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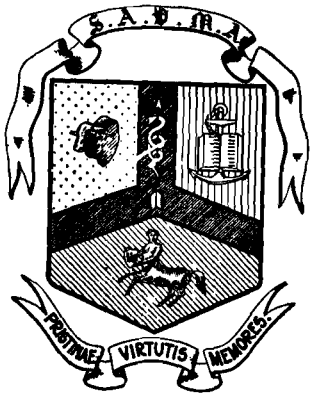

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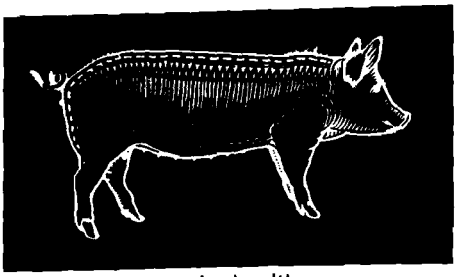

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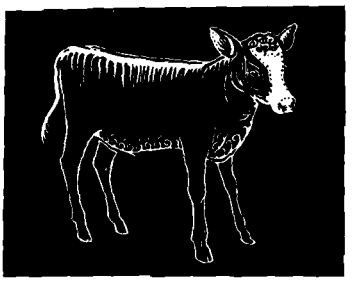

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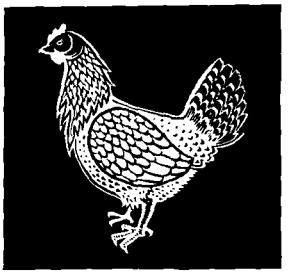

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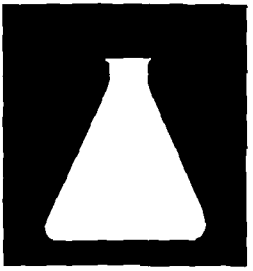

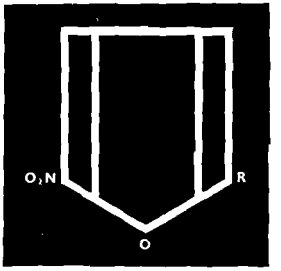

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ACUTE SWINE ERYSIPELAS IN SUCKLING PIGS

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(Received for Publication December, 1961)

INTRODUCTION

Swine erysipelas was first confirmed bacteriologically in South Africa in 1944[1] when the causative organism was isolated from mitral valve lesions found in a Large White gilt. Sporadic outbreaks of the urticarial or "diamond skin" form of the disease are seen from time to time, particularly at abattoirs[2]. Chronic erysipelas has been encountered by the writer at swine autopsies on numerous occasions, generally as valvular endocarditis, and once as polyarthritis, in a sow. The purpose of this note is briefly to record the occurrence of the acute form of the disease as a cause of mortality in suckling piglets.

History

A dead Landrace piglet weighing 13 pounds was received from the Carolina district of the Transvaal for post mortem examination. In a letter which arrived several days later, the owner stated that the animal was 3½ weeks old and emanated from a thriving litter of 9 piglets in which 4 animals had sickened suddenly at the same time. Within two days red-purple patches developed in the skin of their bodies, ears and snouts. Three of the piglets also showed marked swelling of the snout and respiratory distress. The animal received, had died approximately 24 hours prior to its receipt, after an illness lasting 3 days. The remaining three affected piglets subsequently also died, no treatment having been attempted by the owner.

METHODS

Post Mortem Appearance

These presented slight post mortem changes; cutaneous erythema of the snout, ears, ventral abdomen and medial aspect of the thighs; cyanosis; congestion and oedema of most lymph nodes ,particularly the mesenteric and periportal glands; slight ascites, hydrothorax and hydropericardium; pulmonary oedema; slight tumour splenis; severe gastritis with a dark-red focus of necrosis of the mucosa, about 2 cm in diameter, adjacent to the pylorus; patches of catarrhal enteritis in the small intestine and caecum; pin-point haemorrhages in the mucosa of the ileum, the liver parenchyma and renal cortex.

Bacteriological Examination

Material from the stomach, ileum, caecum, liver, spleen, kidneys and mesenteric lymph glands was cultured on 5 per cent sheep blood agar. An organism exhibiting the following properties was isolated from the stomach and kidneys:

Sparse, minute, translucent, smooth colonies on sheep blood agar appeared after 48 hours incubation at 37°C; gram stained smears from these colonies showed numerous, slender, non-sporing gram-positive rods, about 1.0–1.5 u in length by 0.2 u in width; non-motile; produces H_2S; indol and catalase negative, nitrates not reduced; Voges-Proskauer and methyl red tests negative; acid but not gas produced from glucose, lactose and maltose; but no action after prolonged incubation at 37°C on the eight other carbohydrates tested. Galactose and fructose were not tested.

Biological Examination

Ten white mice, each injected intraperitoneally with 0.1 ml. of a 24-hour broth culture, all died within 96 hours. Most developed conjunctivitis. The organism was recovered in pure culture from their spleens, and gram-stained spleen smears showed numerous, slender, gram-positive bacilli lying free or in phagocytes. Unfortunately, no pigeons were available for further biological testing.

Discussion

The cultural and biological characteristics of the organism isolated are consistent with those described for *Erysipelothrix rhusiopathiae*. This strain differs from that described by Haig and Adelaar[1] in being indol negative, producing acid from maltose and showing slightly reduced pathogenicity for mice. Strain variations in mouse pathogenicity and ability to ferment carbohydrates have frequently been reported[3].

Although many modern text books state that erysipelas usually affects pigs from three months of age onwards, reports are not lacking in British[4, 5] and particulalry in American [6, 7, 8] -literature of outbreaks of the disease in nursing piglets, contracted from the sow, where attacks may occur a few days before or for some weeks after farrowing. These attacks are generally of a sub-acute nature, the sow being observed to be "off her feed" for a few days, before gradually returning to normal . Acute septicaemic erysipelas has, however, also been noted in the nursing sow. Transmission of *E. rhusiopathiae* has been reported as occurring during normal suckling and also by means of biting flies[9]. In this outbreak no prior malaise in the sow was mentioned by the owner, but this does not exclude the possibility of a mild attack having passed unnoticed.

ACKNOWLEDGEMENT

I am indebted to Mr. P. E. Alderton for technical assistance and to the Director of Veterinary Services for permission to publish this note.

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SPECIAL ADDITIVES IN THE HANDREARING OF CALVES

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(Received for Publication 15 November 1961)

SUMMARY

1. In a preliminary experiment, comprising four groups of four animals per group, a study was made of the anti-scouring effects of dehydrated whole egg, dehydrated colostrum and synthetic vitamin A (Duravit) in young calves.

2. With respect to gain in weight and efficiency of feed conversion, the results do not seem to show any material differences between the various groups. However, the incidence of mild non-specific scours varied considerably, but in view of the limited number of animals per group, the results do not warrant any definite conclusions.

