosis of the liver.

PIMPLY GUT.

This is occasionally due to parasites. It is suspected only on post-mortem examination. On manipulation of the bowel wall a striking feature is presented, as though various small peas or nodules were embedded in its substance. The bulk of the intestinal mucous surface is apparently normal, but occasional small inflammatory rings surround the solitary lymphatic follicles of the bowel. These, when squeezed, emit a creamy-yellowish fluid, which on examination under a low power of the microscope reveals the presence of a small round worm.

Plugging or congestion of the solitary follicles is also associated with various diseases, but microscopic examination of the contents will differentiate this condition.

The ducts of the Peyer's glands and the solitary follicles

should always be squeezed, in order to determine whether the condition is due to food or to other foreign substances, and in order, also, to make sure that the apparent plugging is not due to *necrosis*. In the latter condition the alteration of structure persists, whereas food or other material escapes when the suspected gland is squeezed. The plugging of the glands with food is often so extreme, especially in the Peyer's patches, that the upper surface, both in colour and appearance, falsely resembles the small necrotic ulcer of Swine Fever.

The above factors will enable one to distinguish the conditions under consideration from the follicular enteritis of Swine Fever, which often commences in the solitary lymphatic follicles of the intestines.

It should be remembered that the abnormalities of plugging and congestion are usually confined to the large intestine, and the exuded material resembles inspissated pus.

DISEASES OF THE SPLEEN.

Primary disease of the spleen is rare; such structural alteration as this organ may undergo is usually of the nature of a complication, or a sequel, of functional disorder of some other organ or organs. Enlargement may be present in cases of chronic venous congestion or cirrhosis of the liver, but is more frequently due to the acute septicæmic form of Swine Fever, or to Swine Erysipelas, and occasionally to Anthrax. In cases of

Tuberculosis the spleen is sometimes studded with well-defined circular necrotic areas of caseous tubercles, creamy white in colour, varying in size from that of a shilling downwards. The external appearance of the tubercle is that of a very small button mushroom.

DROPSY.

Accumulation of fluid in the abdomen is frequently met with as a complication or sequel in diseases of the liver and heart. It is more often observed in mature animals. The diseases with which it is most frequently associated are Cirrhosis of the Liver and Verrucose Endocarditis.

The affected animal is usually in poor condition and unthrifty, and in the sow the abnormally pendulous abdomen simulates advanced pregnancy. At other times the symptoms are suggestive of a septicæmic disorder; the ears become pink, and the skin of the withers reveals a diffuse pinkish discoloration. The appetite is for the most part fairly well maintained; the breathing is irregular.

There is, however, a complete absence of severe systemic depression.

INTERNAL HÆMORRHAGE.

This occasionally occurs as the result of mechanical injury, especially in greedy feeders or strong, vigorous animals, which are apt to climb the door or side of the

stye, rupture of one of the internal organs or blood-vessels occurring. Usually the spleen is involved.

On post-mortem examination the rupture is detected, and the hæmorrhage appears as a large clot of blood. In such cases all the organs of the body are anæmic or bloodless, this condition being particularly noticeable in the lungs.

Internal hæmorrhage is more frequently encountered as a sequel to cirrhosis of the liver.

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necrotic, when it might be confused with the diphtheritic lesion of Swine Fever; but it is in reality differentiated by the absence of the thick false membrane on its mucous surface.

In some instances there is an attempt at recovery, leading to fibrous adhesions of the loops implicated, which may result in attenuation of the bowel wall, terminating in rupture at some localised spot.

Inguinal Hernia.—The loops of the small intestine sometimes become strangulated. This is a much slower process than twist of the small bowel, and the intestine is frequently considerably thickened on its submucous surface. On section it resembles a hose-pipe, without any thickening on its mucous surface. Twist of a chronic nature also will sometimes reveal a similar hose-pipe appearance. Any exudate which occurs in such cases on the mucous surface is very slight and exceedingly thin, and presents a dry, yellowish, crinkled appearance; it is limited to the affected parts of the bowel wall. On further examination, what appears in the first instance to be the false membrane of Swine Fever is readily differentiated after a few hours' exposure to daylight.

PARTIAL PARALYSIS.

Partial Paralysis is a physical condition which is frequently met with in sows which are rearing strong litters of unweaned pigs. It is due to the debilitating effects of the prolonged demand made by a large, strong litter of pigs upon the animal economy of the mother, which exaggerates constitutional defects and results in imperfect co-ordination of movement.

In such cases the animal is bright and lively and has a good appetite, and is normal as to temperature, but is in poor condition, displaying a weakness of the loins, with general debility of the muscular system.

The animal may be able to rise on her fore-quarters, but is unable to raise or support the hind-quarters or legs without assistance.

Partial paralysis is occasionally encountered as a primary condition. I can recall a case where about half a dozen sows, which were all in prime fat condition, were suddenly attacked at one and the same time. They were unable to raise their hind-quarters. The temperatures in these cases were normal, and except for the partial paralysis of the hind-limbs the animals exhibited the usual signs of health.

The cause was unknown, but it was thought to reside

in a dietetic error—*e.g.*, a sudden change to food of a highly nitrogenous nature, which was given injudiciously, instead of being balanced or mixed with other foods, such as a mixture of bran or roots, as a corrective.

There were a large number of other pigs on the same premises, chiefly stores, none of which were similarly affected, although given the same food.

A general collapse which simulates paralysis is sometimes met with as a primary condition, notably in acute cases of the septicæmic form of Swine Fever, in large fat animals. It is differentiated from the true forms of partial paralysis by the symptoms, such as high temperatures (105° to 107°), loss of appetite, constipation, listlessness, and coma. There are also signs of infection among contact pigs on the same premises. Recovery takes place in some instances, but the prognosis is grave, though it may be improved by judicious feeding. Needless to say, the affected animals are highly infectious to contact swine, or to other swine on the same premises tended by the same person.

PARASITIC BRONCHITIS AND PNEUMONIA.

THIS is a common disease of swine. It is caused by a small round worm, about an inch long, known as the *Strongylus paradoxus*.

It frequently affects young store pigs. The most pronounced symptom is a frequent, dry, short, hacking cough, followed by fits of violent coughing in one or more pigs. A number of animals in the same herd are usually affected by this short cough, which often comes on as soon as the animals begin to feed, and is particularly noticeable when the young animals are disturbed. On a first impression the cough is rather suggestive of the short cough associated with the complications of Swine Fever, from which it is easily differentiated by the fact that the majority of the pigs are feeding well, and show no apparent signs of acute illness. The young pigs generally lose condition, and two or three of the herd may become unthrifty, being less able to withstand the distressing effects of the constant cough, which, as previously described, is of a convulsive character, and adversely affects their growth and development. From observation it will be noticed that the affected pigs while coughing seem to make efforts as though to expel some foreign body from the throat.

Post-mortem Appearances.—The lungs are indurated in parts, and the external surface is often studded with irregular nodules, which are most readily detected when the fingers are passed over the pleura of the lungs. These nodules, on section, reveal the presence of thread-like worms, about $\frac{1}{2}$ to $\frac{3}{4}$ inch in length. If a scraping is examined under a low power of the microscope, numerous eggs and embryos will be visible. The persistent irritation leads to bronchitis and pneumonia of the surrounding lung tissue. The trachea and the bronchial tubes, when slit open, are found to contain an excess of white frothy mucus of a foam-like appearance, as though it had been churned or whipped up into a state of effervescence. Numerous parasites will be found mixed up with this frothy mucus, and clustered masses of the parasites can be drawn out from the small openings or bifurcations of the bronchial tubes.

TRICHINOSIS.

