

Chase Valley Disease. *Cestrum Laevigatum* Schlecht, its Toxic Effects on Ruminants.

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HISTORY OF DISEASE.

For years stock-owners of Chase Valley, situated on the outskirts of Maritzburg, have complained of losses in cattle from a disease which became known as the Chase Valley Disease. Losses were heaviest during the winter months, June and July in particular, the percentage mortality being affected by the nature of the season. As frequent enquiries had been made to the Department concerning the toxicity of the Inkberry plant (*Cestrum*) by stock-owners at East London, Durban and the South Coast of Natal, and as the plant is also found in the Chase Valley, suspicion naturally pointed to this plant as a possible causal agent of the disease. In the past numerous feeding experiments were conducted with specimens of this plant sent in from the above-named localities, but these yielded no definite results.

Towards the end of May, 1929, a Mr. Campbell, farming on the outskirts of the Laboratory grounds, reported the death of a beast from this disease. On post-mortem the lesions indicated death due to some vegetable poisoning. On comparison with the recorded post-mortems held by our officials on the disease, these lesions were found to be identical. Being interested the writer got in touch with Mr. Bayer of the Natal University College, who in the past had been of great assistance to Mr. Mitchell in his botanical work, and we arranged to survey Mr. Campbell's farm for possible poisonous flora. This was done next day and it was found that both this Inkberry Plant and a *Senecio* species had recently been eaten by cattle. These two plants were also found to be present in a certain paddock in the Allerton Laboratory grounds, a paddock definitely known to be dangerous to cattle during the months of June and July. This seemed to indicate that one of these two plants may be the causal agent of the disease. Material was then collected from the two plants and feeding experiments conducted.

One beast was fed on the *Senecio* plant with negative results. A second beast, No. 504, was fed on the Inkberry Plant which produced poisoning and subsequent death. This beast was well suited for this experiment as it was a young animal that had been exclusively stall fed. It was given a mixture of green berries and leaves, supplemented with hay, and allowed out into a gravelled paddock during the day.

The experiment was started on the 21st May. From the 21st until the 27th May it received 1 lb. of this mixture every alternate day and from the 27th May until the 2nd June (date of death) every day. On the 31st May, the beast was noticed to be off colour, but appeared slightly brighter the next morning. The day after the beast went down, showing marked symptoms of Chase Valley Disease, and died that afternoon. Post-mortem findings compared with those of Mr. Campbell's beast as well as those recorded by the Laboratory officials on this Chase Valley Disease. In this experiment the beast took readily to the plant and in all received 10 lb., death occurring within 13 days of commencement of the experiment.

The result of this test prompted a series of feeding experiments on a further 11 head of cattle, to be conducted to ascertain which parts of the Inkberry Plant were toxic. Green berries and leaves were separately fed and both proved toxic to cattle. Thus in the 12 animals fed on the Inkberry Plant typical cases of Chase Valley Disease were produced.

At the same time tests were conducted on a horse, a goat, 12 sheep, 2 pigs, rabbits, guinea-pigs and fowls. The plant was found to be highly toxic to the sheep and the goat but harmless to the horse, pig, rabbit, guinea-pig and fowl.

DESCRIPTION OF PLANT, *Cestrum Laevigatum*, NAT. HERB. No. 8262,
BY MR. A. O. D. MOGG, DIVISION OF PLANT INDUSTRY.

Habit.—A much-branched glabrous shrub 6–15 m. high, branching from the base; stems 2.5–7.5 cm. in diameter, covered with a thin light brownish-grey bark which is easily bruised when it shows green beneath and emits an unpleasant dolorous odour.

Leaves.—Aggregated chiefly towards the ends of the branches (when growing typically as a forest sub-shrub), simple, alternate, dark green, sub-membranous, from 3 cm. by 1 cm. to nearly 10 cm. by 3.8 cm. (especially on innovation shoots or when grown as a hedge) elliptic-lanceolate, entire, obtuse at the apex, acute at the base, strongly pinnately veined, glabrous, easily bruised when the same pungent odour is emitted; petiole 0.6–1 cm. in length.