INTRODUCTION

Since the initiation of artificial insemination, a better type of calf has become available. This is especially true for the various breeds of dairy calves and, therefore, their indiscriminate slaughter should largely be discouraged, as the females could be raised with the view to herd replacements, and the males for supplementing the beef industry.

Unfortunately, the handrearing of calves, being in conflict with the natural nursing process in some respects, is often associated with scours due to digestive disturbances of a non-specific nature (Henning[5]). Consequently, several investigators have already studied the anti-scouring effect of various products other than the ordinary antibiotics and chemotherapeutics.

Lundquist and Phillips[8] of the University of Wisconsin pointed out the great importance of vitamins A, C and niacin in the prevention and control of early calfhood diseases. They showed that calves up to two to three weeks of age cannot synthesize vitamin C, and that adequate amounts of vitamin A and nicotinic acid serve as the essential factors in the control of calf scours. In a later publication, the Wisconsin workers (Hansen et al.[4]) concluded that the vitamin requirements of newborn calves were 5 to 10 times that of 3 to 6 months old heifers, being in the order of 10,000 to 25,000 I.U. per day when the source was concentrated fish oil, since this amount was needed to prevent scouring and ensure survival.

Recently colostrum, sour milk and raw eggs were also studied with respect to their anti-scouring properties. Kazahecjan[6] found that colostrum, dried at 35° to 37°C and dosed in amounts of 13 to 20 g. to calves, 3 to 4 g. to lambs and 2 to 3 g. to baby pigs, resulted in a termination of gastro-intestinal disorders in these animals within two days. Various workers (Borodin and Pashover[2]; Verbeek[13]) showed that skimmed milk in a fermented or sour form prevented digestive disturbances in calves, whereas the feeding of whole raw eggs is recommended for counteracting protein loss in calf scours (V.D. Walt[12]).

If the above-mentioned products are actually endowed with anti-scouring properties, they should be of real practical value in the hand-rearing of calves. However, as the nutritional and therapeutical properties of fresh foodstuffs are related to their dry-matter content, it seems expedient to assess their properties on a dry-matter basis. Thus, in this study, which had in view a comparison of the anti-scouring effects of vitamin A, colostrum and eggs, these products were dosed in a dry powdered form.

Experimental

Sixteen, 3 to 5-day old mother-suckled crossbred calves (mainly Friesian x Afrikander) were used in this experiment. According to random arrangement, the calves were divided into four groups with one heifer and three bull calves in each group. The calves were individually penned on slatted floors in the calf house and managed as described in a previous article (Kellerman and Prinsloo[7]).

The groups are designated as follows:

1. Basal ration (control).
2. Basal ration + 10 g. dried colostrum* daily† for 90 days.
3. Basal ration + 10 g. dried whole egg* daily† for 90 days.
4. Basal ration + 100,000 I.U. stabilized vitamin A (Duravit) weekly for 13 weeks (90 days).

Each calf received a gallon of whole milk per day for 30 days when it was abruptly weaned. From the second week good quality lucerne hay and a starter meal were fed *ad libitum*. Individual food intakes were recorded and the animals weighed every two weeks. Weight gains, efficiency of food utilization and incidence of scours served as criteria.

Results

The composition of the calf starter and the relevant chemical analyses of the various feedstuffs are given in Tables I and II, whereas the data pertaining to growth, efficiency of feed conversion and incidence of scours are given in Tables III and IV.

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* The colostrum and whole egg were dehydrated at a temperature below 55°C and at a pressure of 27.5 inches of mercury in a Buflovac milk dehydration pilot plant. In the case of colostrum, it was found necessary to complete the dehydration in an Edwards freeze-drying machine. The minimum moisture content obtained was 2.2% and 3.3% for the whole egg and colostrum respectively.

† Excluding Sundays.

TABLE I

COMPOSITION OF CALF STARTER

	Per cent
Crushed yellow maize	58.5
Wheaten bran	20.0
Skimmed milk powder	20.0
Bonemeal	1.0
Salt	0.5
	100.0

TABLE II

RELEVANT COMPOSITION OF THE VARIOUS FEEDS AND ADDITIVES

	Calf Starter Meal	Dehydrated Colostrum	Dehydrated Whole Egg	Whole Milk	Lucerne Hay
Protein (N. × 6.25)%*	13.8	42.0	50.1		18.5††
Calcium, %**	0.62				
Phosphorus, %**	0.58				
Total Vitamin A Activity†	3,995 I.U./lb.	700 I.U./10 g.	310 I.U./10 g.	5,273†† I.U./10 g.	127,777 I.U./lb.**

TABLE III

EFFECT OF DEHYDRATED COLOSTRUM, DEHYDRATED WHOLE EGG AND STABILIZED VITAMIN A ON THE GROWTH OF YOUNG DAIRY CALVES.

FEEDING PERIOD = 90 DAYS

Group No.	Average Starting Weight	Average Gain	Average Daily Gain
	lb.	lb.	lb.
1. Control	81	100.5	1.11
2. Colostrum	80	107.3	1.19
3. Whole Egg	76	91.0	1.01
4. Vitamin A	77	103.8	1.15

* The protein contents were determined by the Kjeldahl method.

** The calcium and phosphorus contents were determined according to the method of Malan and van der Lingen[9].

† The total vitamin A activity in the calf starter and lucerne hay was determined according to the Methods of Analysis, A.O.A.C.[10]; in the colostrum powder and whole milk according to the method of Wilkinson and Conochie[14]; and in the whole egg powder according to the method of Thompson et al.[11]

†† Average of six samples.

TABLE IV

EFFECT OF DEHYDRATED COLOSTRUM, DEHYDRATED WHOLE EGG AND STABILIZED VITAMIN A ON FEED CONSUMPTION, FEED CONVERSION AND INCIDENCE OF SCOURS IN YOUNG DAIRY CALVES

Group No.	Average feed consumption in 90 days				Feed/lb. gain lb.	Incidence of mild, non-specific Scours. Days/Calf
	Milk (Dry) lb.	Starter Meal lb.	Lucerne Hay lb.	Total Dry Matter		
1. Control.....	37.6	183.7	70.3	291.6	2.90	1.25
2. Colostrum.....	38.2	129.5	93.0	260.7	2.43	0.75
3. Whole egg.....	38.0	165.0	51.5	254.5	2.79	0.25
4. Vitamin A.....	38.8	178.7	64.0	281.5	2.71	3.75

It will be seen that the calf starter had a protein content of only 13.8%, whereas the average of the lucerne hay samples was 18.5%. According to the data given in Table IV, the calf starter and lucerne hay were consumed, on the average, in the ratio of 2.36 lb. starter to 1 lb. of hay. Such a mixture will contain 15.2% of protein which, according to Brown et al.[3], is approximately optimum for normal rates of gain and efficiency of feed conversion in calves.

The respective calcium and phosphorus levels of 0.62% and 0.58% in the calf starter likewise compare favourably with the 0.6% and 0.4% levels given as the average calcium and phosphorus values in calf starters (Abrams[1]).