THIS disease is exceptionally rare in this country, and might be regarded as practically non-existent. But it would be as well, in cases of an obscure nature, associated with symptoms suggestive of Rheumatism, without any gross lesions, to take and examine under a low power of the microscope small portions of muscle from the parts which are most commonly the favourite locations of the parasite, such as the pillars of the diaphragm, the tongue, the laryngeal muscles, and the intercostal muscles. The specimens to be examined should be about the size of a grain of wheat, and should be squeezed flat or pressed between two stout glass slides. Or suspected pieces of muscle may be frozen, and sections cut with a microtome, for which purpose I have used a small hand instrument, employing ether for fixing and freezing.

The muscular pillars of the diaphragm are among the most commonly affected organs; consequently the examination of material should always include tissue from these parts.

The disease is due to a small round-worm or parasite known as the *Trichina spiralis*. It resembles a small piece of hair or thin thread, and both male and female

parasites are found in the intestinal canal of the affected animal. The adult male measures about $\frac{1}{12}$ inch and the female about $\frac{1}{6}$ to $\frac{1}{8}$ inch in length. The female parasite is viviparous, producing young living embryos, which eventually become located in the muscles as cysts. These cysts are occasionally visible to the naked eye, appearing as very small white round specks, about the size of the mark made by an ordinary medium-sized pin. If muscle containing the cysts is eaten in a raw or undercooked state, the embryos are set free, and in the course of a few days they develop into full-grown perfect parasites.

When sections or specimens of muscle are examined under a low power of the microscope, the parasites thus established will appear curled up, the body assuming the form of a fish-hook or the letter **U**.

The author has, during recent years, met with a case in this country. Its history was as follows: The owner slaughtered an ailing sow, and used the carcass for food, in consequence of which he became unwell, with symptoms akin to rheumatism. The medical attendant suspected Trichinosis from the train of symptoms, and eventually found cysts in parts of the carcass of the sow. Further inquiry was made on the farm premises, to ascertain, if possible, the source of the disease. This led to the examination of a dead rat, which was found, on microscopical examination, to be affected with *Trichinæ*. How the rat became infected is difficult to say, unless it had access to offal, or clippings or trimmings of affected flesh, such as might possibly occur in imported pork or bacon.

PARASITIC SKIN DISEASE—SARCOPTIC MANGE (*Sarcoptes scabiei*—Var. *Suis*).

This is frequently met with among swine, and is revealed by a rough appearance of the skin. The affected animals are generally covered with dirty-yellow crusts of accumulated epithelium around the shoulders and withers, and across the thighs and legs, and also on the sides of the body.

The crusts have a patchy distribution, and the affected animals scrub and rub themselves considerably, causing the hair to fall off the irritable parts. The rubbing is sometimes so persistent that bare patches are studded with pin-points of hæmorrhage and inflammatory exudate, which when coagulated or dried gives rise to small excrescences or pimples on the surface of the skin. This escapes from the tunnels or galleries produced by the excavations of the parasites, which burrow in the skin.

The animals usually feed well, but the constant irritation often interferes with their growth.

The true nature of this skin disease is easily detected by dissolving some of the deep layers of the crust or a scraping from the cutaneous surface of the diseased areas in a 10 per cent. solution of caustic potash with a little glycerine. Examination under a low power of the microscope will reveal the existence of numerous parasites, the acari of sarcoptic mange.

If a scraping from the diseased patches or pimples be examined by means of a magnifying-glass, the detection

of the moving parasites is facilitated by applying gentle heat to the specimen or by exposing it to the sun. The demonstration of the parasites with a hand lens is further facilitated by placing a piece of black carbon paper under the glass dish or slide containing the suspected material, the dark ground serving to throw up the glistening sheen of the acari.

The parasites are not smaller than those affecting horses; they are, if anything, slightly larger.

A rather remarkable skin disease is occasionally encountered. In the living animal it takes the form of small, irregular, caseous, brownish-black areas in the substance of the skin. When an affected animal is slaughtered and dressed for pork, these areas appear as numerous creamy-white spots about the size of a lentil. If a scraping is examined under a low power of the microscope, these spots are found to consist of nests of parasitic acari.

The condition is difficult to detect in the living animal, but when the surface of the skin of a dead animal is cleaned by scalding in hot water and scraped to remove the epidermal scales and bristle or hairs, the light creamy-coloured areas are very apparent.

INFANTILE DERMATITIS.

There is also another disease of the skin, confined chiefly and almost solely to unweaned pigs under a month old.

The pigs are covered with brown crusts, which give

them a rhinoceros-like appearance. The disease generally begins around the nose and eyes, and also on the cheeks, eventually spreading all over the surface of the body, which is covered with a moist, dirty-brown, felt-like material.

At places the skin becomes thickened and forms puckers, accompanied by slight cracks or fissures.

The disease generally commences in one animal, but gradually spreads throughout the whole litter, being of a contagious character.

Usually the sow appears healthy, and does not contract the disease. Death frequently ensues.

This is an infantile condition, and the cause is in some cases due to dietetic errors. At other times it is associated with the acute diffuse urticarial lesions of Swine Erysipelas. Pigs in this condition seldom reveal any organic lesions of the internal organs, although the kidneys may be rather congested. The slightly debilitating effects of the disease render the animals more susceptible to Swine Fever, and in exceptional cases they develop lesions of Swine Fever as a sequel, but purely as a secondary factor.

The primary condition is not associated with any degree of gastro-enteritis, nor are any signs of depression met with, such as would exist in acute Swine Fever.

MEASLY PORK.

This disease is practically non-existent in this country. The cases which are occasionally observed are met with

in carcasses of dressed pork imported from the Continent. The importation of live pigs from abroad is now prohibited under the Diseases of Animals Acts, except in special circumstances—as for exhibition, or other exceptional purposes, or for trans-shipment—a licence previously granted by the Board of Agriculture and Fisheries being necessary in all such cases.

The cause of the disease known as Measly Pork is the *Cysticercus cellulosæ*. This is a small parasitic cyst of a bladder-like appearance; to the naked eye it resembles the small grains of boiled sago. The cysts vary in size, and in bad cases are widely distributed throughout the liver and the intramuscular system. These cysts represent the immature stage of a human tapeworm, the *Tænia solium* or pork tapeworm.

The cycle of existence is as follows: If raw or underdone pork containing cysts is eaten by a human being, the cysts are ruptured, and the immature parasites gain access to the intestine, where they develop into the *Tænia solium* or tapeworm, which produces eggs that are voided in the fæces. The pig owes its infection to eating the eggs, which in the course of several weeks undergo partial development in the intestine, ultimately becoming located and undergoing their further larval development in the liver and intramuscular system of the pig, in the form of small cysts.

Generally the animal shows no symptoms during life, and cases often occur in animals which are in good condition.

INTESTINAL PARASITES (*Ascaris suillæ*).

LARGE round-worms are frequently found infesting young store pigs, and are a constant source of unthriftiness and stunted growth.

The parasites vary in length from 4 to 9 inches, but in exceptional cases attain a length of 12 inches.

They are chiefly confined to the small intestine, which at times is densely packed with them, and can readily be seen in the dead pig, when the abdomen is opened, through the external surface of the distended bowel wall. In these cases several feet of the small intestine are packed with parasites, presenting a hard cord-like appearance, as many as 200 to 300 worms having been counted in a small pig about fourteen weeks old. The parasites are so closely packed in the lumen of the bowel that it is a mystery how any food can escape into the large intestine, and it is even more surprising that the animal is able to live at all.

A few immature worms may be found in the appendix of the cæcum; these are about 1 inch in length.