Inflorescence.—An axillary sub-spicate cymose cluster; peduncle short, 0.5–2.5 cm. long, often bearing reduced leaves with solitary or 2-nate almost sessile flowers arising in their axils and terminated by a cluster of 2–4 sessile flowers.

Flowers.—Light green with creamy-yellow corolla lobes, somewhat sweet scented.

Calyx.—Five-lobed, campanulate, valvate, glabrous, persistent, very slightly accrescent in the fruit, becoming widely campanulate, green in the flower turning olive-brown in the fruit; tube 2.5 mm. long; lobes at most $\frac{1}{4}$ of that length, obtuse or truncate with scarious margins.

Corolla.—Tubular 1.5 cm. long, straight, narrowed to the base around the ovary, but shortly and suddenly dilated at the throat, 10-nerved, glabrous, lobes five, connivent, 0.5 cm. by 2 mm long, obtuse, with induplicate-valvate margins.

Stamens.—Five, included, all perfect, alternating with the corolla lobes; filaments filiform, attached to the corolla-tube throughout the lower two-thirds of its length, thickened near the base, glabrous, with the free portions 0·5 cm. long; anthers short, ovate; thecae parallel, brown when mature.

Disc.—Inconspicuous.

Ovary.—Two-chambered, shortly stipitate; style simple, filiform; stigma greenish, capitate, dilated, slightly two-lobed, glabrous; ovules 3–6 in each chamber.

Fruit.—A succulent indehiscent ovoid purplish-black berry 1 cm. long by 0·5 cm. in diameter, usually with six seeds.

Seeds.—Greyish-brown, 0·5 cm. long by 2 mm. in diameter, irregularly flattened and angled by mutual pressure; embryo slightly curved; cotyledons oblong, broader than the radicle.

As already stated the Inkberry Plant is a species of *Cestrum*. Botanical opinion for some time could not definitely determine its exact specific name. However, Dr. E. P. Phillips, Principal Botanist, Pretoria, forwarded a series of specimens and photographs of the plant to Kew Gardens, and Mr. N. Y. Sandwith examined them and definitely classified the species as *Cestrum laerigatum*. This classification agreed with the one given by Miss H. Forbes of the Natal Herbarium to whom specimens were also forwarded.

The difficulty of classification may have been due to the fact that this plant is not indigenous to Natal, but originally was a native of Tropical America. It may thus be a case of an unstable genetic form of one species which by adaptation to its local conditions and depending on its stage of growth, assumes slight botanical differences. This is readily seen when one compares the type of growth of the hedge variety with that of the plant growing under natural veld conditions, as seen in the Chase Valley. The Inkberry Plant may be described as a sub-tropical evergreen shrub which under natural conditions may attain a height of 20 feet and grows on the slopes and gulleys around Chase Valley.

When used as a hedge or windbreak, by repeated cuttings it forms a very dense bush, serving well for the purpose for which it is used.

In the young stage the leaves are broad and long, and deep green in colour. This is well seen from the hedge type and on the young shoots given off from the parent tree. As the plant develops and attains its tree-like proportions, the leaves seen on the older branches are smaller, narrower and yellow green in colour. It is on these that the flowers and later the berries develop. The berries are at first a deep green in colour, which later change to deep black as ripening occurs. The plant usually bears its flowers and berries during the months of June and July, depending on the stage of development of each plant and on the nature of each season.

STAGES OF TOXICITY OF THE PLANT.

From experiments conducted the results seem definitely to indicate that it is the young shoots with their broad green leaves as well as the freshly formed green berries that are the most toxic to ruminants. That is the reason why the Inkberry hedges and windbreaks have been found to be such a menace because they, in the main, are composed of such shoots. These shoots are equally toxic whether in the green stage or cut and dried, for in the process of drying it does not lose its toxicity. It is of interest to note here, that when cattle were fed on material collected from a plant, that had already formed ripe black berries, this material could be fed *ad lib* to ruminants without producing any harmful effects.