The average daily consumption of starter and hay by all the calves during the first thirty days, amounted to 2.13 oz. of meal and hay each. These intakes, together with the gallon of whole milk, therefore supplied a total of about 22,800 I.U. of vitamin A per animal per day which, according to Hansen et al.[4], should suffice for the normal growth and well-being of young calves.

From the above computation of the protein, calcium, phosphorus and vitamin A levels in the utilized feeds, one could expect that all the groups should manifest a well-nigh normal performance, and that any marked differences between the various groups should be attributed to the specific treatments.

As the number of animals in the various groups was too small to allow for a statistical analysis of the results, the latter should be taken to be of a preliminary nature. However, from a perusal of the results given in Tables III and IV, it will be observed that the performance of the animals with respect to gain in weight and efficiency of feed conversion did not differ much between the various groups. For instance, the average daily gain per group varied from 1.01 to 1.19 lb. with a grand average of 1.11 lb., whereas the efficiency of feed conversion (lb. feed/lb. gain) varied from 2.43 lb. to 2.90 lb. with a grand average of 2.70 lb. for all the groups.

On the other hand, the incidence of scours varied to a much greater extent. Actually, the groups receiving extra vitamin A (100,000 I.U. per calf per week) showed the greatest incidence of scours viz. 3.75 days per calf which is three times that of the control group. In the whole egg

and colostrum groups, scouring only occurred to the extent of 0.25 and 0.75 day respectively but, on account of the limited amount of animals per group, it is impossible to ascertain whether the low incidence of scours in these groups, as compared with that of the control group, is of actual significance.

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A SIMPLIFICATION OF PRESTON'S SYSTEM REGARDING THE HANDREARING OF CALVES

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(Received for Publication 10 October, 1962)

SUMMARY

1. Because Preston [13], in his system of the handrearing of calves, recommends the feeding of limited amounts of whole milk (6 pints/calf/day) for at least three weeks, as well as the inclusion of 10 per cent skimmed milk powder in the calf starter, this experiment was planned with the view to investigate the extent to which the whole milk can be replaced by skimmed milk when a first grade lucerne hay and an all-vegetable concentrate mixture are fed.

2. The results obtained with respect to daily gain and efficiency of food utilization did not reveal any significant differences between three groups of calves receiving, after the colostral period, 6 pints per calf per day of:

I Whole milk for 4 weeks;

II Whole milk for 2 weeks followed by skimmed milk for 2 weeks;

III Skimmed milk for 4 weeks.

3. After an eventual period of 84 days, the fourweek substitution of skimmed milk for whole milk, caused a saving in feed cost of about two Rand per calf.

4. The calves on the skimmed milk regime seemed to be more susceptible to certain calf ailments, especially nutritional scours and pneumonia. Therefore, the successful application of this simplified system of calf rearing calls for an exceptionally high standard of hygiene and protection from extremes in temperature and other climatic factors, and if this is not possible, it might be advisable to feed initially whole milk for a few weeks as was done in the case of group II.

INTRODUCTION

According to Neethling[11] a beef shortage can be expected in the Republic of South Africa by about 1975, and the practice of slaughtering dairy calves for veal therefore constitutes an important potential loss of beef in this country. The number of calves slaughtered from July 1959 to June 1960 amounted to 156,676[5]. This same phenomenon is probably experienced in other parts of the world, but fortunately, most countries are conscious of this deleterious process and in consequence, several workers have already studied various systems by means of which such calves can be reared in a simple and inexpensive way.

Naturally, for economical reasons, all these workers applied the early weaning system of Preston [13, 14] who actually popularized the concept

of early weaning and subsequent dry feeding, propounded by Mead et al.[10] more than 37 years ago.

Although Converse[3] already reported in 1949 that calves could be reared on skimmed milk, lucerne hay and an all-plant meal mixture, recent workers[2, 4, 6, 13] in this field, using the early weaning system, all fed whole milk or at least some whole milk, plus a good quality lucerne hay and various calf starters. The main difference in the composition of the starters used is be found in the origin of their proteins. For certain specific reasons some workers included a small amount of skimmed milk powder or fish meal, whereas others made use of all-vegetable concentrate mixtures. Prestons[13] reported that the inclusion of 10 per cent. dried skimmed milk instead of 10 per cent linseedoil meal resulted in a 20 per cent. greater consumption of meal and a corresponding higher growth rate. Clark and Whiting[2], on the other hand, found that the inclusion of 10 per cent. skimmed milk powder, in the place of an equal amount of linseed in the starter, did not improve gains, and thus concluded that calves need no animal protein after the age of four weeks.

As large amounts of less costly skimmed milk are available in certain pastoral areas in this country, the object in mind with this early weaning experiment was, therefore, to determine the extent to which the already limited allowance of whole milk (Preston[13]), can be replaced by skimmed milk in the immediate post-colostral period, when use is made of an all-vegetable protein starter meal.

Experimental

Three groups of 3 to 5-day-old Grade Friesian bull calves, which had received colostrum from birth, were individually penned on slatted floors in the calf house and managed as described by Kellerman and Prinsloo[7]: Milk was fed to the extent of 6 pints per calf per day for only 28 days, when the calves were abruptly weaned. The types of milk fed were as follows:

Group I: Whole milk for four weeks.
Group II: Whole milk for two weeks followed by skimmed milk for two weeks.*
Group III: Skimmed milk for four weeks.*

The allowance of six pints of milk daily was divided into two feeds per day. From the second week, first grade lucerne hay and an all-vegetable starter meal were fed *ad libitum*. Individual food intakes were recorded and the animals weighed every two weeks. Weight gains and efficiency of feed conversion were used as criteria.

As the calorie content of skimmed milk is only about half that of whole milk[9], the calves receiving the skimmed milk were more prone to the various calf ailments than those to which the whole milk was fed. In treating the ailments, the following remedies were used:

White Scours: Phthalylsulphthiazole administered for three days on the basis of 1 g. per 15 lb. body weight per day, divided into two doses.

Coccidiosis: Di-iodohydroxy-quinoline administered for three days on the basis of 1 g. per 15 lb. body weight per day, divided into two doses.

* During the skimmed milk periods, each calf was dosed with about 100,000 I.U. of vitamin A (Duravit) per week.

Nutritional Scours: The following mixture was administered once per day for one to two days:

Chlorodyne—1 tablespoonful

Kaolin—2 tablespoonfuls

Limewater—20 oz.

Calf Pneumonia: Simultaneous, intramuscular injection of 600,000 I.U. of Penicillin and $\frac{1}{3}$ g. Streptomycin per day for three days.

Results

The concentrate mixture, formulated in Table I, represents an all-vegetable meal mixture.