Sometimes a few isolated worms are found in the stomach, and occasionally a few large round-worms are found in the pharynx, along the outside of the wings of the larynx, having apparently been forced up

from the stomach during a fit of coughing, and it may happen that one or two will have gained partial access to the interior of the larynx, causing a fit of choking.

The temperature of the pig is normal. The appetite is voracious, and the fæces normal. A cough is sometimes noticeable. Occasionally a worm is passed with the fæces.

Impaction of the small intestine often leads to twist of the bowel and death.

The average length of a worm in these dense masses of parasites is about 9 inches.

FOOT AND MOUTH DISEASE.

THIS is a specific disease of a highly contagious and infectious nature. The causal organism has not been isolated; it belongs to the group of invisible viruses. Foot and mouth disease is generally classed as a septicæmic disease, and the blood is said to be infectious in the early acute stage, but the chief and most dangerous factor of infection is the infective straw-coloured inflammatory exudate contained in the vesicles. A minute drop of this fluid, or about $\frac{1}{200}$ part of a minim, is said to be sufficient to reproduce the disease experimentally in another animal.

There are many ways in which an animal may contract infection, such as by contact with a diseased animal of another species, or through various media of infection, the commonest being the clothes or hands of an attendant which have come into contact with a diseased animal.

Again, the fact should not be overlooked that the virus might conceivably be contained in imported unsterilised serum manufactured from an infected animal, or one that had recently passed through the stages of recovery unnoticed. This accident is not likely to occur with serum prepared in this country, as foot and mouth disease is rarely met with in England.

Incubation.—The period of incubation varies, depending upon the means by which the infection is contracted, but generally speaking, if the disease is conveyed by the ordinary natural means, the period usually covers from one to three days, and seldom exceeds ten. The virus is readily transmitted by milk from an infected cow, and where affected animals of another species are turned into a straw-yard or other premises, and swine have access to the same premises, every opportunity will be afforded for the swine to contract the infection.

In the acute stage there is a high temperature (105° to 107°), which is associated with the formation of vesicles, and as soon as these rupture or break the temperature falls.

Symptoms.—As a rule there is a distinct painful lameness, which the victim reveals by holding the foot off the ground. The animals are disinclined to move, arch their backs, and bury their noses in the litter. When moved, they frequently go on their knees, and when standing at rest they have a tendency to draw all four legs under the body, like a horse affected with laminitis or fever in the feet. The movements of the limbs, the uneasiness, and paddling of the feet, are similar to those which are seen when a horse has been blistered.

Lesions.—The heels show distinct vesicles at the bulbs, and when these are broken there is a shedding of the affected portions of the epidermis, which results in the formation of cups or wings (with irregular borders) at the upper surface of the bulbs of the heels. The unbroken vesicle around the coronary band resembles a curvilinear blister, which is sometimes accompanied by hæmorrhage.

The raised skin at the side of the heels, representing an unbroken vesicle, is easily torn, and reveals a weeping inflammatory exudate and a raw red base. This occasionally extends from the back of the bulb of the heel toward the interdigital space. Similar lesions—vesicles and hæmorrhages—affect the base of the supernumerary digits, and are very characteristic of the disease; when broken they too reveal a sore with a bright red surface. In all lesions of the feet there is a tendency to the shedding of the *whole* of the horny claws of the foot, from the upper surface downwards. In detecting lameness one should endeavour to make the animals move on a hard surface, the lameness being then considerably intensified; but it may be practically impossible to detect it if the animals are merely forced to move over a cushion of farmyard manure, straw, litter, etc.

The tongue is not a constant seat of lesions; in the majority of cases it is normal, but occasionally it reveals a vesicle.

True vesicles* are readily detected on the snout, and on the buccal mucous membrane, between the lips and the teeth. Vesicles are also occasionally observed around the alveolar spaces or gums.

These vesicles, when ruptured, show a raw red base, and if examined shortly after rupture the red base is

* The physical appearance of a vesicle or blister in its primary state closely resembles the unbroken blister produced on the finger or hand of the human subject by burning, or the blister produced on the hands and fingers of a person unaccustomed either to manual toil or the use of oars.

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The disease is notifiable to the police, it being the duty of the owner or person in charge to report an animal suspected of or suffering from Foot and Mouth Disease. The Board of Agriculture and Fisheries has power to order the slaughter of animals affected with the disease, or suspected of it, or exposed to infection. If the animal when slaughtered is affected with the disease, compensation is paid, representing the value of the animal immediately before it became affected; in every other case the compensation shall be the value of the pig immediately before slaughter.

TETANUS OR LOCKJAW.

THIS disease is caused by a bacillus, a rod-shaped micro-organism, sometimes known as the "drumstick bacillus," in consequence of its resemblance, during sporulation, to a drumstick. It has a wide distribution in nature, being frequently found in the earth, especially in the surface soil.

As a disease in the pig tetanus is not common, but cases are occasionally seen following the minor operations of castration and "ringing" the nose to prevent damage to pasture, etc. Sows have sometimes fallen victims to tetanus because the ring has been implanted in the soft tissues of the nose instead of merely passing through the cartilage. This has given rise to a deep-seated wound, which has had every opportunity of becoming infected. Considering that the operation of castration has frequently to be performed in dirty surroundings, it speaks a good deal for the care and cleanliness of the operators in general that tetanus is rare in the sty.

Symptoms.—These are usually noticed about seven to ten days after the operation, just about the time the wound would be expected to heal. During this period a toxin is elaborated in the wound, the process being favoured by the presence of a mixed infection. The

toxin has a particular affinity for the nerve cells. It produces hypersensitiveness, and a train of symptoms of a nervous character, which react on the muscles of the body.

The temperature is raised, and there is a tendency to constipation, while the animal shows abnormal signs of *nervousness*. The back is arched, and when the affected animal is standing at rest all four feet are drawn together under the body. The head and nose are protruded. The animal comes to the trough to feed, and attempts to suck a little food, the jaws being closed or fixed by a tonic spasm, and frequently falls over and dies in a paroxysmal access. Recovery sometimes takes place, but the chance is remote if well-developed symptoms are present.

In one outbreak of the disease several pigs of a litter were affected, although it was reported that plenty of antiseptic was used when castrating, and several lambs which were operated on at the same time similarly developed symptoms of tetanus.

Examination of the wound usually reveals partly healed tissues with a scabbed surface. On section it is found to be permeated by a dirty-brown liquid pus, which infiltrates the surrounding tissues.

Serum antitoxin is an excellent preventive measure, provided it is injected (subcutaneously) before the animal shows any symptoms of disease. It is most certain in its action if injected at the time of operation. If the animal has *ever* been inoculated with any other animal serum, the dose should be administered in fractions and at intervals, in order to avoid anaphylaxis.

SWINE ERYSIPELAS OR MEASLES.

THIS is a common disease of pigs. It affects all classes of swine, and in the acute stage is more frequently fatal than any other disease of pigs.

It is commonly known by the name of Purples, Red Soldier, or Measles, and in the early days of veterinary science was for a long time confused with Swine Fever.

The cause is a small rod-shaped organism or bacillus. The origin of Measles is usually sporadic: that is, its appearance is not explainable by any previous history of contact or infection.

In the mild form of the disease it is usually noticed that the pigs become suddenly unwell, and that the symptoms are ushered in by a serious constitutional disturbance. The temperature is high (105° to 107°), food is refused, the animal is disinclined to move, and breathes heavily, and in addition the cutaneous tissue surrounding the nose is often swollen.

Death frequently takes place within forty-eight hours; if an animal survives this period, there is a great prospect of recovery. But this is sometimes followed by unthriftiness; the pig does not do well, and is subject to valvular disease of the heart (*Verrucose Endocarditis*). Large warty growths affect the upper surface of the

mitral valve, and sometimes the tricuspid is affected also. In an animal which has apparently recovered there is always a danger of heart lesions, which often prove fatal at a subsequent stage of the animal's existence. There is reason to believe that some recover from the warty growths on the heart valves, but in these cases there is generally a thickening of the valve, leading to functional incompetence.