This led the writer to think that once black berries had appeared on this plant it was an indication that this plant had reached its maturity stage for that year. In this stage the poisonous properties had by metabolic processes become neutralized and rendered inert. This probably explains why previous experiments with this plant yielded no definite results, and that when such experiments were conducted, the material supplied must have been supplied from a plant in the blackberry stage.

QUANTITY OF PLANT NECESSARY TO PRODUCE POISONING.

The object was to prove definitely that this plant was the cause of the Chase Valley Disease, and in all experiments the animals were fed right up to the time that they showed first symptoms. An animal has been killed with 10 lb. of mixed berries and leaves, but there is a strong suspicion that a smaller amount of the toxic material will be sufficient.

SEASON OF THE YEAR.

Chase Valley Disease occurs mainly in the months of June and July, because it is at this time that the grazing is poor, the plant attractive and green and in its toxic stage. Cattle take quite readily to this plant despite its rather unpleasant odour, but sheep and goats will not touch it, even after being starved for some time.

ANIMALS AFFECTED.

Under field conditions the great danger is to cattle. Under artificial conditions by drenching and forced feeding small quantities of this plant prove deadly to sheep and goats. The horse, pig, rabbit, guinea-pig, and fowl apparently suffer no ill effects.

SYMPTOMS OF THE DISEASE.

The period of time from commencement of the feeding test until onset of the first symptoms varies in length, depending on the quantity as well as the toxicity of the material fed.

From the onset of first symptoms until the time of death, it is usually a matter of a few hours in most cases.

Cattle.—In the peracute form the animal is usually found dead. In the acute form symptoms appear suddenly and are severe from the onset. They are: Increased salivation with dribbling from the mouth, running of the eyes, staring coat, arched back, extended head, cessation of rumination, loss of appetite, rapid emaciation and weakness, staggering gait, in co-ordination of movements. The eyeballs become sunken, the eyes having a staring, glassy wild look. The mucosa becomes slightly injected, moist and yellow-tinged. The animal becomes constipated and the anal mucosa inflamed. There is frequent micturition, the urine being light coloured and slightly yellow. The pulse becomes weak, the respirations shallow and increased.

In this stage when the animal is running loose, the farmer is warned to be careful when approaching and handling such an animal, because it is liable to turn vicious.

As the symptoms become progressively worse, the animal lies down and can be made to move only with difficulty. Eventually it is even too weak to do this and when in the recumbent position its head is usually held arched towards the right flank. Acute abdominal pain is shown early and this becomes progressively more severe. The animal continually grinds its teeth and groans and by restless movements tries to kick and horn its abdomen.

Just before death supervenes the animal struggles and kicks as if in terrific pain and death seems to come as a welcome relief.

In the early stages the temperature may show slight fluctuation but there is no well defined febrile reaction. From onset of first symptoms the extremities of the animal are cold and from this onset until death the time is very short, varying from 4–12 hours.

In the chronic form the symptoms are similar but less severe and more prolonged. The animal may live as long as 3–4 days and in some cases it may recover.

Recovery in such cases is of a very slow nature; the animal always remains a bad doer.

Sheep and Goats.—In these animals the symptoms appear suddenly and are very severe. The animal refuses food, discharges from the eyes, shows increased salivation and lachrymation, rapidly becomes weaker and lies down. It breathes rapidly with shallow respirations, the pulse becoming weak and wiry. The eyeballs become sunken and the pupils of the eyes dilated, giving the eyes a glassy fixed look. Urination increases and the animal suffers acute abdominal pain. Just before death occurs the animal struggles violently. From onset of first symptoms until time of death it is a matter of a few hours.

DIAGNOSIS.

This is made from the symptomatology of the disease, the time of the year, and the presence of the plant in its toxic stage, coupled with the post-mortem findings indicative of acute vegetable poisoning.

PATHOLOGICAL FINDINGS.

The extent and intensity of the pathological findings which are shown on post-mortem, depend largely on the amount of toxic material fed, over what period fed, and the duration of the symptoms produced.