Table I

Composition and Chemical Analysis of Concentrate Mixture

	Per cent.
Crushed yellow maize	51
Wheaten bran	20
Peanut oilmeal	19
Molasses (cane)	7
Bonemeal (fine)	2
Salt (fine)	1
	100
	Per cent.
Crude protein (N. × 6.25)	16.9
Crude fiber*	5.9
Calcium (Ca)†	0.68
Phosphorus (P)†	0.63

It contains about 17% crude protein which, according to Brown et al.[1] should be optimum for maintaining normal growth and feed conversion in young calves. As a matter of fact, the daily gains of the three groups (1.01–1.21 lb./calf/day) average more than 1.0 lb. per day which is in close agreement with the values given by Brown et al.[1] (1.12–1.30 lb./calf/day) for a similar growth phase covering 84 days. Moreover, according to the analysis of variance, the F values for gain in weight and feed conversion (Tables II and III) were non-significant at the 5 per cent and 1 per cent. levels, thus showing no differences in performance between the three groups (also see Figures 1 to 4).

* The crude fiber was determined according to the Official Methods of Analysis, A.O.A.C.[12]

† The calcium and phosphorus contents were determined by the method of Malan and van der Lingen.[8]

TABLE II

THE INFLUENCE OF WHOLE MILK AS COMPARED WITH SKIMMED MILK ON GROWTH IN FRIESIAN BULL CALVES (TOTAL PERIOD = 84 DAYS)

Group Number and Treatment	Average Starting Weight	Average Gain	Average Daily Gain
	lb.	lb.	lb.
I (7 Calves). Whole milk for 28 days	77.0	84.6	1.01
II (8 Calves). Whole milk for 14 days followed by skimmed milk for 14 days.....	79.5	101.5	1.21
III (8 Calves). Skimmed milk for 28 days.....	80.0	92.5	1.10

TABLE III

THE INFLUENCE OF WHOLE MILK AS COMPARED WITH SKIMMED MILK ON FEED CONSUMPTION, FEED CONVERSION AND FEED COST* IN FRIESIAN BULL CALVES. (TOTAL PERIOD = 84 DAYS)

Group Number and Treatment	Milk (Dry) Whole: 13% solids. Skimmed: 9% solids	Concentrates	Lucerne Hay	Total Dry matter	Feed Conversion or Feed lb. Gain	Total Feed Cost
	lb.	lb.	lb.	lb.		
I (7 Calves). Whole milk for 28 days....	27.3	102.1	114.0	243.4	2.88	R7.90
II (8 Calves). Whole milk for 14 days followed by skimmed milk for 14 days....	23.1	183.1	102.4	308.6	3.04	R7.80
III (8 Calves). Skimmed milk for 28 days....	18.9	190.4	65.2	274.5	2.97	R5.91

* The whole milk and skimmed milk were costed by the Dairy Control Board at 22 and 6 cents per gallon, respectively.
The commercial prices per 100 lb. of concentrates (dairy meal) and first grade lucerne hay, when purchased in quantities of a ton of meal or truck load of hay, are approximately 206 and 100 cents, respectively.

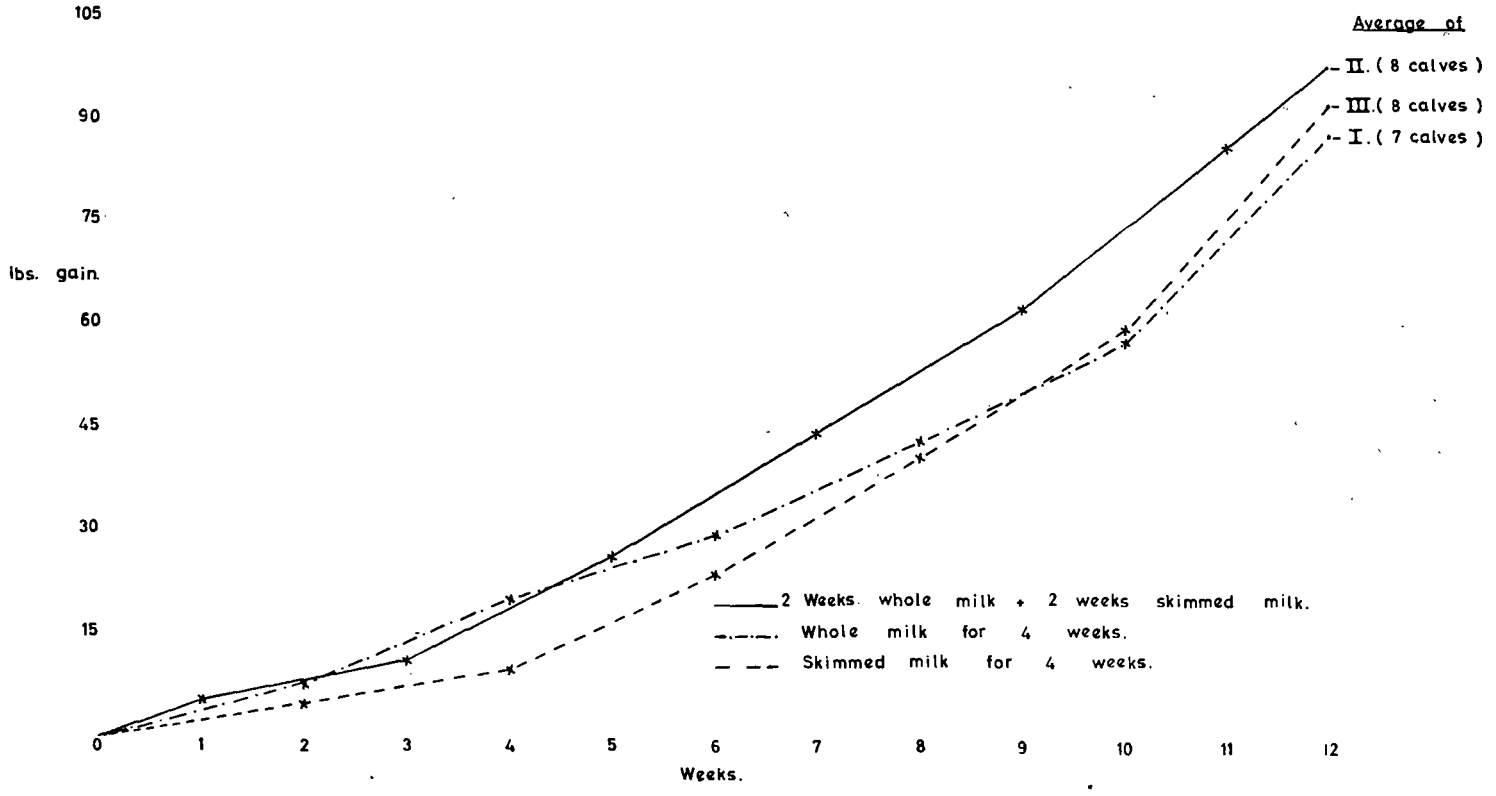

Fig. 2—Three-month-old bull calves fed 6 pints of whole milk per animal per day for 28 days.

Fig. 3—Three-month-old bull calves fed 6 pints of whole milk per animal per day for 14 days followed by 6 pints of skimmed milk per calf per day for 14 days.

Fig. 4—Three-month-old bull calves fed 6 pints of skimmed milk per animal per day for 28 days.

