

lime is formed ; these are all deadly parasiticides. However, in the absence of quicklime, slaked lime will do, only it should be as fresh as possible. Slake the lime, pass it and the sulphur both through a fine sieve and at once mix them with a little water, to the consistency of cream. Boil about 50 gallons of water and pour the mixture slowly in, keeping the water on the boil the whole time. This aids the chemical combination very much.

{To be continued.}

## Disease " Nenta " in Goats

By Veterinary Surgeon Soga.

I commenced the investigation of this disease on the 31st of July last, when, accompanied by Mr. P. Weyer, I visited several farms on which there were cases of Nenta. The disease was not so severe as it will be later in the season.

I visited Yogelstruis Kraal, Mr. P. Weyer, also Goeblaars Kraal (Mr. Schumann). At these farms I had an opportunity of seeing goats in all stages of the disease—from the first day's affection to the third week. On the former farm I saw twenty-eight affected out of a herd of one hundred. It was on this pasturage that I selected the herbs for experimental purposes.

I also paid a visit to the farm Braak Poort (Mr. Huter); here again, there were Nenta goats. Mr. Huter kindly gave me a diseased goat, which we conveyed to Darlington and on the following morning I made a post-mortem examination. To insure a thorough examination I killed the animal by incising left and right carotid arteries. The result of this and other post-mortem examinations are summed up in this report. I had opportunities offered whilst at Darlington, of re-visiting the above-mentioned farms, and repeatedly taking note of the progress of sick stock.

Diverse are the opinions given as to the cause of Nenta ; most farmers hold to the opinion that the disease was caused by an herb, but here again opinions differed as to the particular herb.

All thanks are due to Mr. P. Weyer for having signalled the plant; this gentleman had made several experiments with various herbs stated by farmers to cause Nenta, and had satisfactorily proved the plant.

It is needless to say that other herbs may still be brought forward as a cause of the disease. I have interrogated Kafir and Hottentot herds, as to what herb they consider is the cause of Nenta, but with no signal success.

There are undoubtedly many herbal poisons, but there are very few which produce the ante and post-mortem conditions as induced by the Nenta plant.

Accompanied by Mr. P. Weyer, I proceeded to the veldt where I saw the plant on subsequent occasions, whilst gathering the herb for experimental purposes, opportunities were offered me for noting its habits. Certain portions of the veldt are suited for its propagation; on some parts of Darlington Estate it cannot be found at all, on these parts there is no fear of goats contracting Nenta, but in camps where the herb is to be found, stock take the disease indiscriminate of the quality of the goat,—old boer goats and well-bred Angoras.

For experimental purposes Mr. P. Weyer generously gave me eight goats on which to try the action of these suspected herbs.

The first herb I experimented with was the Nenta bush or plant; for convenience, I cut the leaves into small pieces and bruised them. Each goat, irrespective of size, received two ounces daily. They had been selected from a flock grazing on the estate known to be free from the disease. These goats, prior to receiving a dose of the herb, were submitted to a careful examination by thermometer the previous day.

I shall here give a list of the goats (as transcribed from my notes), in the order in which I dosed them, considering it necessary so to do.

No. I. *Black Faced Kapater*.—Temp. 101  $\frac{3}{5}$  Fah. ; dosed, 2oz. of leaves, on the 4th, 5th, and 6th August (7th not dosed); 8th, put out with flock of ewes in the morning—returned in the evening sick, showing characteristic symptoms of Nenta (unsteady gait, shivering, disinclination to move, &c.); turned out again on the 9th inst. with flock, still sick ; dosed with 4oz. of raw linseed oil; died on the 12th inst. Oil produced a most severe form of convulsions immediately swallowed.

No. II. *Mmorchid* (Klop Heeks). —Temp. 102 Fah.; dosed firstly on the 1st inst., dose 2oz. ; repeated on the 2nd inst. (3rd not dosed), 4th, 5th, and 6th inst., dose on each occasion 2oz. ; 7th, not dosed ; 8th, morning, turned out with flock, returned in evening, no change ; 9th, no dose ; 10th, turned out with flock, returned evening with symptoms of Nenta. Still alive.