In the acute stage the disease is occasionally infectious to contact animals. It sometimes assumes a highly dangerous and infectious form. Death in these cases usually occurs within forty-eight hours of the initial symptoms. The skin is often diffusely affected by a pink discoloration, and the death-rate may amount to 24 per cent. or more of the herd.

This fatal and serious form of the disease is observed more particularly in large fat pigs, but more rarely in store animals. There is a danger of the development of heart lesions in animals which survive an attack.

Generally speaking, these heart lesions are most frequently found in large pigs which have never been noticed as ailing, presumably as the sequelæ of a mild attack. Occasionally they are met with in store pigs, and exceptional cases have been noted in unweaned pigs only four weeks old.

Symptoms.—These are most frequently observed in large fat pigs. They assume the shape of urticarial lesions or skin discoloration in the form of well-defined, diamond-shaped, purplish areas covering a surface of about a square inch, with a pinkish border. They are

particularly noticeable along the sides of the body and over the region of the shoulders, and again along the upper surface of the hind-quarters. In some instances the skin is irregularly raised in blotches or tumefactions, more particularly on the body and between the thighs. The skin lesions are not always noticeable to the naked eye, but the tumefactions can be detected by passing the hand over the surface of the body. These skin lesions gradually fade away in an animal which recovers, and in the majority of instances are associated with the peeling of the affected patches, while on rare occasions the whole of the superficial layers of the epidermis will peel off and be shed. Occasionally the skin discoloration is diffusely pink over the abdomen and buttocks, and on section the underlying muscles are seen to be of a dark tint, as in the "black quarter" lesion in cattle. Some farms are particularly subject to the disease, and it has long been a bugbear to pig-keepers. It has often been known to attack pigs which have had access to a farm-yard, or to styes with earthen floors, or other similar premises, on which the excreta contaminate the surface of the soil.

Lesions.—In sucking pigs or stores there may be an absence of skin lesions, and the pigs may die suddenly.

The post-mortem appearances will be found to vary. There is usually some degree of gastritis, and it is often intense. Petechial enteritis is present, but the fæces do not adhere to the petechiæ, which fade when exposed to sunlight. There is also a little patchy enteritis, which resembles a congestion rather than a well-marked

enteritis. Again, this inflammatory blush has a tendency to fade when exposed to sunlight, which helps to differentiate it from the intense enteritis associated with Swine Fever.

The mesenteric glands and the lymphatic glands throughout the body are swollen, and often present a mottled appearance; at other times they are normal in size, but of a strawberry-red colour. They do not display the very dark red or bluish-black colour which is observed in Swine Fever.

The peritoneum, particularly over the stomach, is frequently splashed with hæmorrhages resembling a smear of blood. The spleen may or may not be enlarged; more often than otherwise it is normal in size and appearance.

The kidneys are usually normal in appearance, but at times they are the seat of petechiæ, which are not of the intense, persistent type seen in Swine Fever. These organs are often studded with dirty-grey patches, due to the arrest of emboli detached from the valvular growths. These patches, which are irregular in shape, represent areas of necrosis.

One outstanding feature which helps to differentiate this disease from Swine Fever is the fact that the constitutional disturbance during life is less pronounced.

The animal retains a certain vigour, the toxic effect of the disease being less depressing than Swine Fever, although it constitutes a pure type of septicæmia. The fæces are usually normal, with a tendency to constipation.

In the mild form of the disease the animals are

frequently slaughtered for food, and if the carcasses dress and set well, and otherwise appear normal, it is customary, in Continental countries, to pass them for food, provided the skin lesions, which are removed, are not extensive.

Animals slaughtered when running a high temperature during the acute stages of the disease should be condemned as unfit for food. It should be noted that animals suffering from measles in the acute virulent form should never be slaughtered for food, as the pork may cause ptomaine-poisoning.

In young pigs the disease is often associated with swollen joints, simulating rheumatism, and when it is of long standing it is a cause of arthritis, which results in lameness. The swelling in the acute stage is often accompanied by a straw-coloured, gelatinous, inflammatory exudate. The spleen in these cases is usually enlarged, and on section is black and tarry. A similar condition of the spleen is met with in the acute septicæmic form of Swine Fever, but the latter disease is highly infectious to contact animals.

Acute Endocarditis.—The endocardium or internal lining membrane of the heart frequently shows signs of inflammation in the acute form of Swine Erysipelas. This is often the only alteration of structure found to exist in cases with a fatal termination. It is more often found affecting the left ventricle; it appears as a dark hæmorrhagic stain, in the form either of spots or irregular patches, which are of a persistent type and cannot be removed by washing with water.

A peculiar condition of the liver is often encountered in pigs which have been doing well and appear to be robust. The animals usually die suddenly. In such cases the organ presents an appearance of yellow fatty degeneration, and is streaked with black areas resembling hæmorrhages.

Swine Erysipelas is not contagious in the ordinary sense of the word, but in the acute stages it sometimes becomes highly infectious, and assumes alarming proportions. Where this occurs the healthy pigs should at once receive a dose of serum, injected subcutaneously, the dose depending on the size and weight of the animal. Serum treatment has been adopted with good results in this country, and is regarded by experienced practitioners as the best curative treatment in the early stage of the disease.

The protective effect of the serum is of brief duration, lasting about ten days, but exposure to a mild degree of infection immediately after inoculation converts the passive immunity thus conferred into an active one, which is of long duration.

The double inoculation or simultaneous injection of serum and an attenuated culture of the specific bacillus has also been adopted with success, the serum being injected on one side of the animal and the attenuated culture on the other side. It is not advisable to resort to inoculation with cultures on farms or other premises with a clean history. In cases of doubt it is always wise to use small doses of culture, and to test the potency of the culture a few animals only should receive the double

treatment to begin with, in order to insure that the culture used is of standard strength. In no case must cultures be used without the injection of serum, the latter serving to modify the effects of the former.

This disease has not been scheduled in the list of diseases contained in the Contagious Diseases of Animals Act.

ANTHRAX.

THIS disease is due to a specific organism or rod-shaped microbe known as the *Bacillus anthracis*. The disease is not infectious in the ordinary sense of the word, but where swine have access to a common source other animals are likely to be affected.

The disease is occasionally met with in swine, and is often associated with a diet containing the offal or blood of an animal of another species which has died or been slaughtered in consequence of some undefined ailment. In many instances the development of anthrax in the pig has been the means of bringing to light unsuspected cases of the same disease in animals of other species. In some districts certain farms and pastures are especially dangerous, and may constitute the originating source of many obscure local cases of the disease.

The existence of anthrax is often difficult to establish, because its history and symptoms are not those usually associated with anthrax in animals of other species. It is frequently related that the animal has been noticed to be ailing as long as forty-eight hours before death: an apparently unusual history, for anthrax is popularly believed to be associated with sudden death.

It should, however, be recorded that pigs occasionally

recover from anthrax. Such recoveries, it is true, are limited to those cases in which the constitutional disturbance has not been extensive.

From the symptoms exhibited during life it is often impossible to suspect anthrax. Except in rare instances the symptoms are not diagnostic, and the disease is suspected only after a post-mortem examination, some gland or other organ being intensely black, while other lesions are absent. When such an abnormal condition is discovered without any other apparent cause of death, anthrax should be suspected. Owing to the frequency of its localised form, blood smears should be made from the affected organ, and also from the spleen and throat glands. If stained with an old stock solution of methylene blue, the existence of anthrax will be revealed by the development of McFadyean's purple reaction, which oozes out from the substance of the rod-shaped bacilli. A general invasion of the circulatory system rarely takes place under natural conditions, so that an examination confined to the blood-stream is not a reliable method of diagnosis.

