of horses, partly because the conditions of the circulation vary very much, and the organism, as is known, can settle only in individuals already somewhat weakened by disease.

A word or two still regarding treatment. We formerly treated purpura chiefly with cinchona and wine; then on account of the uncertainty of the results we adopted the therapeutics recommended by Dieckerhoff (tracheal injection of iodine dissolved in a solution of iodide of potassium), but had, if possible, even less benefit, in spite of the strict observance of his directions in over a dozen cases. We then tried doses of calomel (Siedamgrotzky), arsenic, antifebrin, antipyrin, menthol, and specially creolin (the latter to disinfect the bowel), division of the swellings, etc., and all alike without really encouraging results. Since that time our treatment has been again symptomatic: wine and easily digested food to counteract the failing strength, slight exercise and massage with camphorated spirits and bandaging to remove the subcutaneous swellings, disinfection of the nose and eventual superficial necroses, etc. But we shall not fail to try also the treatment with ichthiol recommended by Lustig.¹

Should an affection of the vessels in the sense indicated be proved to be the actual nature of the disease, there might be recommended in that case, besides a strict separation of the diseased animals, a thorough disinfectant treatment of all primary centres, a stimulant therapeutics to raise the blood pressure, administration of alcohol, etc., and against the formation of intestinal ulcers a disinfection of the bowel with creolin might be indicated. To counteract the constipation and consequent blood stasis in the intestine, where diarrhoea does not already exist, the administration of calomel, clysters, physostigma, or pilocarpin would be very commendable; also the administration of nutritious and easily digested food. It appears to me that the almost exclusive feeding of such patients with milk—a mode of treatment very successfully practised in Italy—is very plausible.

ON THE DIAGNOSIS OF TUBERCULOSIS IN ANIMALS.²

By M. P. CAGNY, Senlis, France.

AT the International Veterinary Congress held in Brussels in 1885, a report on tuberculosis was presented by a commission composed of Messrs. Fleming, Lydtin, and Van Hertsen. In this very remarkable work Lydtin makes the following statement: To-day the veterinarian can recognise the animals already attacked in a building where tuberculosis has been signalled, as easily as he can recognise the glandered horses in a stable where glanders has been proved to exist.

I avow that this conclusion appeared to me to bear the mark of exaggeration, yet it was exact. Several of our *confrères* had already arrived at the same conclusion, and I will cite in particular one of the members of this Congress—M. Grissonnanche.

Since then I have had the opportunity to see M. Lydtin, to inquire of him the details as to his manner of procedure, and then to apply

¹ *Deutsche Zeitschrift für Tiermedizin*, 1887.

² Communicated to the Congress for the study of Tuberculosis, Paris 1888. Translated from the *Journal de Médecine Vétérinaire et de Zootechnie*, January 1889.

in my practice the principles by which he is guided ; and I can verify the exactitude of his affirmation.

At the outset it must be clearly understood that it is not a case of recognising with certainty tuberculosis in every degree—in the animals present in a market for example, but only to recognise the affected animals in a herd where one case has already been reported.

The thing will be easy in proportion to the experience that the veterinary surgeon has had of bovine pathology in general, and of tuberculosis in particular. It may be remarked at the outset that the measures actually taken to prevent contagion being generally *nil*, it may be affirmed almost with certainty that when one is consulted it is not a mere isolated case.

To arrive at exact diagnosis it is necessary to be well acquainted with the progress of the affection, first in a group of animals, and then in each individual.

If the animals are kept in too confined a building, with low roof, badly ventilated, and badly lighted ; if the floor, walls, and roof of the building are full of holes and irregularities ; if, moreover, this building is situated in a humid place, such as the declivitous part of a courtyard, it may be affirmed on entering that the majority of the animals have already some tubercular lesions. On the contrary, in the opposite conditions—sanitary building, etc.—the contagion will have made much less progress.

Some years ago, for example, tuberculosis invaded the cowshed of one of my clients. The cows were Flemish animals, purchased young, of a good conformation, well nourished, etc. ; but the building had a low roof, was badly ventilated and lighted, and situated at the sloping part of the court. The walls were in a good state, but the ventilation was absolutely defective. I demanded and obtained the erection of another building, much better situated and better managed, and the contagion was arrested. The animals newly introduced have escaped contagion, and I have even observed in the cows already attacked an arrest in the progress of the malady, and an amelioration in their condition.