No. III. *Rooi Skimmel* (little) Red Rhone.—Temp. 99 Fah ; dosed on the 4th, 5th, and 6th. inst. dose 2 oz. daily ; turned out with flock on the morning of the 8th inst., returned very sick, showed signs of Nenta, died on the 10th inst. after a dose of raw linseed oil.

No. IV. *Large Rooi Skimmel Kapater*. — Temp. 103  $\frac{3}{5}$  on day of dose, average normal temperature for one day, 101 Fah. ; dosed on 4th, 5th, and 6th inst.; 7th, dosed with a mixture of 1 oz. leaves and 1 oz. herb stalks grated; 8th turned out with flock, returned same evening sick, characteristic symptoms of Nenta ; died on 10th inst.

No. V. *Little White Goat*.—Temp. 103  $\frac{3}{5}$  Fah.; dosed 4th, 5th, and 6th inst. dose, 2 oz. of herb ; 7th inst., dosed with 8 oz. of grated herb and leaves, returned same evening sick after having been turned out with flock of ewes; on 8th inst., Temp. 104  $\frac{2}{5}$  Fah.; died evening of the 8th.

No. VI. *Little White Goat, No. 2*.—Temp. 102 Fah.; dosed 4th, 5th, and 6th inst., 2 oz. doses; 7th inst. dosed with 8 oz. of herb, stalks, and leaves, returned very sick with flock of ewes. I administered a dose am. chlor., 40 grains, nux vom. 20 grains, repeated same on the 9th inst., morning, died afternoon of 9th. Both No. 5 and this goat had what is called *Opblaas Nenta* distention of the abdomen.

No. VII. *Black-faced Goat* (Kapater).—Temp., 103  $\frac{2}{5}$ ; dosed 4th, 5th, and 6th instant. ; up to 8th not dosed, turned out with herd of ewes to feed; dosed with 3 oz. of raw linseed oil; on the 10th inst. showed signs of Nenta on the 11th, up to present date, 21st symptoms have subsided, still alive.

No. VIII. *Parrot-mouthed Goat*.—Temp. 102 Fah. ; dosed on the 1st instant; repeated dose on the 3rd instant, also 4th, 5th, and 6th inst.; 7th inst., very sick ; 8th ditto, died on the 10th instant.

On the goats which died on the 10th instant, viz., No. 4, No. 3 and No. 8, the post-mortem appearances were synonymous with those of a goat on which I had made a post-mortem upon, received from Mr. Huter, and also goats which died in the last stages of the disease, received from Mr. Schumann.

It is not necessary to enter into a lengthened account of the post-mortem appearances of each experimental goat. I have entered the same into the general post-mortem appearances in this report on the disease.

Having satisfied myself, and by demonstration satisfactorily proved that this is the herb which causes Nenta in goats, having induced in healthy goats all the symptoms common to the disease, I cannot do better than give a description of this plant; prior to doing so I may state as a further proof that Nenta is due to this particular herb. The disease makes its appearance in this district in May, June, July, and August, gradually becoming worse as the season advances the severity of the disease corresponds to the time when the plant is in flower, which is in November or may be December (controlled however by rains), at this time the plant is most potent. " The time to gather medicinal plants is from the time the plant is going to flower, to the time that the first seeds are ripe,"

After seeding, the plant is denuded of leaves, and remains so till the following season, *i.e.*, from January to May, likewise there is an abatement during these months of the disease in goats. However it can be easily understood that where the herb is plentiful goats may during these quiescent months digest portions of the stock, which will account for the odd cases during these months.

Nonorchids resist the disease to a great extent, either by natural ingestion or by artificial.

The following description of the plant is furnished by Professor MacOwan, F.L.S. :—

The plant sent to me by Mr. Soga for identification is *cotyledon ventricosa*, *Burm.*, figured in a rough way in Burman's *Decades Planlarum Africanarum*, Amstel, 4to., 1738, tab. 21, fig. 1. A Very closely allied species, *C. uibereulosa*, *Lam.*, not uncommon on the rocky talus of Muizenberg is figured in tab. 20. I have had the former in cultivation for some years, having been sent here from Graaff-Reinet with an intimation that it had a suspicious reputation.