Sudden deaths among pigs are of common occurrence, and are due to a variety of causes other than anthrax. It would therefore be a mistake to suspect anthrax in such cases, but where the post-mortem fails to reveal any lesions it would be wise to make three or four smears from the various organs, including one of the blood-stream, in order to eliminate anthrax. Of course, this procedure may not always be attended by perfect results, but in general practice it is impracticable to do more.

Lesions.—The most common symptom of anthrax is a localised swelling of the tissues surrounding the throat. This is usually consequent upon feeding on the offal of a diseased animal of another species. Some of the animals affected with this localised swelling in the throat may make a complete recovery.

When the swelling in the throat, which is often diffuse, and which may vary in dimensions from the size of a coco-nut downwards, is incised, a considerable quantity of a pale yellow exudate escapes from the cut surfaces. The submaxillary glands are enlarged and of a dark red colour, owing to hæmorrhages. The straw-coloured exudate sometimes accumulates in the neighbourhood of the larynx, and in the dead animal resembles the raw white of an egg.

The carcass quickly decomposes; hence blood and other smears should be made as soon as possible after death, to avoid contamination by extraneous organisms. There is often a discharge of froth and blood-stained mucus from the mouth, nose, and anus; but this may be seen in diseases other than anthrax.

The Spleen.—The enlargement of this organ is not constant, and what used to be regarded as a typical condition—namely, an enlarged organ, which on section allows an escape of a black tarry blood—is frequently associated with other septicæmic diseases, particularly with acute and virulent Swine Fever.

The abdominal cavity often contains a large quantity of colourless gelatinous exudate. The intestinal mucous membrane occasionally shows hæmorrhages, and the

mesenteric lymphatic glands are discoloured a dark red.

Generally the blood is darker in colour than normal ; it is usually of a venous tint, and does not readily coagulate.

Microscopic Examination.— Where there is a general invasion of the blood-stream, the microscopic examination of the fresh blood will naturally reveal large numbers of anthrax bacilli.

But in the localised forms of the disease, which are much more frequent, the bacilli vary in number, and an extensive search is often necessary to locate a few bacilli. It should also be borne in mind that pig's blood from various organs, when stained with methylene blue, gives rise to a sky-red or rose-pink reaction, which must not be confused with the purple reaction described by McFadyean. In some instances microscopic examination fails to give a clue in these cases. The practitioner should then have recourse to cultural experiments, or experimental inoculation of a guinea-pig, a licence being required for the inoculation test on animals.

Staining for the Anthrax Bacillus.—Another method of staining to obtain McFadyean's purple reaction is to make a smear of blood, dry it, and apply gentle heat to fix the smear on the glass slide. Then apply a few drops of stain consisting of a 1 per cent. aqueous solution of methylene blue to which a $\frac{1}{2}$ per cent. aqueous solution of bicarbonate of soda has been added. Allow the slide to stand for about thirty seconds, wash in water, dry, and examine under a high power of the microscope.

Anthrax Bacillus : Cultural Method.—If the microscopical examination of a suspected blood-smear yields negative results, a small quantity of blood should be transferred, by means of a platinum loop, to some bouillon, and incubated at the body temperature for twenty-four to forty-eight hours, in order to favour the multiplication of anthrax bacilli.

Notification.—Anthrax is a notifiable disease, it being the duty of the owner or person in charge to notify to the police the death of an animal affected with or suspected of the disease. Cutting the carcass of a diseased animal, except for the purpose of microscopical examination, is forbidden by law. In most cases of sudden death or sudden illness in pigs (in the absence of a history pointing to the disease) anthrax should not be suspected until other possible factors, such as Epilepsy, Heart Disease, Œsophageal Choking, Syncope, and other conditions have been eliminated. As a rule this can only be done by post-mortem examination.

Serum treatment is advisable for animals exhibiting a normal temperature which have not developed suspicious symptoms, but it should be confined to those swine which have been exposed to a risk of contracting the disease.

Vaccination is uncertain in its results, and should not be resorted to save as an extreme measure, nor should it be practised on clean premises, on account of the risk of contaminating the soil and setting up a new centre of disease.

The disease is communicable to the human subject.

A case recently occurred in which it was decided to slaughter an ailing sow for food. The person who attended for the purpose of killing the sow believed that the animal was choked, and inserted his hand in its throat in order to remove the obstruction, with the result that an abrasion was caused by the sow's teeth, in consequence of which he contracted anthrax and died.

As most persons who keep pigs also keep fowls, and as the latter occasionally stray into or have access to the sty and its surroundings, it will be as well to remark that no fears need be entertained as to the fowls contracting anthrax. They are naturally immune to the disease.

TUBERCULOSIS.

THIS is a common disease of swine. It is caused by the tubercle bacillus, and is synonymous with the disease known as Consumption in the human subject.

It is frequently the cause of unthriftiness in young pigs, which become stunted in growth, and are seen to be in poor condition. For the most part it assumes a chronic form.

Symptoms.—The temperature is raised; the animals cough, display a capricious appetite, and do not thrive. These symptoms by themselves are not diagnostic. Occasionally the glands in the region of the throat are visibly enlarged, a symptom which is very helpful in arriving at a diagnosis during life.

Tuberculosis is most frequently found in fat pigs which appear healthy, and are slaughtered for food, the disease being rarely suspected during life. In these chronic latent cases lesions of the glands of the throat predominate. On section the glands, which are usually enlarged, are seen to be affected with necrosis and thick caseation. Occasionally the latter undergoes a softening process, and resembles pus. The tonsils also are affected by this form of necrotic caseous ulceration, which assumes a distinctive erosive appearance, often associated with a central core or slough. At other times the

adenoid tissue of the tonsils is thickened and bespattered with numerous small yellow tubercles about the size of a pin's head.

In bad cases the lungs are studded throughout their substance with numerous small yellow tubercles, or the disease may be localised in the form of several large well-defined nodules, which on section reveal the well-known appearances of necrosis and caseation. A clue to diagnosis in these forms of Tuberculous Pneumonia is afforded by the enlargement of the bronchial and mediastinal lymphatic glands, which on section reveal appearances of necrosis and caseation.

In long-standing forms of the disease this caseous matter sometimes shows signs of calcification, and is found to be gritty on section.

Abdominal lesions are most frequently confined to the mesenteric lymphatic glands, which on section very often reveal distinct traces of calcification, in addition to necrotic caseation. The intestinal mucous membrane is in my experience a very rare seat of lesions in the pig; when it is affected the lesions take the form of crater-like ulcers. In such cases the mesenteric glands governing the area reveal signs of tuberculosis, which factor will enable one, in cases of doubt, to differentiate the tuberculous ulcer from the necrotic ulcer associated with Swine Fever.

Tuberculosis is contagious and infectious, but in swine it commonly assumes a chronic latent form. When several pigs are found to be suffering from the latent form of the disease it will usually be discovered on inquiry that they

have been fed on milk from an infected cow. In such cases the udder is frequently the seat of a localised tuberculosis. Another likely source of infection is access to a cow-shed or other premises where a cow with an open lung lesion is kept. Infective material is expelled with the mucous discharge during coughing, or the infected discharge is coughed up, swallowed, and voided in the fæces, which swine are likely to rout over in their search for unconsumed grain. In an animal which is extensively affected it is customary to condemn the whole carcass, as tuberculosis displays a tendency to generalisation, the bones of the neck being particularly susceptible, and also other vertebræ and joints.