It is the absence of ventilation and of light, due to insufficiency of the building, more than the elevation of temperature, that appears to play the principal rôle.

The farmers who turn their milk into cheese have an economical means of heating their dairies, which are placed between two cowsheds, of which the doors and windows are generally closed. This arrangement offers a grave inconvenience, viz., that the temperature of these sheds is often raised from 25° to 30° C. But they are well lighted, the animals are not too close, and the walls are well kept, and hence tuberculosis is not very frequent. The animals attacked, if there are any such, are not too dangerous for their neighbours. But if, as I have had occasion to observe in a farm lately, to the elevation of temperature are added other causes—overcrowding, absence of light, etc.—tuberculosis propagates itself with extraordinary rapidity. In this farm, out of sixty milch cows distributed in several sheds, three-fourths were notoriously tubercular within a little more than a year after the first case was observed, and the subjects were more numerous and worse attacked, not in the warmest sheds, but in those that were the worst lighted and ventilated.

Moreover, in our country the disease propagates itself less on the animals at pasture, which live night and day in the open air, than on those that pass the whole or part of the day in the cowshed.

It may be noted in passing that the laboratory experiments on the influence of habitation, communicated to the Congress, appear to be in accord with the clinical facts.

This action of the air and of light gives to the progress of epizootics of tuberculosis a rate different from that of epizootics of another pulmonary affection—contagious pleuro-pneumonia.

In the case of contagious pleuro-pneumonia, what one used to designate “contagion at a distance,” or contagion by volatile virus, does not take place while the animals are permanently stalled. Carefully made observations show that the contact is made by immediate contact from one affected animal to its habitual or accidental neighbour. If the animals are at liberty the whole or part of the day, the occasions of contact are multiplied, and the malady communicates itself more rapidly and to a greater number of the animals.

In the case of tuberculosis the contrary seems to be the case: little or no contagion at pasture, rapid communication to the whole herd living in a confined atmosphere. That is due in great measure to the fact that the subjects of pleuro-pneumonia are slaughtered on the appearance of the first symptoms, while the tubercular subjects on the contrary are kept for a very long time. And since the sojourn in a badly ventilated building is a condition favourable to the conservation of germs, it is altogether natural that in these buildings the disease is propagated more rapidly to a greater proportion of the animals.

These considerations recalled, bearing in mind that in every contagious malady, whatever it may be, every animal exposed to the contagion ought to be considered as already attacked from the moment that it presents a symptom—I will not say of disease, but merely of disturbed health (malaise), of any indisposition whatever, the veterinary surgeon ought to have pointed out all the animals which do not appear in a state of perfect health, all the animals that are “not doing well,” to use the common expression, all those that have been ill in any fashion whatever. To be a little more precise, he will cause to be pointed out those that cough, or those on which visible tumours of the glands (of the intermaxillary space, or more often of the parotideal region) have been observed. If the indications do not appear to him sufficient, he ought if necessary to shut the animals in the cowshed, or to remain in the field, to examine the animals without noise, and without disturbing them; to observe them at a distance, noting the manner in which they conduct themselves, their manner of feeding, etc.

Before passing to the individual examination, it is necessary to recollect that in a particular animal tuberculosis may present itself under two distinct forms—the pulmonary form and the glandular form. Besides these there is the tuberculosis of the serous membranes, but that is more rare. These various forms can co-exist in the same animal, the whole three it may be, or two of them.

Pulmonary Form.—There are symptoms of a chest affection: cough, sensibility of the spine, abnormalities of the sounds heard on auscultation (sometimes there is merely exaggeration of the respiratory murmur). It must not be forgotten that in the case of pulmonary

tuberculosis, the organ being partially destroyed, the function is essentially modified, that there is more or less *phthisis*, and that the animal is in a bad condition.

It is necessary to clearly understand the meaning of this expression ; it does not signify that the animal is always and markedly wasted, but that its general state is not what it ought to be, taking into account its conformation, its nourishment, the hygienic conditions in which it is found, etc. And to recognise it, it is necessary to compare it with the other animals of the same herd. A phthisical cow of one cowshed might be fatter than a healthy cow of the same race and age inhabiting another cowshed, where the totality of the hygienic conditions were not so good. Everything is relative. I insist on this point, which appears to me to have been a little misunderstood hitherto by the majority of those who have spoken concerning the difficulties of diagnosis, and who, to prove these difficulties, cite examples of non-emaciated cows with pulmonary lesions.