My esteemed friend and co-worker, Mr. Soga, is aware that it is a great surprise to me to find a crassulaceous plant suspected of such active properties as would be involved in its producing the cerebis-spinal paralysis and other symptoms of Nenta. Crassulaceae are generally accredited with purely mucilaginous properties. That the investigator is aware of this *a priori* forecast from a botanical point of view, is to me a confirmation of his views regarding the plant, such forecast obviously leading to caution and repeated verification of first results. The only corroborative fact known to me, indicating the possible possession of active properties in plants of a closely allied order, occurs in *Mesembrianthemum tortuosum*, *L.*, one of the Hottentot *Kaauw-Goed* plants. This, when properly prepared by fermentation in a skin bag, kept warm under a native shepherd's arm-pit, produces a sort of intoxication on being chewed. This fact has quite recently been observed by my accurate correspondent, Mr. Edward Alston. See Pappe, *Fl. Cap. Med.*, Prodiomus, p. 17.

Mr. Soga states that other plants are discredited as producers of Nenta. I may refer to my identification, in a doubtful way, of one of these as *Lessertia annularis*, *Bch.*, a low-growing leguminous plant of the Karoo gebroken veldt, whose properties recall the accounts given of the Australian Poison-Pea, *Gastrolovium bilobum*, *R.B.*, which renders whole districts of otherwise valuable pasture useless. There is much confusion about Nenta plants. I have had an excellent fodder plant *Diplopappus folifolius*, *D.C.*, the Draai bosje, gravely shown as the Nenta.

Compare my evidence of stock-food plants reprinted in the *South African Agriculturists' Almanac* for 1887, pp. 111-112.

P. MACOWAN, F.L.S.

*Symptoms of Nenta as evinced by Natural and Experimental ingestions of the plant.*—These are many and various, and may be divided into ordinary and extraordinary.

In the early part of the season when Nenta is not prevalent, only two or three in a flock daily taking the disease. A few goats that have eaten the herb during the day or the previous few days, when they are returning to the kraal make every endeavour to be first, no sooner are they in the kraal than they lie down. Others that are more severely affected travel along with great difficulty, staggering gait, tucking in of hind legs, severe shivering, dangling of the head, a prominent arching of the back in many cases, the opposite in some cases, hurried breathing, a constant endeavour on the animal's part to keep the head steady, when lying down the neck is twisted, the head resting on the flanks, should the animal be roused he presents a miserable cramped appearance; twisting of the neck as a symptom is often seen in the morning, the animal having slept with the head on the flank, which conjoined with the tendency of the neck twisting by action of the poison, aggravates.

In very severe cases called *Opblaas Nenta* "an aggravated form of the disease, due to an overdose of the herb," the extremities become cold, swelling of the abdomen, constant grinding of the teeth, rumination ceases, regurgitation of the food takes place (*purely involuntary*), the latter dribbling out of the mouth and nostrils, frequent micturition, there is often present inability to open the mouth to its ordinary extent, difficult swallowing concomitant with the latter symptoms. We have in the last stages great salivation, spasmodic heaving of the abdominal muscles, spasms of the diaphragm, on looking into the mouth the tongue and palate have a bluish-tint.

*Post-mortem appearances*, either from a case of induced Nenta, or by a natural inhibition of the plant.

*First Stomach Rumen.*—Unhealthy, having the inter-papillary spaces packed with dry food, giving the stomach the appearance of having no papillae.

*Second Stomach, Reticulum*, containing a large quantity of food.

*Third Stomach, Omasum*, unhealthy, contents usually dry; when an attempt is made to extract food, the mucous membrane spreads. No inflammatory appearance.

*Fourth Stomach, Abomasum*, containing liquified food, in some cases slight inflammation.

*Duodenum and Intestines* contain very large quantities of food. Intestines in parts dilated.

*Portal Vein and intestinal veins* full of blood which can be extracted with ease, giving a good cast of the smaller veins.

*Liver* very dark in colour, diseased, very friable.

*Spleen*, one section very dark, not above normal.

*Kidneys* much affected, medulla dark bluish appearance, corlet, dark brown.

*Lungs* have dark patches upon them, pulmonary artery distended with blood.

*Heart Arteries* charged with blood, the nature of this coagulated blood is such that in taking hold of the exposed end and gently pulling, a splendid cast of the vessel and secondaries is had.