Explanatory Note:

Although the differences between the three groups with respect to growth, statistically were non-significant, it would appear from Figure I and Table II that the performance of the calves in group II was slightly better than that in groups I and III. This phenomenon could probably be explained by the fact that the calves in groups I and III were purchased at random on neighbouring farms, whereas those in group II were specially selected for health and thriftiness on properly managed dairy farms. Furthermore, as only 16 pens were available, groups I and III were run concurrently, and, only after the completion of the experimental period, were succeeded by group II.

However, from Table III it is evident that as the consumption of milk solids was reduced, those of the concentrates and lucerne hay respectively increased and decreased in accordance. That is, as skimmed milk contains only about half as much energy as whole milk[9], the calves instinctively compensated for this difference in milk calorie intake by consuming more concentrates and less roughage. Yet, in spite of this greater consumption of the more expensive concentrates by the calves in group III (skimmed milk), the feed cost of this group was about two Rand less than that of group I. On the other hand, very little difference in feed cost was found between groups I and II.

ACKNOWLEDGMENTS

The writers wish to thank Mr. H. J. van Dyk for the statistical analysis of the results; Mr. G. de V. du Toit for the chemical analyses on the calf starter; Mr. D. J. Coetzer for drawing the growth curves, and Mr. E. L. Barrett for the management of the calves.

The Director of Veterinary Services is thanked for permission to publish this article.

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THE DIAGNOSTIC VALUE OF CYSTS IN THE SCLERAL CONJUNCTIVA IN BOVINE BESNOITIOSIS

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(Received for publication November, 1961)

SUMMARY

1. The occurrence of fairly large numbers of clinically inapparent cases of bovine besnoitiosis on farms in the enzootic regions is recorded.

2. The diagnosis was made by visual examination of the scleral conjunctiva for cysts of *B. besnoiti*. This proved to be the most reliable diagnostic procedure known to date.

3. The biopsy and laboratory techniques used to confirm the diagnosis microscopically are described.

4. The significance of these observations is discussed in the light of ome epizootiological features of the disease.

INTRODUCTION

The diagnosis of natural cases of bovine besnoitiosis showing typical symptoms of anasarca followed by scleroderma, alopecia and seborrhea usually presents no difficulty. Histological examination of the sclerotic skin will reveal the characteristic cysts.

Skin lesions however, are usually absent and cysts not always demonstrable in skin sections of artificially infected cattle[1, 2]. Consideration of this phenomenon, and the observation that relatively few animals show clinical signs when an outbreak of besnoitiosis occurs on a farm, led to a suggestion by Pols[1] that clinically inapparent infections in very young, and possibly also in mature animals, giving rise to a state of premunition, probably occur in the enzootic regions. The lack of a reliable diagnostic agent or instrument made this hypothesis difficult to prove.

Cysts of *Besnoitia besnoiti* (Marotel, 1912) are known to occur in the scleral conjunctiva (s.c.) of naturally affected clinical cases of bovine besnoitiosis[3]. (During this investigation it was established that these cysts are not situated in the opaque sclera as stated previously[1, 3], but in the transparent portion of the conjunctiva stretching across the sclera known as the scleral conjunctiva.) They are not present during the primary stage of the disease. Although it has not been determined how soon after infection they become visible to the unaided eye, their presence indicates a chronic infection[6]. The diagnostic value of this phenomenon was investigated by Pols[1] in 15 clinical cases showing cysts in skin sections. Only 9 showed cysts in the s.c.; four had white nodules that were not cysts and two had none at all, indicating a somewhat limited diagnostic use.

METHODS

Field Observations (Table I)

These were made in the Soutpansberg district of the Transvaal—on the Mara Agricultural Research Station, and on two private farms "Parma" and "Cherbourgh". The disease is enzootic in these regions of the bushveld.

The object of our visit to these farms was to pick out all clinical cases of besnoitiosis, confirming the diagnosis by visual examination of the sclera for cysts, and histological examination of skin biopsy material if necessary, with the ultimate aim of ascertaining whether removal of such cases from the herds, would subsequently influence the incidence of the disease.

On examining the eyes of every animal of a particular group of cattle at Mara, with a number of clinical cases among them, we found to our surprise that cysts could be found in a number showing no signs of skin involvement. This prompted us to examine the dorsal portion of the s.c. of both eyes of every animal on the experimental farm, as closely as possible for cysts.

Mature cysts seldom exceed 600 microns in size[1]. They appear as elevated white granules resembling minute grains of sand strewn over the sclera. Experience was soon gained in differentiating cysts from similar white spots sometimes encountered. The diagnosis was later confirmed in 35 positive cases that were slaughtered at the Pretoria abattoir, by removal of cyst-bearing pieces of s.c. for microscopical examination as described below, and by histological examination of skin specimens from 9 of these animals.

The cattle on the two privately-owned farms (which are more than 30 miles apart) belonged to one farmer. Those on "Cherbourgh" had been transferred thither from "Parma" shortly before our visit, on account of a severe drought. For this reason we have regarded the two groups of cattle as one herd. As we were unable to examine the eyes of every animal in this herd, we concentrated on groups with clinical cases among them.

Laboratory Investigations (Table II)

It was necessary to prove beyond doubt that the white granules in the s.c., on which the diagnosis was based, were cysts of *B. besnoiti.* For this purpose a technique of obtaining cyst-bearing portions of this tissue was developed (suggested by T.W.N.). A few drops of a surface acting anaesthetic (e.g. "Novesine" (Wander)) were instilled into the eye, and a small portion of the s.c. containing one or more cysts picked up with a mosquito artery forceps and removed with a small pair of scissors when the drug had taken effect. The ensuing wounds healed well without further treatment. Similar specimens were collected from the Mara animals slaughtered at the Pretoria abattoir (*vide supra*). All specimens were placed in specimen tubes containing normal saline and stored in a refrigerator if not examined immediately.

At the laboratory the specimens were examined carefully under a stereoscopic microscope (magnification: x 8 or x 32) for cysts. After removal from the eyeball, cysts were inclined to sink below the surface of the s.c. making it rather difficult to find them, especially if only one or two were present. Each cyst consisted of a small white globule (contents

of cyst) surrounded by a thin, completely transparent zone, representing the hyaline cyst wall (Figs. 1 and 2). The cysts therefore, had a characteristic appearance and could be differentiated quite easily from non-parasitic structures in fresh preparations.

One or more cysts were dissected free from surrounding tissue and squashed between two clean slides. The resulting two smears were stained with Giemsa, and examined for cyst organisms of *B. besnoiti* (Fig. 4).

