

death is the cause of it, as I have already before remarked.†

It is the same with the bonnet, which forms, so to speak, only a single pouch with the first stomach; but I must observe, for those who may be ignorant of it, that this internal membrane is in some cattle naturally very black, or of a bronze colour; and in some others of a pale yellow.

The "omasum," (many plies) or third stomach, is in all very much contracted, inflamed on the outside, and covered with spots; but in the interior, when the cattle eat fodder, the food is black, compact, dry between the livrets; so that one cannot better compare them, on account of their colour and form, than to tablets of chocolate, following the judicious remark of Messieurs DeHuen, Ouwens, Van Velsion and Westerhof, doctors at the Hague. When during the summer the cattle are at grass in the meadows, the substance is sometimes quite soft, but it is not less foul with acrimony.

The external membrane is sometimes adherent to the two sides of this hard matter, having been also detached by sphacelus. In some the livrets themselves were entirely sphacelated, hard and transparent, like gold-beaters skin; in others we noticed the blood in the vessels dried up. But next the part which unites the opening of the paunch with the abomasus, and where the livrets seem to terminate, there was often a sanguineous matter, very acrid and of a loathsome smell, which extended even into the abomasus.

The abomasus (fourth stomach) was generally empty, that is to say, without food, but distended with wind, and sometimes furnished with a sanguineous and gangrenous matter; at other times with a yellow and fluid very fetid matter, without any tinge of blood. The "epithelium" or internal membrane is easily detached, as in the other stomachs, and from the same cause.

There was often, but not always, in the cavity of the small intestines, principally in the ileum an extravasated fetid blood. In the large intestines I have also sometimes found extravasated and coagulated blood; and at other times the dejections yellow or of another colour, of which it would be difficult to give an idea.

†(From text page 38, lecture 2.) I ought to notice to you here a singular phenomenon; when one opens the third stomach of a beast dead from the distemper, the "epithelium" or internal membrane is entirely detached from it, and attacked to the food, so that we can pull it off in scraps; whilst it is impossible to separate this "epithelium" from the other membranes in a healthy and newly killed animal; from whence we may conclude that this separation of the first membrane is one of the symptoms of the distemper, when we find it so detached from the other membranes after an animal has been killed, &c., &c.

The rectum was with many much inflamed near the anus, and furnished with a sanguineous matter around the hardened excrement, particularly at the wrinkled or corrugated part. This is the reason why among many cattle the blood goes out by the anus immediately after death. This blood often caused great mortification in the folds of the rectum. Sometimes the excrement was packed together dry, like figs, whilst the rectum was, as it were, not inflamed.

In the sucking calves which died of the distemper, the "omasum" (many plies) was not stiffened by the hardened matter; however, the interior membrane was detached much the same as in the cows. The liver of these calves had no flakes; this was impossible, because they had not yet been at pasture. All the rest was found more or less in the same state, and the gall bladder was always very large. The kidneys were generally of a pale colour, although they otherwise appeared to be very healthy. But the bladder was in almost all full of urine; however, I have found it as it were empty in a calf. In the cows with calf the uterus was inflamed, speckled with purple and gangrenous spots, like the paunch. The fetus, however, presented no apparent sign of disease. The udder was extremely inflamed and contained a thick milk.

Such was the condition of the stomach. I pass now to the viscera of the chest, in order to afford you a new spectacle of the frightful ravages of this disease. The lungs, which appear at the moment when one opens the chest, and which are ordinarily livid, a little reddish, are in the greater number of these cattle inflamed in one place or another, speckled with purple spots, and the gangrene affects sometimes one lobe more than the other. I have seen some of which the lobes were entirely sphacelated; so that when incisions were made in them, we perceived only venous blood, without being able to distinguish the cells. In many, air was present in the cellular membrane between the cells; it is this which forms emphysema.

The trachea is interiorly empty in some cattle; its membrane is covered with red, purple and gangrenous spots; or else it is entirely gangrened. In others it appears to be covered with a thin ichorous film; but in general it is entirely full of a white froth. This froth is not found in the trachea only, but throughout the lungs as far as one can follow the branches of the bronchia. If we take this into consideration, we will no longer be surprised at the plaintive lowing of the suffering animal. The difficulty of respiration is its cause; and from thence comes the inflammation and gangrene of the lungs. The throat is inflamed in all; but chiefly in those which have the trachea full of froth. I mean by this not only the larynx, but also the pharynx, that is to say, the throat or the duct towards the œsophagus and the larynx. The nostrils, the cavity of the nose and the tongue, were almost always healthy, in other words without inflammation and without gangrene, except at the root of the tongue, where it joins the pharynx.

I have never found anything unusual with the tongue; but certainly at its root, and laterally about the base, a little ichorous tenacious matter, which some have without doubt taken for aphthæ. I have found in many the muscles of the neck and the fat of the dew-lap much inflamed, purple and almost gangrened. The eyes of some were very

much inflamed. The heart offered nothing remarkable; one of the ventricles contained sometimes clotted blood, sometimes fluid blood, and at other times it was empty.

I have opened the head of only one animal; but this operation is difficult, and the parts too foul; so that this requires a more exact examination. The brain of the animal upon which I made these observations was very sound. But indeed, I did not expect anything particular with regard to this, because the cattle appear to preserve their knowledge up to the last moment, in other words, that they give signs of pleasure to those who take care of them, and that they make known their uneasiness by plaintive lowing, more frequent when we caress them in this deplorable state. Many observers have found that the brain was much inflamed.\*

In only one have I found the legs violently affected by the disease; but nevertheless all the rest, and the intestines in particular, were inflamed and sphacelated.

All the principal writers who have spoken of the distempers of 1710, 1730, 1741, 1745, &c., up to the present time, agree upon this point, as we may see in Ramazzini, who speaks also of the emphysema of the lungs, and of the brain, of the exanthema and of the aphthæ upon the tongue, of the thickening of the blood rather than its dissolution; so that the blood scarcely ran from some animals which he had opened.

Bates says that in four cows out of sixteen which he opened, he found the liver black and contracted, and the mesenteric glands much swollen. I cannot deny having seen the glands, particularly those which are near the abomasus, (fourth stomach) and of the rectum, very large and as it were swollen; but I am aware of having observed the same thing in healthy animals given over to the butcher; they are less manifest in fat oxen.

Michelotti left after his death observations which quite agree with mine; he mentions in them emphysema of the lungs. He asserts also to have seen serous and corrupt brains.

The Marquis of Courtivron, Ernest Stief, Fischer, Ottomarius, Gœlicke, who, according to me, is very exact, and all the foreign doctors whose works I have consulted, are in accord upon the principal characteristic symptoms of this disease.

The doctors of the Hague, who have not bestowed less care and accuracy in their investigations, have found these symptoms nearly such as I have pointed out. They have made fine experiments with the tallow, and found that it threw out in burning a disagreeable smell; they have even thought that candles which might be made of it would spread the contagion and cause great ravages. They speak also of pestilential boils (Anthrax? F. Charbons) in the liver. The anatomical observations which they have made upon about thirty animals deserve your attention; and those of Engelmann are neither less curious nor less exact.

I must only warn you of two things: firstly, of not concluding too easily that there is emphysema in the lungs or in other parts; for it is easy to fall into error with regard to this, if we do not open the animals immediately after their death; it is besides difficult to conceive how quickly corruption takes possession of these animals. We must not, es-

\*Der Koenigl. Grosbritt. Churfurst. Braunschweig, Landwirtschaftl. Gesellschaft. Nachr. IV., Samml.—Zelle, 1776, page 372.