*Brain.*—Cerebrum and meninges normal. (Meninges of Cerebellum in some cases slightly congested). The posterior aspect of the *tentorium Cerebelli* "membrane, dividing Cerebrum from Cerebellum," was very much congested.

*Medulla Oblongata* with coverings. Medulla normals, coverings slightly congested.

The spinal cord with coverings healthy, all but in one case a small portion of the anterior fourth of the lumbar portion of cord.

There was an extensive congestion extending the whole length of the cord between the outer coverings of the spinal cord and the bones. (*Dura mater*).

*Treatment*, preventative and general.—Knowing that the disease Nenta is due to a specified cause, our duty is to remove that cause where practicable.

Eradication could be carried out on some farms, there being no more difficulty experienced in destroying this herb than in burweed.

Many farmers have stated to me that it is too difficult a matter to eradicate the herb. One can only say to this, that by permitting the herb to remain there will always be war waged against its ravages in stock, and certainly, these can be minimised by eradication where *practicable*. The average loss on six farms annually in this part of the district is about eighty head of goats, half this number of goats paid for eradication would materially help. Say, the farmer gave a goat for every bag of the herb, or perhaps two bags. For every pound of the herb destroyed, I may safely say five goats are saved not only from death but from sickness. It will therefore behove every farmer on whose pasturage the herb grows to make every endeavour to have the plant eradicated, and thus minimise his annual loss.

*General Treatment.*—To be successful, the animals must be taken when first seen or suspected, and placed in small camps where they can have plenty of shelter; walking aggravates the symptoms; these animals must not be excited in any way other than absolutely necessary. Administer at once a dose of physic—

Epsom Salts, 4 ounces,

Chloride of Ammonia, 40 grains,

in a cupful of cold water. Should there be no movement of the bowels in 48 hours, give a second dose—

Epsom Salts, 2 ounces,

in a cupful of water.

Bleed the animal freely from the jugular vein, which can be done by clipping the hair off the neck low down, press open the vein with the left hand, so that it may dilate, open it with a sharp lancet or pen-knife, draw away from a quarter to half a teacupful of blood. Should the operator fear doing this, he may bleed at the tail.

Whilst experimenting with goats I found that raw linseed oil aggravated the cases, making the animal infinitely worse. Epsom salts is the best locative, conjoined with Chloride of Ammonia. This dose gets rid of compaction of the third stomach.

After having purged the animal with the above dose, give twice a day,

Nux vomica pulv., 20 grains,  
Annon. Bromide, 20 grains,

in half a cup of cold water. Nux vomica does not mix well with water, but if well stirred it mixes tolerably.

On a subsequent occasion I tried the following with beneficial result:—

Chloral Hydrate ½ oz.  
Creosote 10 drops  
Boer Brandy 1 oz.

This dose I gave four times a day. I also tried subcutaneous injections of strychnine 1/60 of a grain dose four times a day, but I find the first dose best.

Should the animal not care to feed, bran 4 ounces.

Meal 4 ounces must be made into a wash and given to the animal, by aid of a spoon daily. This inability to eat is due to paralysis of the muscles of mastication. This symptom does not last very long.

In dosing goats great care must be taken, the animal should be in a lying position, the operator with the goat between his legs, with his left hand he catches the goat by the mouth, opens this by catching hold of the upper jaw with his thumb and forefinger, the latter being inside on the palate, with the third and fourth fingers, he presses down the under jaw, the bottle he holds in his right hand, pours in no more than a large tablespoonful at each time, *the tongue must not be touched*, should the animal cough the head must be lowered at once, till the animal ceases to cough.

With care nearly all cases will have recovered from the seventh day to a month from the date of affection.

After recovery some little time should elapse prior to allowing the goats to proceed with the healthy flock to feed, as they are not quite fit for so long a journey.

Until an antidote is found one must be content to treat the disease as symptoms show us. *Tobacco* is recommended by some farmers, and rightly so, because in its action it is antagonistic to some of the symptoms shown by Nenta. *Coffee* is also stated to be a good remedy. These latter I have never tried.

Respecting another medicine which I used in four cases, viz., Hydrate of chloral, I may state that it acted exceedingly well in cases of weakness, also in regulating the urine, preventing this frequent micturition seen in the worst cases.