They are in the main: Generalized lymphadenitis and cyanosis. The heart shows increased fluid in the pericardial sac (hydropericard.) Presence of epicardial, endocardial and myocardial haemorrhages with degeneration of the myocard. Slight increase of fluid in the thoracic cavity is seen (hydrothorax). There is a large increase of fluid in the abdominal cavity (ascites.) The liver shows subcapsular haemorrhages. Depending on the amount of plant fed, the length of time during which feeding is conducted, duration of symptoms, so the liver changes vary from acute congestion to acute inflammation and fatty degeneration to liver cirrhosis. The mucosa of the gall-bladder is thickened and oedematous and shows the presence of petechiae. The kidneys show acute congestion and degeneration. The urinary bladder is distended with straw coloured fluid. The mucosa is slightly thickened, showing presence of numerous petechiae. Alimentary tract: Abomasum shows presence of acute inflammation, walls thickened and numerous petechiae present. There is acute inflammation of the small intestines, the inflammation varying from catarrhal to catarrho-haemorrhagic. The large intestines show similar lesions. The caecum is usually filled with blood and the walls thickened and inflamed. The rectum contains hard lumps of faecal matter covered with a bloody exudate, the mucosa being markedly thickened and inflamed.

TREATMENT AND PREVENTION.

As for all vegetable poisonings, when the animal has eaten sufficient of the toxic material, treatment is of no avail. In the chronic cases that recover, the practitioner can only alleviate symptoms as they appear. This is directed towards relieving the constipation, treating the inflammation of the bowels and restoring appetite and condition. But as already stated the animals that do recover are always bad doers and from the economical point of view should be destroyed.

Prevention is directed towards keeping cattle away from localities where Inkberry grows during the time when grazing is poor and this plant is in its toxic stage, namely in June and July.

In conclusion the writer would like to emphasise that the experiments were directed towards proving that the Inkberry Plant as found around the Chase Valley is definitely toxic to cattle and is the cause of the so-called Chase Valley Disease.

ACKNOWLEDGEMENTS.

Before concluding my report I wish to thank Mr. W. Green, Officer in Charge of Allerton Laboratory, for the encouragement and assistance given me in this work, as well as the laboratory assistants, Messrs. Hill, Bachman and Mulligen for their help in the photography, collection and feeding of this plant.

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EXPERIMENTAL WORK.

CATTLE.

Experiment No. 1.

Period of experiment: 13 days.

Stall-fed Heifer Calf D.O.B. No. 504. *Age:* 15 months.

Object of experiment: To prove toxicity of plant.

21.5.29	1 lb. mixture of green berries and leaves fed.
23.5.29	Ditto.
25.5.29	Ditto.
27.5.29	Ditto.
28.5.29	Ditto.
29.5.29	Ditto.
30.5.29	Ditto.
31.5.29	Ditto.

Animal noticed to be off colour with slight lachrymation, salivation and increased urination.

Improved slightly in the course of the day.

1.6.29 Ditto.

Animal more or less normal.

2.6.29 Ditto.

Developed acute symptoms of cestrum poisoning.

Died in extremis at 3.30 that afternoon.

P.M. held was typical of Chase Valley Disease. P.M. No. 456.

Remarks.—Animal was stall-fed throughout. Besides receiving its cestrum allowance, it was given hay and water. During the day it was allowed out into a gravelled paddock. It took readily to the plant and took its ration up to day of death. In all it received 10 lb. of the plant. Material was obtained from Mr. Campbell's paddock.

Experiment No. 2.

Period of experiment: 37 days.

Stall-fed Bull Calf D.O.B. No. 535. *Age:* 10 months.

Object of experiment: To prove toxicity of green berries.

4.6.29–26.6.29	17 lb. berries (mainly green) fed. Material obtained from Mr. Campbell's paddock. No symptoms apparent.
26.6.29– 9.7.29	4 lb. berries fed. Material obtained from Mr. Todd's farm.
10.7.29	Animal developed acute symptoms of poisoning and died that night.

Conditions of experiment as for previous.

P.M. held was typical of Chase Valley Disease, P.M. No. 459.