It is important to take account of the state of the hair, of the skin, mobility or adhesion to the ribs, suppleness or rigidity ; if the palpation does not give sufficient indications, recourse may be had to the following method, which was suggested to me by the practice of subcutaneous injections. Given two animals with skin of the same thickness, suppose the first to be in good health, and let a subcutaneous injection with a Pravaz syringe be administered to it, one observes that the needle traverses the skin with the greatest facility, it passes without effort, and glides as if in butter. Suppose the second ill from any cause whatever, and let the same operation be practised on it, it is with difficulty that the needle penetrates, one feels as if it traversed a resistant body like wood ; the skin is dry and unyielding.

Glandular Form.—Although tuberculosis of the lungs is generally accompanied by glandular lesions, it is necessary to recognise that frequently tuberculosis of the glands exists without other tubercular lesions. For simplicity's sake I shall examine what is done in the case of glandular lesions alone.

The veterinary surgeon ought to examine with the greatest care the superficial glands, especially those situated in the intermaxillary space, in the parotideal region, and those in front of the fascia lata. He will know to find the tubercular glands, as he knows to find them in glanders. These specific glands present themselves under the form of hard resistant masses of an elongated form.

When they augment in volume, when they are transformed into abscesses full of a rather white, liquid, creamy pus, they give rise to symptoms due to interference with the function of neighbouring organs: respiration, circulation, and prehension of food. These tumours have been described under such names as *gourme* and *scrofula*, but their true nature has been known since the bacillus of Koch was discovered, and for my part I have submitted some of them to the examination of M. Nocard. When they do not involve any important organ, they may be observed in animals whose state of health appears perfect ; and most frequently their existence is not recognised until the day when, owing to increase of size, they modify some important function, in compressing an organ situated in their neighbourhood.

The following is an example : In the majority of the towns the butchers make a kind of exhibition in their shops on Good Friday.

A long time in advance they visit the neighbouring farms, choosing the animals of good conformation, and of which the fattening is already well advanced, and they buy on the condition that they shall be delivered to them two or three days before that date. One year a butcher of Senlis selected in this way a cow of four to five years old well formed, and the fattening was continued up till the day indicated. During the two last weeks there was observed, intermittently, some arrest of rumination, and a little indigestion. I examined the cow and found in the intermaxillary space a hard tumour, of which I was beginning to recognise the true nature. The cow was killed on the day fixed, and I assisted at the opening of it. The tumour situated under the pharynx, the movements of which it also slightly impeded, was a hypertrophied gland weighing 500 grammes. M. Nocard found the bacillus of tuberculosis in it. The butcher and I examined with care the whole of the carcase, without being able to find any other lesion whatever.

This fact is interesting, for it shows that in our animals the glandular lesions may exist alone, remain isolated for a long time, and be overlooked until the moment when by their volume they come to hinder the neighbouring organs; for six weeks to two months previously this cow had by a butcher been specially chosen as healthy from among several others. But certain internal glands may be attacked. These are especially the bronchial and mesenteric glands. Hypertrophy of the first is characterised by intermittent indigestion (tympanites), by interference with respiration (roaring) or circulation (distension of the jugulars, venous pulse), etc.

For the second, the pathognomonic sign is a special indigestion; it appears intermittently; for amelioration once obtained, it is reproduced after the next meal. Later there is diarrhoea, emaciation, etc.

I note further the conclusions to be drawn from the state of the udder, the vulva, and especially the neck of the uterus.

En résumé, every morbid symptom ought to be examined with the greatest care. It will be remarked that hitherto I have not spoken of the indications which may be afforded by a microscopic examination, and by culture, of the products of discharge or of glandular abscesses. That I did purposely, for I think that at present the majority of veterinary practitioners cannot undertake these researches in a serious fashion; but such means when necessary are not to be despised from the point of view of diagnosis.

The veterinary surgeon who has any doubts after having examined the animals according to the indications I have given, will do well to collect some laryngeal mucus, to practise exploratory punctures in the glands, and to submit the products obtained to the examination of competent persons.

I am persuaded that by attention and repeated examinations, my fellow practitioners will be able very promptly to acquire the ability to recognise in this way the majority of tubercular animals. True, there will always be difficult cases, cases of mistake, but not so many as is believed, and my conclusion is that in the majority of cowsheds the diagnosis of tuberculosis is much less difficult than it is said to be.