In spite of medicines, I cannot but say that it is next to useless to fight with effects. Satisfied that we have the cause let that be removed. Eradication of the herb where practicable, failing this, where the farmer will take the trouble, form camps in which to keep the sick animals and dose them. The latter, I am afraid many farmers will not do, as unfortunately they state it is too much trouble. Many farmers I may state are eradicating the herb.

I may state that in the symptoms, post-mortem conditions and general information contained in my report to you, on the disease Nenta in August, I can make no alteration. From observations made on the disease during my stay in Darlington this month corresponded with those during August.

J. FESTIRI SOGA, M.R.C.V.S.

#### Cheese-Making.

In the above-mentioned essay on cheese-making, printed in *Journal* No. 12, Vol. III, page 90, paragraph 6, instead of "3-J- to 4-J ozs. salt required for 100 gallons of milk," read "for the cheese made from every 10 gallons of milk, 3-g to 4J ozs. salt are required." EDITOR,

#### *Aristida verms* Andropogon.

After all that has been said and written about Steek-grass, it is curious that the information sent to the Department is so far incomplete as to be absolutely misleading. I have had seventeen examples of "Steek-grass" sent to me from various parts of the Colony, all vouching for the reality of the type in more or less distinct terms. But there is a proverb about old birds, and many reminiscences of the fact that the presentation of data with some limitation and doubt is worth ten times as much as an easy affidavit, have led me to the conclusion that we have by no means heard the last word about Steek-grass. I have, like the proverbial old bird, tried to sift the chaff, and distinguish between what appeared to me to be two very distinct issues, viz., the Steek-grass that damaged the wool, and the Steek-grass that damaged the wool-producer—the unlucky sheep. I think we have now got hold of the elements of them both.

Sixteen observers have sent me the *Aristida congesta*, R. S. Sch. as Steek-grass. I have no doubt they are every one of them right, besides being courteous and obliging, and worthy of my thankful regards, which I am not slow to tender. But, alas! my colleague and friend, Mr. Hutcheon, the Veterinary Surgeon, concerned professionally more with the inside than the outside of the sheep, showed me a piece of dried skin from the neck of a wretched lamb which had died of the irritation consequent on the penetration of "Steek-grass" (for so the advices ran) into the skin and subjacent tissues. I examined the spicules in the skin. They were so altered as to give no indication of their origin. They were grass-spicules—that was all that the most lynx-eyed botanist could say. In the sample of wool cut off from the neck-fleece were spikelets of *Tragus occidentalis* Nees. *Aristida*, achenes of *Lasiospermum*, and many short stiff hairs, more like the tips of a cat's whiskers than anything else. I reported on what could be made out, but for these vegetable whisker-tips there was no explanation, and they have been on my mind ever since. Could there be an error of observation, and the *Aristida* be not really as black as it was painted?

This day comes a parcel of grass-samples—No. 17, to be quite accurate. A gentleman, who, I am sorry to say, desires to remain *incognito*, sends three grasses, and says, "Would it not be well if writers ca Steek-grass would make known *which kind* of Steek-grass they refer to? I send two samples—No. 1 is the worst Mnd, the seed of which penetrates through the skin of the sheep, and frequently causes death. This grass, I believe, grows in great luxuriance in the up-country districts. No. 2 is the Steek-grass which spread all over the Colony last year. I think it is the same as that called 'Silver-grass' by the Australians, and is, I presume, the one about which so much has been written lately."

Thank goodness, we have found an observer at last who can rise above popular names, and see things for himself. Here is the key to a puzzlement of a year's duration, and I shall no longer keep looking at those cat-whisker hairs, and try to remember where anything like them can possibly come from. No. 1 of this correspondent's sending is the culprit that kills the sheep by worryment. No. 2 is the simpler, inferior vegetable villain that spoils the fleece only. No. 1 is *Andropogon contortus*, Willd.—No. 2 is *Aristida congesta*, R. S. S., many times aforesaid. And the lesson to be drawn from those sixteen samples of one Steek-grass and one sample of the other, is that it is sixteen times more easy to take evidence second-hand than to investigate it for oneself and get it accurate,