Instances have been known in which the chief symptom displayed was that the pig carried its head on one side.

The spleen is occasionally studded with tubercles, and miliary tubercles are sometimes seen in the substance of the liver. In the majority of cases the disease exists in a latent form, and is not suspected during life, but is found at the post-mortem examination affecting the glands, and particularly the submaxillary glands.

Tuberculin may be used as an aid to diagnosis, the dose varying according to the size and age of the animal.

Necrotic lesions are encountered in the lungs as a sequel to or complication of Swine Fever, but they are differentiated from those of tuberculosis by the absence of caseation and calcification of the hepatised lung tissue, and also by the marked absence of areas of necrotic caseation in the bronchial and mediastinal lymphatic glands.

SWINE FEVER.

THIS is a highly contagious and infectious disease of swine, the causal organism of which has not been isolated. It is classed among those diseases which are due to an invisible virus; by this it is meant that the blood, which is very infectious in the acute stage of the disorder, contains an organism or virus which is capable of passing through a Berkefeld filter. The filtrate is capable of causing the disease experimentally if a few drops of it are inoculated under the skin of a healthy pig.

The disease may also be produced by feeding swine with infected blood. It is therefore a true type of septicæmia, and until recently was confused with other diseases, particularly with Swine Erysipelas, from which it may readily be differentiated.

Owing to the diverse nature of the symptoms, and the varied duration of the period of incubation, which is largely dependent upon the quantity of virus that enters the system at one and the same time, diagnosis during the lifetime of the animal is even to-day a matter of considerable difficulty. After exposure to infection by natural means, it is generally found that a period of ten to fourteen days elapses before young pigs are noticed to be visibly ill, and an interval of fourteen to twenty-one

days before older animals develop visible signs of disorder. It has, however, been proved beyond doubt by Sir John McFadyean and Sir Stewart Stockman in this country that the cause is an ultra-visible virus.

The pseudo-bacillus of Swine Fever, which is capable of propagation only in the animal body, is closely connected with this virus, and might be regarded as the secondary infection which is largely responsible for the gross lesions of Swine Fever—such as necrotic button ulcers, diphtheritic lesions, and other similar changes.

Evidence of the early stages of the lesions is often seen in the adenoid tissues, and in the Peyer's patches, solitary follicles, and mesenteric lymphatic glands, associated with petechiæ in some of the internal organs of the body. The petechiæ, whenever present, are always to be considered as the precursors of early lesions, which, sooner or later, become well marked and highly conclusive. These petechiæ must not be confused with submucous hæmorrhages, which are seldom smaller than a split pea in the intestine, but occasionally, in the stomach, they assume the form of a distinct pyramidal coagulation, protruding from the mucous membrane, and liable at first sight to be mistaken for the ulcer of Swine Fever. On section, however, even to the naked eye, they reveal a distinct clot. These submucous hæmorrhages may also be met with in the early acute stage of the disease, and might be regarded as an enlarged and intensified multiple petechia; they are particularly noticeable in the stomach. The upper surface of the clot often presents a circular necrotic appearance.

Forms of the Disease.

There are two forms of the disease, the Acute and the Chronic. In the acute form of the disease the sudden onset of symptoms and the manifestations of the disease are often so violent that the person in charge is led to suspect the probability of poisoning, so quickly does death ensue. In the acute form of the disease we have all the symptoms which we should expect to encounter in a true septicæmia; there is loss of appetite, high temperature, drowsiness, and a marked thirst. In the early stages the fæces are usually constipated, but quickly become diarrhœal. The skin commonly betrays a bluish-red discoloration about the ears, between the thighs, and around the buttocks and legs; this is associated with rapid wasting, and the animals reel in a staggering, intoxicated condition.

In the chronic form of the disease the animal survives an acute attack, and develops the characteristic lesions of Swine Fever—button ulcers and chronic diphtheritic deposits being the most prominent features. An animal with these extensive and well-developed lesions frequently appears to be in excellent condition, as it has tided over the acute stage which caused it to lose condition, and is now regaining flesh. This chronic disorder is often most difficult to detect during life, even by an expert, failing a history of exposure to infection, and the knowledge, which is sometimes difficult to obtain, that the animal is not feeding as well as it should. Even the most experienced observer would be likely to pass an animal of this

type as apparently sound, although actually affected with latent lesions.

This latent condition, with great attention, careful feeding, and plenty of fresh air, is often tided over, when the animal recovers and becomes immune. If other animals on the premises are exposed to contact with one of these latent cases, there is every probability that they will eventually but slowly develop symptoms of disease, the period depending upon the measure of contact.

These chronic cases sometimes continue to do very well until the advent of such circumstances as tend to lower the vitality, such as chills or parturition, which are frequently attended by a recrudescence of the disease, leading to complications of pneumonia and a fatal termination.

In some of the chronic cases there are, of course, signs of unthriftiness and stunted growth, but these conditions may exist apart from Swine Fever, being met with in chronic cases of cirrhosis of the liver, etc. The chronic form is said to be the commoner of the two varieties met with, but for many years past the acute form has probably been more noticeable. A fact which helps to mislead one with regard to the frequency of the chronic form is that the acute form seldom allows time for the development of the gross diagnostic lesions on the appearance of which Swine Fever used to be declared. The insidious latent forms of the disease are highly dangerous, for they serve to keep the disease alive, and act as new centres of infection when favourable circumstances exist, especially among weak young pigs.

Consequently the mixing of a large number of pigs must be attended by risks of their contracting infection from latent lesions. For the prevention of Swine Fever a sound, strong herd of pigs is very essential, for they are better able to withstand the predisposing effects of other ailments. The smallest pig of the litter—it is often known as the “Harry pig” “darling,” or “ked”—I regard as an unfavourable element, unless it is strong and robust, for it frequently serves as an incubator and intensifier of infection, handing it on to its fellows in a kind of a snowball fashion, the disease gradually increasing in potency until a fresh outbreak is the result.

Swine Fever Lesions.

Under this are comprised a great variety of structural alterations, their nature depending upon the stage of the disease. Generally speaking, there is scarcely an organ of the body which may not be attacked in the acute septic forms of the disease. Hæmorrhages of the bladder and petechial spots in the kidneys, accompanied by a discharge of blood-stained urine, ecchymosis of the peritoneum and the heart muscle, enlarged spleen, and petechial laryngitis, are among the early acute lesions of the disease. But when the disease is well established the gastro-intestinal mucous membrane is the most constant seat of the typical lesions—namely, the well-known necrotic button ulcers, diphtheritic lesions, ulcerations, and rough areas of cirrhotic tissue, the latter indicating healed lesions, intense general enteritis, or congestion

of the gastro-intestinal mucous membrane, and occasionally ulcers on the tongue.

In its early acute stage the most outstanding feature of the disease is that it is highly contagious and infectious, and is associated with an intense thirst, the pigs sucking up the surface drainage and accumulations of liquid excreta. Sometimes we note an intense gastro-enteritis and practically nothing else, except a bluish-mahogany tinge due to congestion of the mucous membrane. The mesenteric glands are abnormal, being usually congested, and a very dark red, or nearly black, in colour.

Again, the intestines may be studded by a petechial enteritis, the fæces tending to adhere firmly to the petechial areas.

The liver shows no diagnostic lesions, but in exceptional cases areas of necrosis may coexist with healing ulcerations of the intestinal mucous membrane.

The spleen is frequently enlarged, and gorged with black tarry blood, indicating an early acute septicæmic condition.

The kidneys will often show early indications of petechial nephritis. This is most important, and is occasionally the only lesion to be observed in the early stage of the disease. In some instances there is a general sign of septicæmic hæmorrhages throughout all the organs of the body, these being particularly noticeable in the bladder, peritoneum, heart, lungs, kidneys, and larynx.