Skin specimens were also collected by biopsy or after slaughter from all animals listed in Table II. Ten sections were cut from each piece of skin at intervals of 50 microns, stained with haematoxylin and eosin and examined for cysts of *B. besnoiti.*

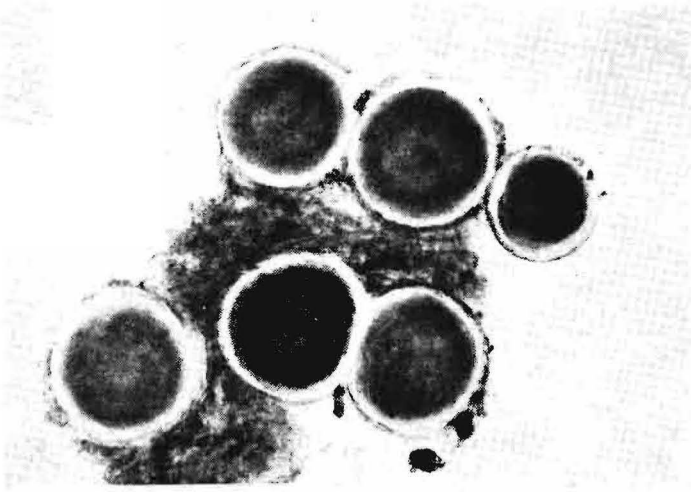

FIG. 1.—Fresh preparation of cysts of *B. besnoiti* from the scleral conjunctiva under cover glass, photographed with transmitted light. × 75.6.

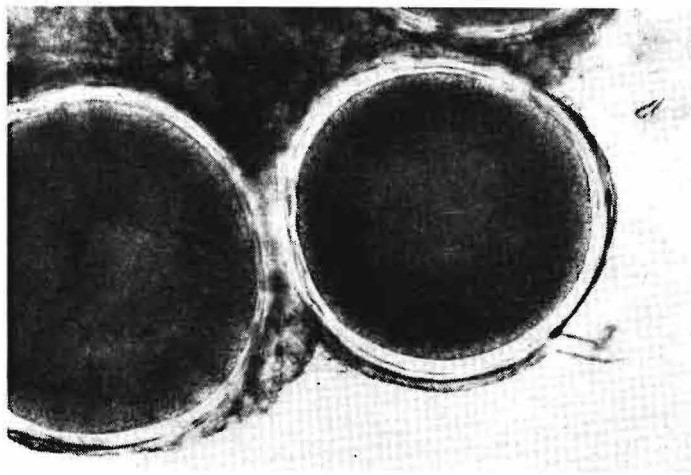

FIG. 2.—Same preparation as in Fig. 1. × 192.

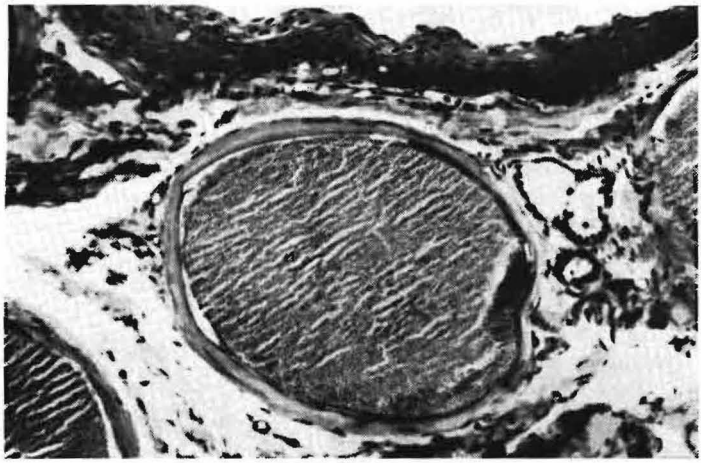

FIG. 3.—Cyst of *B. besnoiti* in the scleral conjunctiva. Haematoxylin and eosin. × 192.

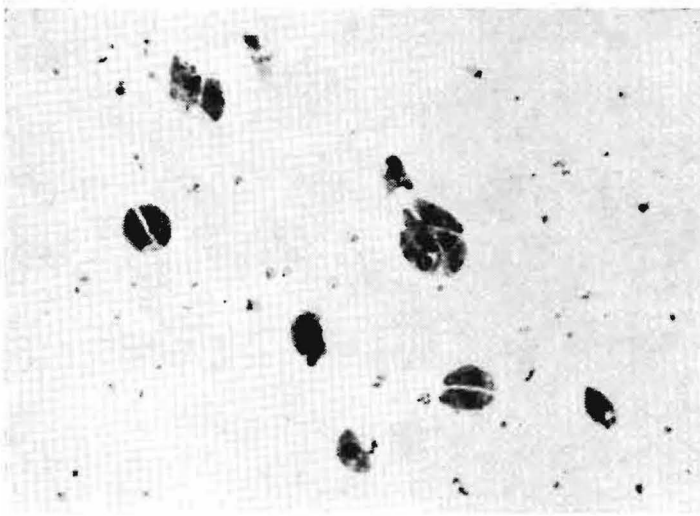

FIG. 4.—Cyst organisms of *B. besnoiti* from a ruptured cyst from the scleral conjunctiva, stained after Giemsa. × 1200.

TABLE I

INCIDENCE OF BOVINE BESNOITIOSIS ON FARMS REFERRED TO IN TEXT

Farm	Cattle examined			
	Age group	Number	Number affected	
			Clinical signs	Cysts in *s.c. (Total No.)
Mara Agricultural Research Station	†Full-grown	1,435	15	110
	Calves	187	0	0
	Total	1,622	15	110
Parma and Cherbourgh	Mixed	155	38	76

* s.c. = scleral conjunctiva. † = Newly weaned and older cattle.

TABLE II

COMPARISON OF THREE DIAGNOSTIC AIDS FOR CHRONIC BOVINE BESNOITIOSIS

Bovine No.	Diagnostic aids			
	1. Degree of scleroderma	*Besnoitia besnoiti* cysts in		
		2. Skin sections	3. Scleral conjunctiva	
			No. of cysts	Cyst organisms in cyst smears
779	—	+	+	Positive
810	—	—	+	Positive
818	—	+	+	Positive
800	—	+	+	Positive
803	—	—	+	Positive
815	—	—	+	Positive
818	—	+	+	Positive
361	—	—	+	Positive
227	—	—	+	Positive
57	—	+	+	Positive
394	—	—	+	Positive
306	—	++	+	n.e.
38	—	+	+	n.e.
896	?	++	+	Positive
902	?	+	++	Positive
894	?	+	++	Positive
102	?	—	+	Positive
802	?	+	++	Positive
895	+	+++	+++	Positive
898	+	+	+++	Positive
899	+	+	+++	Positive
900	++	+	+++	Positive
1,109	+++	+++	+++	Positive
934	+++	+++	+++	Positive
130	+++	+++	+++	Positive
688	+++	+++	++	Positive
901	+++	+++	+++	n.e.
897	+++	+++	+++	n.e.
78	+++	+++	+++	n.e.
1,061	+++	+++	+++	Positive

Scleroderma — = none; + = slight; ++ = moderate; +++ = severe

Scleral conjunctiva + = 1–10 cysts; ++ = 11–50 cysts; +++ = 51 + cysts

Skin sections — = no cysts; + = 1–10 cysts; ++ = 11–20 cysts; +++ = 21 + cysts; n.e. = not examined

Results

Field Observations. Of 1,622 cattle examined at Mara Agricultural Research Station, 110 (6.8%) showed cysts of *B. besnoiti* in the s.c. Of the latter only 15 (0.9% of the total number of cattle, and 13.6% of those with cysts) were typical clinical chronic cases. The remaining 95 (86.4% of those with cysts), constituting the greater majority, had apparently contracted clinically inapparent infections. Not a single case was found among the unweaned calves.