Remarks.—In the early part of the experiment the material was obtained from Mr. Campbell's paddock, but towards the latter part of June it was noticed that the greater part of the material was in the blackberry stage. Suspecting at this stage of the work that the plant loses its toxicity when the blackberries form, as no symptoms of poisoning were yet apparent, the material was then collected from Mr. Todd's farm, as his bushes were still in the greenberry stage and typical cases of Chase Valley Disease had been reported on his farm.

So it was that only when material of plant in the greenberry stage from Mr. Todd's farm was fed that poisoning could be produced.

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Experiment No. 3.

Period of experiment: 17 days.

Heifer D.O.B. No. 513. *Age:* 2 years.

Object of experiment: To prove toxicity of green leaves.

17.7.29 2 lb. leaves from Todd's fed.

19.7.29 ditto.

21.7.29 2 lb. leaves from Lab. paddock fed.

24.7.29 ditto.

26.7.29 ditto.

30.7.29 ditto.

31.7.29 4 lb. ditto.

1.8.29 2 lb. ditto.

2.8.29 In the morning the animal was noticed to be off colour and in the afternoon developed acute symptoms.

Died before sundown.

P.M. typical. P.M. No. 465.

Remarks.—On examination of the bushes on Mr. Todd's farm on the 21st July it was found that the majority were in the blackberry stage. It was then decided to take material from an inkberry hedge growing around a Laboratory paddock, as it was still in the greenberry stage.

Experiment No. 4.

Period of experiment: 25 days.

Black Bull D.O.B. No. 531. *Age:* 2 years.

Object of the experiment: To prove the toxicity of the green shoots.

7.8.29-31.8.29 20 lb. of green shoots from a Laboratory paddock hedge fed.

31.8.29 Animal developed acute symptoms in the afternoon and died that night.

From the appearance of first symptoms until time of death it was a matter of 4 hours.

P.M. typical. P.M. No. 473.

Experiment No. 5.

Period of experiment: 13 days.

Black and White Cow D.O.B. No. 534.

Object of experiment: To prove toxicity of dried leaves.

In June this animal had been fed on inkberry leaves from Mr. M. Campbell's paddock, receiving daily small doses of not more than 1 lb. From the 26th June it received similar doses of material from Mr. Todd's farm and later from the Laboratory paddock without harmful effects.

On the 18th August it was decided to test out the toxicity of a quantity of dried leaves obtained from the hedge of the Laboratory paddock. These leaves had been dried for about a month.

From the 18th until the 31st August 14 lb. of such material were fed. The dried leaves were made into a fairly hard paste with water. Quantities of 1 lb. were fed by spoon daily.

On the 31st the animal developed acute symptoms and died within a few hours.

P.M. typical. P.M. No. 474.

Similar experiments were conducted on seven more animals, feeding young leaves and green berries. Some were fed on small quantities of not more than 1 lb. daily, others on 4-5 lb. and even as much as 10 lb. weekly, at intervals with no apparent effects.

But it was noticed that in all animals when the larger dose of 4-5 lb. was fed at short intervals, it very soon produced poisoning and rapid death.

These larger quantities were made into a paste with a small amount of water and forcibly fed by spoon.

P.M. No.'s and D.O.B. No.'s are as follows:—

Heifer, aged 18 months,	D.O.B. No. 501,	P.M. No. 460.
Cow aged ———	D.O.B. No. 399,	P.M. No. 463.
Bull, aged 3 years,	D.O.B. No. 488,	P.M. No. 464.
Cow, aged 4 years,	D.O.B. No. 450,	P.M. No. 466.
Heifer, aged 4 years,	D.O.B. No. 519,	P.M. No. 467.
Heifer, aged 2 years,	D.O.B. No. 514,	P.M. No. 468.
Ox, aged 5 years,	D.O.B. No. 443,	P.M. No. 472.

TYPICAL POST MORTEM.