Lungs.—In the early acute stage the apical lobes of the lungs may be distinctly congested, a symptom which should be regarded with suspicion. Again, there may

exist a well-defined area of nodular pneumonia, varying in size from that of a pigeon's egg downwards. On section the nodular area is dark or blackish in colour, and the interlobular septa are distended with inflammatory lymph. This type of pneumonia is almost diagnostic, although it is very limited in extent, and it is sometimes the only lesion present in pigs exhibiting symptoms of intoxication.

There may also exist, in the intoxication stage of the disease, an œdematous condition of the gastro-intestinal mucous membranes, a condition which is present as a complication in various other diseases.

Chronic lesions, in the form of necrotic button ulcers, are most frequently found in the large intestine, but occasionally in the stomach, larynx, and pharynx, and on the tongue of young pigs. The surface of the button ulcer is occasionally bile-stained (yellow), but more often it is black in appearance, displaying concentric rings. There is also a hose-pipe condition of the ileum, with dense masses of crumbling necrotic tissue on its mucous surface; a similar condition sometimes affects the whole of the large intestine, and causes the loops of bowel to become adherent, setting up a chronic peritonitis. The extent of the alteration of structure is so general that one of the most surprising features of the disease is that the animal is able to keep alive, and what is still more surprising is that its condition is often fairly good. The disease in this stage frequently shows no signs of spreading to *healthy* fellow-pigs, being usually limited to one pig in the herd. The author believes that a large proportion of

pigs suffer from a mild attack of the disease and recover, without displaying any noticeable symptoms during life, or leaving any visible traces of infection. It is when the weakly pig comes into contact with obscure infection that the disease lights up in a recognisable form, and, in a sense, keeps the pot boiling. The recovery of animals from a mild type of the disease probably serves to explain why some pigs exposed to great risks of infection escape an attack, they having previously acquired a lasting immunity. From this it will be gathered that pigs frequently recover from Swine Fever, but it should be borne in mind that in animals which are visibly ill the prospects of complete recovery are exceedingly rare, for pneumonia frequently follows as a complication, and in many instances proves fatal.

Swine Fever in the acute form is most frequently associated with a fatal termination, particularly among pigs under four or five months old. Pigs of all ages are liable to infection and development of symptoms, a mature animal being better able to withstand and ward off the depressing effects. It does not seem that there is any breed of pigs which is pre-eminently disposed to the disease.

Characteristic Stench in Cases of Swine Fever.—In addition to the factors already mentioned in connection with the diagnosis of Swine Fever, it is well to remember that there is a characteristic necrotic odour associated with the incipient forms of Enteritis due to Swine Fever. This odour is a useful aid in differentiating the disorder from the various forms of enteritis produced by other

causes, such as mechanical irritants and errors in diet, etc. In cases of Swine Fever with well-developed intestinal lesions the foetid necrotic odour is so pungent and characteristic that the disorder can in many instances be foretold from the repulsive nauseating smell emitted by the excreta, and also at the post-mortem examination.

Predisposing Factors.—Injudicious feeding, particularly on raw swill, is an important factor, for the food is likely to contain infective material, such as the clippings and trimmings of meat from an animal slaughtered while suffering from the acute form of the disease; and even when swill may be excluded as a direct cause of infection, it is, owing to its variable composition, an important factor in the development of disease, as it may in some cases result in a lowering of the vitality, thus acting prejudicially upon the various organs, so that their functions are impaired, when the system, being deranged, offers a more favourable medium for the development of pathogenic organisms. This predisposing factor is worthy of serious attention, for it may be generally accepted that any factor which tends to lower the animal's vitality renders it more susceptible to Swine Fever.

Under the heading of predisposing factors we may also include the lack of dry accommodation and suitable housing, such as should be provided by constructing styes and other premises with a warm southerly aspect, so that Nature's greatest germicide—*sunlight*—is not excluded.

There is every reason to believe that animals which

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SWINE FEVER—SERUM TREATMENT.

Serum is obtained from an animal which has been repeatedly injected with the blood of animals suffering from Swine Fever in gradually increasing doses, until it attains a high degree of immunity. When this stage has been reached, after a period varying from five to seven weeks, blood is withdrawn on several occasions from the immune animal, and the serum which exudes from the clot is known as "anti-swine-fever serum." (There is, of course, an elaborate laboratory technique, which I do not attempt to describe, for the manufacture of serum in large quantities.)

Defibrinated blood is also used, with the same results as the serum, but its disadvantages will be readily understood. Its use involves a risk of conveying other diseases. Even serum, before being issued for use in the field, should be sterilised. Serum is a wonderful protective if inoculated into a healthy animal. It confers immunity for about ten days; this may be converted into an active immunity of a longer duration by mixing the inoculated healthy animals with a few diseased pigs, preferably in the proportion of about 10 to 1. Serum is not a curative, and if inoculated *after* an animal has been exposed to infection there is a risk that the disease

may gain the upper hand. This is particularly the case with young unweaned pigs; they do very well while they are running with the sow, but shortly after they are weaned they often develop disease, which is not easy to control.

One of the greatest advantages of the use of serum is that it permits of the restocking of infected premises with healthy swine, either for breeding or feeding, provided they are inoculated with serum immediately on arrival, and at once exposed to infection for the active period of the serum—namely, ten days.

When diseased pigs have been retained for the purpose of mixing them with swine treated with serum, the diseased animals should be isolated or destroyed after the tenth day, unless they show signs of recovery sufficient to justify the expectation that they will repay the cost of the food which they consume; for there is a risk that the ailing pigs may develop complications of Pneumonia, which sometimes becomes infectious to healthy contact swine.

Vaccination is occasionally resorted to, but is risky, as the disease will sometimes gain the ascendancy. In vaccination, the animal is inoculated simultaneously with serum and a small dose of virulent blood, the serum being injected into one leg and the blood into another (subcutaneously), the object being to give the animal a mild form of the disease; for if virulent blood were injected alone it would probably prove fatal. Vaccination can only be practised with any degree of safety upon premises which are well constructed and well

isolated, and which lend themselves to the purpose of controlling the disease. It has been practised with success on a few occasions in this country, but as a general treatment to be carried out on non-infected premises it is not to be recommended. I believe, however, that the time is not far distant when a safe and useful vaccine will be obtained.

With regard to serum treatment, it possesses one great drawback: the immunity conferred is of short duration, and there is no uniform standard of strength, so that the protective effects will sometimes be found to vary. Another very great obstacle to its successful use is the fact that many apparently healthy pigs are the subjects of latent infection, so that in these cases the serum treatment is often applied too late to give reliable results.

Disinfection.—From recent experiments carried out by the Departmental Committee appointed by the Board of Agriculture and Fisheries to inquire into Swine Fever, it was found that after a short interval, of about two weeks, the excreta of diseased animals became inert, and that only where the fæces were fresh was there any danger of infection to other pigs. Consequently, if a sty is left empty for a period of two or three weeks it is said that fresh pigs moved into the sty incur no danger of infection, although the sty has not been disinfected. When an empty infected sty is cleansed and disinfected, it is said to be quite safe as a dwelling for fresh pigs.

Notification.—The disease is notifiable. Every person possessing or having in his care an animal affected with

or suspected of this disease must report the case to the police, and as far as practicable take steps to segregate the diseased animal from animals not so affected. Under the Diseases of Animals Act, 1894, the Board of Agriculture has power to order the slaughter of an animal affected with or suspected of Swine Fever, or exposed to infection. The compensation payable for swine thus slaughtered is as follows :

1. If the animal is affected with Swine Fever, one-half of its value immediately before it became affected with Swine Fever.