Similar conditions existed at "Parma" and "Cherbourgh" where 76 (49%) of the 155 animals examined were affected. The typical clinical picture was seen in 38 (24.5% of the total number of cattle, and 50% of those with cysts). We are convinced that more than 38 (50%) sub-clinical cases would have been found had we examined the eyes of all 630 cattle on these farms. Only one unweaned calf with a sub-clinical infection was found.

Laboratory Investigations. The results obtained with the three known diagnostic aids for chronic bovine besnoitiosis are compared in Table II.

The 30 cattle listed were all infected as they all had cysts in the s.c.; in 23 animals cysts were found in skin sections, and only 12 showed definite clinical signs of chronic besnoitiosis. Of the 13 sub-clinical cases with cysts in the scleral conjunctiva, only 7 showed cysts in skin sections. *Not a single clinical case was encountered with mature cysts in the skin, not accompanied by cysts in the scleral conjunctiva.*

With a few exceptions, cysts were very numerous in the scleral conjunctiva of clinical cases, and rare in sub-clinical cases.

Discussion

This is not the first time that cyst-like structures have been observed in the scleral conjunctiva of cattle showing no external signs of bovine besnoitiosis. Neitz[4] informs us that he saw them in a couple of animals in the Rustenburg district in 1952. Bigalke and Schutte[5] observed such granules in two perfectly healthy cattle on a farm where besnoitiosis was rife. Ten skin sections cut at intervals of 50 microns, however, were negative for cysts of *B. besnoiti*, and it was assumed that the white granules in the eyes were not of a parasitic nature. In the light of the observations recorded in this article, it is very likely that they were in fact, cysts.

The results of the laboratory investigations listed in Table II clearly indicate that careful inspection of the s.c. for cysts is the most reliable method known at present, of diagnosing clinical, and especially sub-clinical chronic infection with *B. besnoiti.*

As these cysts are macroscopically visible, their presence can be used for making surveys of the distribution and incidence of the disease. In this article we have shown that the incidence on a few farms in the enzootic regions was very much higher than was anticipated. The question arises, however, whether sub-clinical cases with no cysts in the s.c. are also present on such farms. In artificially infected cattle, for instance, cysts are often not to be seen[1, 6]. In our opinion there is no reason why this should not be the case in nature as well, making the incidence even higher than it has just been found to be.

The fact that relatively large numbers of clinically inapparent cases of bovine besnoitiosis are present on farms such as Mara, where only a few new clinical cases are seen every year, provides strong evidence in favour of Pols' theory (*vide supra*-Introduction) that a form of immunity (premunity) exists in the former, protecting them from the severe form of the disease[1]. Whether or not a large number of calves develop a low-grade infection as postulated by Pols [1] remains to be seen. With one exception all sub-clinical cases encountered in this investigation were animals well over weaning age.

Failure to appreciate that the majority of cattle naturally infected with besnoitiosis develop an inapparent form of the disease, has undoubtedly retarded progress in research on artificial and natural transmission to a large extent.

Our observations that cysts were numerous in the eyes of all 66 *clinical* cases we examined, (Table I and II), differ somewhat from those made by Pols in 15 such cases (*vide-supra*-Introduction). Although it is not impossible that chronic clinical cases may be encountered with no cysts in the scleral conjunctiva, we submit that it will be the exception rather than the rule.

ACKNOWLEDGEMENTS

The writers wish to thank the Director of Veterinary Services for permission to publish this article. We appreciate the interest shown by Prof. W. O. Neitz in this work. We are very grateful to Messrs. H. P. Eloff and J. D. Skinner of Mara Agricultural Research Station, and Mr. S. J. Matthee of the farm "Parma" for providing the facilities for conducting these investigations. Thanks are due to Dr. W. J. Wheeler, Director of the Pretoria Municipal Abattoir for arranging for specimens to be taken, and to Dr. D. H. G. Irwin for advice on the use of surface acting local anaesthetics. Mr. J. A. Roos is thanked for preparing the histological sections and Mr. A. M. de Bruyn for the photomicrographs.

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TRACER DYES IN INTRAMAMMARY PREPARATIONS AS A METHOD OF RAPID INDIRECT DETECTION OF ANTIBIOTIC RESIDUES IN MILK — A REVIEW

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Evidence presented to the Ad hoc Committee of Enquiry into the Contamination of Milk and Meat by Antibiotics and Insecticides.

(Received for publication on 23rd January, 1962)

INTRODUCTION

Contamination of milk with residues of antibiotics is by now firmly established as a cause of allergic manifestations in sensitised or allergy-prone persons, and of starter growth failure in the production of cheese, butter, yogurt and similar milk products. Although all the antibiotics (and also sulfonamides, etc.) are involved, penicillin is mainly concerned.

Assay of these residues in milk is dependant on microbiological procedures which, although more accurate, are essentially time consuming. The most rapid method developed is that by Wright and Tramer[1], using a coloured growth indicator within 2½ hours of commencing incubation. Both the milk producer and the personnel on the milk reception deck are concerned, and neither can use these tests as a routine screening mechanism for the immediate elimination of milk containing antibiotics.

Although there are other known routes by which milk may become contaminated with antibiotics, it occurs mainly through the use of milk from quarters treated for mastitis with various infusions containing antibiotics as the therapeutic agent. For this reason various workers have investigated the idea of incorporating a dye in these intramammary preparations so as to provide a rapid easy direct visual means of detecting antibiotics.

Dalgaard-Mikkelsen and Rasmussen[2] selected Green S. (Rowe's Colour Index 737) from various certified food colouring agents. Hargrove, Lehman and Matthews[3] and Hargrove, Plowman and Wright[4] studied various fluorescent dyes such as chlorophyll, esculin, fluorescein etc. with the idea of using the Ultra Violet lamp to detect the dye in low concentrations. Smitasiri, Kosikowski, Guthrie and Fincher[5] studied Annatto, Red Food Dye and water and fat soluble chlorophylls and found the latter most promising. Shahani[6] reported favourably on green-turquoise dye as a tracer. Dawson and Feagan[7] found another food dye, Brilliant Blue F.C.F., the most satisfactory.

TRACER DYES

To be considered satisfactory, dyes added to intramammaria must:

1. Be quite harmless to the consumer.
2. Not be irritant to the mammary tissues of the cow.
3. Not destroy the antibiotic during normal storage.

4. Be completely soluble in milk.
5. Be excreted parallel to the antibiotic.
6. Be readily visible to the naked eye in milk containing low concentrations of antibiotic, e.g. 0.1 i.u./ml. penicillin, which is the level at which starter culture growth is compromised (Berridge[12] etc.).