<i>Interim</i>	Died during the night.
<i>Rigor Mortis</i>	Present in jaw, hind limbs, and broken forelimbs.
<i>Condition</i>	Poor.
<i>Abdomen</i>	Not distended.
<i>Integument</i>	N.U.
<i>Natural Openings</i>	Mucous membranes, injected and moist, Anal M.M. reddened, presence of solid ingesta. Eyes sunken. pupils dilated.
<i>Blood</i>	Dark red in colour, stains well.
<i>Flesh</i>	N.U.
<i>Subcutaneous Tissue</i>	Small amount of fat, shows numerous red areas and gelatinous infiltration.
<i>Peritoneal Cavity</i>	Omentum shows numerous dark red areas, increased amount of fluid, about 500 c.c. present.
<i>Diaphragm</i>	N.U.
<i>Pleural Cavities</i>	Slight increase of fluid, Over diaphr., Pleural, Costal, Mediast. and Pericard. surfaces presence of numerous scattered red areas.
<i>Salivary Glands</i>	N.U.
<i>Thyroids</i>	Over surface presence of pinpoint dark areas, on section apparently normal.
<i>Thymus</i>	N.U.
<i>Lymph Glands</i>	Throughout carcase enlarged, on section moist with presence of red areas.
<i>Tongue</i>	N.U.
<i>Pharynx</i>	N.U.
<i>Oesophagus</i>	N.U.
<i>Larynx</i>	N.U.
<i>Trachea</i>	N.U.
<i>Lungs</i>	N.U., except for slight injection of bronchial mucosa.
<i>Heart</i>	Pericardium. There is increased amount of fluid in pericardial sac (200 c.c.). Epicardium. Smooth glistening and transparent with presence of numerous dark red areas particularly over the auricles. Endocardium. Smooth glistening and light grey in colour with presence of numerous dark red areas. Myocardium. Light grey in colour, with reduced consistence, and on section slightly moist with presence of small pinpoint red areas.
<i>Liver</i>	Capsule smooth and glistening with presence of irregular dark red areas seen under capsule. Its size is reduced and edges sharp. On section the cut surface is light yellow-brown in colour and lobulation indistinct. Edges are inverted and consistence increased. Gall-bladder is distended, with a greenish yellow thick bile; the mucosa is thickened and shows presence of pinpoint red areas. The walls of the bladder are thickened and oedematous.
<i>Pancreas</i>	N.U.
<i>Spleen</i>	N.U.
<i>Adrenals</i>	Normal in size, on section is moist with presence of scattered red areas.

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<i>Kidneys</i>	Capsule contains slight amount of fat, strips easily leaving a greyish-red surface. On section surface is moist, and reddened zones indistinct, consistency reduced.
<i>Alimentary Tract</i>	Rumen contains large amount of semi-solid ingesta and the mucosa strips easily. Reticulum is filled with the ingesta and the mucosa strips easily. Omasum is distended with solid ingesta, and the mucosa strips easily leaving a pinkish-red surface. Abomasum contains a fair amount of fluid ingesta, the mucosa is swollen and shows diffuse pinkish-red surface with dark red areas. The surface is covered with a thick yellow exudate somewhat blood-stained. Small intestines; throughout its length shows the mucosa to be thickened and diffusely reddened as well as being covered with a yellowish-red exudate. The latter portion on external appearance has a slate-blue colour. Large intestines similar to small intestines. The colon has also a slate-blue colour externally. Caecum is filled with a dark red fluid which is ingesta admixed with blood. The mucosa is markedly thickened and reddened. The rectum contains hard lumps of solid ingesta which is covered with a slimy red exudate. The mucosa is thickened and diffusely reddened.
<i>Uro-genital System</i>	Urinary bladder is distended with a slightly turbid fluid. The mucosa is slightly thickened and reddened, showing presence of numerous small red areas.
<i>Nervous System</i>	Sexual organs, N.U.
<i>Skeleton</i>	N.U.
<i>Pathological Anat. Diag</i> ..	Slight cachexia. Cyanosis. Generalised lymphadenitis. Hydrothorax, hydropericard and ascites. Numerous sub-serous haemorrhages. Sub-Epi-Endo, and Myo-cardial haemorrhages. Degeneration of Myo-card. Ascites, Cirrhosis and degeneration of liver with presence of sub-capsular haemorrhages. Catarrhal inflammation of gall-bladder. Slight hyperaemia and degeneration of kidneys. Petechiae of urinary bladder. Impaction of fore-stomachs with catarrhal abomasitis and catarrho-haemorrhagic enteritis, colitis and proctitis.
<i>Etiological Diagnosis</i>	Vegetable Poisoning. Feeding <i>Cestrum laevigatum</i> (Chase Valley Disease).