2. In every other case the compensation shall be the value of the pig immediately before it was slaughtered.

At the post-mortem diagnosis of Swine Fever the writer relies on examination by the naked eye. This, in conjunction with the history, symptoms, and signs of infection, generally yields satisfactory results.

PNEUMONIA.

Pneumonia, or inflammation of the lungs, is a very common disease of swine. It occasionally exists as a primary condition, and in such cases is often associated with pleurisy as a complication, but most frequently it occurs as a secondary factor, and is the sequel of some other debilitating disease, such as Swine Fever; or again, it may coexist with some other disease in the form of a complication.

There are several types of Pneumonia—*e.g.*, (1) Broncho-Pneumonia, or Catarrhal Pneumonia; (2) Necrotic Pneumonia; (3) Septicæmic Pneumonia; and (4) Chronic Pneumonia. By far the most usual type is the chronic form of the disease.

The symptoms will be found to vary according to the type and character of the disorder. Generally speaking, cutaneous discolorations will be present in the acute conditions, the parts of the body affected being the tips of the ears, the under surface of the abdomen, and the region of the buttocks or hams. The withers may also be discoloured.

The temperature is raised (105° to 107°), and there is a noticeable cough. The respirations are accelerated; there is a loss of appetite, and a consequent loss of flesh. Acute Broncho-Pneumonia is not associated with

such marked symptoms of depression and collapse as the acute septicæmic form. In the latter form of Pneumonia the depression is very marked, and this type is more likely to be attended by fatal results.

The septicæmic condition is highly contagious to contact swine. It frequently exists as a primary condition, and the symptoms are pronounced.

Broncho-Pneumonia, or Catarrhal Pneumonia is often observed in young pigs, with all the general symptoms of Pneumonia, but the systemic disturbance is not great. The most pronounced symptom is acceleration of respiration. The post-mortem appearances are fairly characteristic and constant. The lungs present the appearance of a miniature chess-board of light and dark areas. This appearance is extensively diffused through the lungs. This form of Pneumonia displays no tendency to become contagious, and the predisposing cause is usually a chill.

It should not be forgotten that in all cases of Pneumonia the hepatisation of the affected part is differentiated from congestion by the fact that the hepatised part sinks in water, whereas the congested part floats.

Congestion of the apical lobes in young pigs is often associated with Swine Fever. The area affected is usually of a dark venous tint, resembling a piece of muscle, and is V-shaped in appearance.

Necrotic Pneumonia.—In this form there are numerous areas of necrosis (varying in size from that of a Spanish chestnut downwards) irregularly distributed through the lung tissue, but most frequently found in

the anterior lobes of the lungs. These have often been confused with areas of tuberculosis, from which they are, however, easily differentiated when it is remembered that tuberculous lesions are prone to undergo a caseous degeneration which often becomes calcareous, and that necrotic caseous tubercles are found affecting the bronchial mediastinal lymphatic glands, which are frequently enlarged.

In Necrotic Pneumonia the bronchial glands are only slightly enlarged, and there is a marked absence of areas of necrosis in these glands.

If the necrosis is due to tuberculosis, it is highly probable that similar lesions will coexist in some other organs of the body.

Necrotic Pneumonia may exist as a complication of Swine Fever, but is most frequently a sequel, and whenever encountered a guarded diagnosis should be given as to the non-existence of Swine Fever. It usually affects several animals in the same litter or herd. If it is found prevailing among swine with other symptoms of an acute infectious nature, it will almost certainly justify a diagnosis of Swine Fever.

Septicæmic Pneumonia.—This exists more often as a primary condition of Swine Fever, and is occasionally the only lesion to be discovered in undoubted cases of the acute toxic form of Swine Fever. It is associated with a high temperature, marked depression, and loss of appetite. Sometimes the animal shows signs of intoxication, and there is a want of co-ordination in the movements of the limbs, and also a weakness of the

hind-quarters. The animal reels and is unsteady in its gait, and there is a sharp, short, hacking cough.

Post-mortem appearances will be variable, but the commonest lesion is in the form of a well-defined, circumscribed, nodular lesion, which on section presents a hæmorrhagic appearance. The interlobular septa of the affected area are distended with a blood-stained inflammatory exudate. Several such nodules may be scattered through the lung, but they are not numerous nor diffuse. The dimensions are also variable, the commonest size being about that of a medium-sized walnut. This disorder may safely be said to represent one of the earliest forms of acute Swine Fever.

At other times the anterior lobes of the lung tissue exhibit a similar appearance, but it is strictly limited to the apical lobes, and is not diffuse. The bronchial and tracheal glands are also hæmorrhagic in appearance. This type of pneumonia is more often met with in strong mature pigs, and is constantly associated with signs of infection among other swine on the same premises.

Chronic Pneumonia is very prevalent, and there are usually well-marked symptoms in the shape of irregular respiratory efforts. Animals showing these marked symptoms are known among pig-keepers as "Pankers" or "Blowers," and are generally regarded as unsatisfactory "doers," unlikely to thrive or constitute a profitable investment. Curiously enough, the condition of the animal is fairly well maintained, and the temperature raised only by some 2° or 3°. The animal is often fatter than one would expect, having regard to the extensive lesions

which are found to exist, and the appetite remains fairly good, although it is at times capricious.

Post-mortem reveals an extensive area of hepatised lung tissue, of a pale grey colour, and the lungs appear more voluminous than normally. This disorder generally affects several pigs in a litter or herd, and should in the majority of instances be regarded as a sequel to Swine Fever, but it is occasionally found to exist as a complication of that disease.

In the majority of instances there are no bowel lesions. When the disorder is associated with emaciation, bowel lesions in the form of healing ulcerations and scar tissue may be looked for in the intestinal mucous membrane.

Pleurisy.—This is frequently associated with acute forms of Broncho-Pneumonia or Lobular Pneumonia. It takes the form of yellow fibrinous strings of coagulated lymph on the pleural surface of the lungs. In some cases it leads to adhesions between the lungs and the chest wall.

In those cases which recover evidence of old pleuritic lesions is often found in the chest, in the shape of strong fibrous strings of tissue.

Although pleurisy is often the result of the extension of the pneumonic area, it occasionally exists as a primary condition, being favoured by dark, damp, cold styes. The chief symptoms are irregular and restricted respiratory efforts, a small rise of temperature, and a slight cough, together with a loss of appetite.

EPILEPSY OR FITS.

Young pigs under four months old are often attacked by fits or convulsions.

It is not unusual to find more than one animal in the same litter affected.

Symptoms.—There is a sudden onset of symptoms, and usually the animals are in good condition, thriving, and apparently healthy. The temperature in simple cases will usually be normal. The animals have a good appetite, but on partaking of a little food at the trough they stagger, with uplifted head, run backwards, and fall over on one side, with exaggerated, struggling, galloping movements. A little frothy saliva escapes from the mouth, the eyeballs appear unduly prominent, and there is a period of unconsciousness.

When the animal regains its faculties it will be observed that its recovery is associated with a considerable degree of exhaustion, from which it will make a speedy convalescence if it is placed in cool, quiet surroundings.

There is a tendency to constipation of the bowels. Some animals may develop three or four fits at short intervals during the same day.

Epilepsy is often attended by a fatal termination.

The cause of the illness is often obscure, internal parasites or worms, teething, and errors in diet being the most frequent causes.

The post-mortem examination seldom reveals any definite etiological or symptomatic appearances, other

than worms or a slight inflammation of the lining membrane of the stomach—*e.g.*, gastritis.

Convulsions occasionally occur as a complication of the early forms of swine fever, and in tetanus, but in these diseases systemic disturbances are marked before and after an attack, and there is also loss of appetite, etc.

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