SHEEP.

To test out the toxicity of this plant on sheep it was fed to eleven sheep and produced toxic effect resulting in death.

It was found that even after prolonged starvation sheep would not eat of this plant. In all cases it had either to be forcibly fed by spoon or drenched with a stomach tube.

In the first experiment on sheep D.O.B. No. 613 the animal received 1 lb. of minced green berries on the 18th July and a further 21 lb. on the 19th. On the 18th the temperature rose to 103.6 F., and on the 20th to 105. On the 21st it dropped down to normal and continued normal until the 30th. On the 30th the animal received 3 lb. of minced green berries, and in the evening temperature rose to 103.4, the animal showing marked symptoms of disease. It died overnight. Post-mortem held was indicative of acute vegetable poisoning, as well as comparable with the post-mortem lesions seen in cattle dying from cestrum poisoning.

A similar experiment was done on sheep D.O.B. No. 611; only in this experiment the animal was drenched with a stomach tube with a watery extract of 3 lb. of minced green berries and leaves.

Experiment started on the 7th August and animal received the above quantity. On the 8th the temperature rose to 103.6, and animal was noticed to be off colour. On the 13th August it received a further 4 lb. of watery extract of berries and leaves. On the 14th the temperature rose to 105.2, the animal showing acute symptoms. On the 15th it died.

Post-mortem held was typical.

An experiment was then conducted to test out the toxicity of young cestrum leaves on sheep D.O.B. No. 663. On the 6th September it was drenched with a watery extract of 4 lb. of minced green leaves. On the 7th the temperature rose to 105.4. The animal developed acute symptoms and died *in extremis* at midday.

Post-mortem typical.

A similar experiment was conducted on sheep D.O.B. No. 660, which on 6th September received a watery extract of 2 lb. of minced green leaves. On the 7th the temperature rose to 105.6. Animal developed acute symptoms and died that afternoon.

Post-mortem typical.

Similarly for sheep D.O.B. No. 658, which received 2 lb. of green leaves in the morning of the 10th September. Temperature rose to 104.4 that afternoon. Acute symptoms developed and on the following day it died.

Post-mortem typical.

Similarly for sheep D.O.B. No. 662, fed on the 17th September; death occurred within 24 hours, the temperature rising to 105.8 on day of dosing.

Post-mortem typical.

It was then decided to try a smaller quantity of green cestrum leaves. Sheep D.O.B. No. 664 was dosed with a watery extract of one and a half pounds on the 13th September. The temperature rose to 105.4 on the morning of the 14th. The animal died at noon.

Post-mortem typical.

The next object was to ascertain whether the green leaves in the dried state would be toxic to sheep. For this experiment four sheep were used.

D.O.B. No. 661-24397 received extract of 1 lb. dried leaves, producing death in 24 hours.

D.O.B. No. 659-24439 received extract of 2 lb. dried leaves, producing death in 24 hours.

D.O.B. No. 657-24525 received extract of 2 lb. dried leaves, producing death in 48 hours.

D.O.B. No. 666-24607 received extract of 3 lb. dried leaves, producing death in 12 hours.

GOAT.

In order to ascertain whether this plant would be toxic to goats, goat D.O.B. No. 609 was used.

On the 7th August, 1929, it received a watery extract of 4 lb. of minced green berries. On the 13th it received at further 4 lb. On the 22nd it received an extract of 1 lb. of berries and leaves. On the 27th it received a further 5 lb. Shortly afterwards the animal developed acute symptoms of poisoning and died on the 28th.

Post-mortem typical.

FURTHER EXPERIMENTS.

This plant was fed to the horse, pig, rabbit, fowl and guinea-pig with apparently negative results.



Fig. 1. Branch, adult tree, showing berries, flowers, and leaves.



Fig. 2. Berry, leaves, and flowers; cross-section of flowers and berry.