Quite soon, Smitasiri[5] and later Rasmussen and Simesen[8] showed that certain types of vehicles or bases were unsuitable for use with tracer dyes. Those containing aluminium monostearate, commonly used to prolong the excretion time and so reduce the frequency of administration, were found to be responsible for the presence of deeply staining particles with high penicillin concentration in milk no longer discoloured by soluble dye. Rasmussen et al[8] showed that substitution of the aluminium monostearate with "Tween" resulted in a shorter excretion time and even distribution of dye.

There is increasing expression of doubt regarding the desirability of long-acting intramammary preparations. From the therapeutic point of view it should be remembered that most antibiotics are bacteriostatic in the concentrations just below those at which they are bacteriocidal. Furthermore, organisms are only susceptible to destruction by antibiotics during the logarithmic growth phase. Bratlie[9] has put this to practical application and found that he obtained most success in the treatment of chronic udder infections when using three infusions, each giving an initial high antibiotic level, with 8–12 days interval. There would also appear to be some connection between the development of resistant strains of pathogenic organisms and long-acting intramammaria. Romer, quoted by Hogh and Rasmussen[10] states that preparations with a short excretion time are fully equal, therapeutically, to those maintaining a prolonged excretion time. From the point of view of the processor or consumer of milk, short-acting preparations are infinitely preferable in terms of early, safe utilisation of milk from successfully treated quarters.

Most of the work on tracer dyes and assessment of their suitability in terms of the six basic requirements set out above, has been done on the directly visible water soluble triphenyl—methane dyes such as *Food Green No.* 4, previously known as *Green S* or *Edicol Supra Green B.S.* (*Rowe's Colour Index No.* 737 *or New Colour Index* 44090):

1. *It is an approved or certified food dye* in many countries, including Denmark and South Africa. Food dyes are under constant surveillance because of their potential harmfulness, and particularly their possible carcinogenicity. For this reason they are specifically controlled by legislation.

Hogh and Rasmussen [10] have conducted prolonged feeding experiments on laboratory animals, pigs and calves, and they found no evidence of toxic action; there is some discolouration of the gastro-intestinal mucosa, and the contents of the digestive tract are well stained, but no trace of the dye could be found in extracts of plasma, kidney, liver and muscle. After intervals of 5 days and 1–2 weeks respectively, pigs and calves lost the dye from their digestive tracts. Use of discoloured milk from treated quarters for feeding other farm animals is therefore not precluded.

Some dye-stuffs are known to be carcinogenetic when injected, particularly subcutaneously. Of the three substances (Food Green No. 4, Food Blue No. 3 and Food Blue No. 2) Williams, quoted by Dalgaard-Mikkelsen and Rasmussen[11], found Food Green No. 4 to be

the least carcinogenetic on subcutaneous injection. Absorption from the intestine is however of very low order, and by proper control the amount of dye in milk will in any event be minimal.

2. *The effect of the dye-stuff on the mammary tissue of the cow* has received careful study by Hogh and Rasmussen[10]. They found that, intrinsically, different preparations without added dye-stuff have varying irritant effects on the tissue as shown by an increased cell count of the milk. When Green S was added the increase of cell content was slightly accentuated, especially where relatively non-irritant bases were used. However, by the time all penicillin and dye had been excreted, the degree of irritation was of the same order as in uncoloured preparations, and in any event the irritant effect was of no practical significance.

3. *The effect of the dye on antibiotics in intramammaria during normal storage* was studied by Rasmussen and Simesen[8]. Using the agar-cup method with *Sarcina lutea* as the test organism, they found 82–110% of the stated amounts of penicillin in the tube preparations after adding 50 mgm of Green S and storage up to 8 months at 5°C. Hogh et al[10] found no evidence of destruction in preparations containing *procaine* benzyl penicillin after storage at 20°C for up to 10 months. On the other hand, *sodium* benzyl penicillin seemed to be reduced in effectivity by about 50% during 9 months storage when compared with similar preparations without dye. *Sodium* benzyl penicillin in aqueous suspension was not effected after 12 days storage at 4°C. It would therefore appear that the vehicle or base should also be considered when assessing the effect of dyes on antibiotics.

4. *The Solubility* of Green S dye in the water phase of milk is complete, giving it a blueish colour in high concentrations and a green colour in lower concentrations. The butter fat is not stained. Aluminium monostearate in the vehicle causes the insoluble particles containing penicillin and dye to be excreted in the milk for some time after soluble dye is completely excreted.

5. *Parallel excretion of dye and antibiotic* is of vital importance to the success of indirect detection methods. Using 100,000 I.U. penicillin and 50 mgm. of Green S dye, Rasmussen et al.[8] showed that parallel excretion in the case of six different preparations to be near perfect, even though complete excretion times varied from 60 to 460 hours. Hogh et al[10], using six different short-acting preparations, could confirm this. The nature of the base or vehicle should however be carefully considered.

6. *The ready detectability of the dye-stuff* in milk is important. 0·1 I.U. penicillin per ml. of milk is significantly high to compromise starter culture growth in dairy product manufacture, and this may readily be detected, as shown by Rasmussen et al[8], because even quantities of dye as low as 0·2 mgm./L. of milk can be seen with the naked eye. This would enable the milk producer to know when the milk from treated cows still contained significant quantities of antibiotics.

The public health demands a zero tolerance for antibiotics in milk, and this demand is not so readily met by the direct visual detection method. Rasmussen et al[8] have described a simple acetone extraction method

which however, requires 12 hours of refrigeration. Dalgaard-Mikkelsen et al[11] have recently described a rapid technique, using an ion-exchanger, of detecting 0·03 mgm. of dye/L which is equivalent to 0·002 I.U. penicillin/ml. The method is suitable for use on milk reception decks, as it takes only a few minutes to perform. Using larger quantities of milk (200–500 ml.) they maintain that 0.01 to 0.005 mgm. of dye/L can be detected.

It would therefore seem that Green S dye provides means whereby the farmer can assess the antibiotic content of milk from treated cows, milk product manufacturers can ensure that their starters are not inhibited, and using the ion-exchange technique, the public can be protected to a considerable extent. Short of a complete ban on the use of penicillin in intramammary preparations, present knowledge offers no better way of control.

Mention should also be made of the work of Dalgaard-Mikkelsen et al[11] to study the effects of stained milk on dairy products, should such milk be accidentally used. Failure of starter culture growth is the obvious result, but if this were not to happen for some reason or other, the butter would show no discolouration whilst the cheese would show a greenish tint if the milk contained 0.02 mgm. dye/L.—the amount just below that which is detectable by direct visual means.

Conclusion

The inclusion of 50 mgm. per 100,000 i.u. of penicillin in all intramammary preparations would appear to provide an excellent means of detecting antibiotic residues in milk without causing harm to cow, consumer and dairy product manufacturer, and without reducing the therapeutic efficiency of the preparation.

Careful attention should however be given to formulations in view of the importance of the vehicle or base as well as the form of penicillin used. Hogh and Rasmussen[10] have however clearly shown that formulations which behave satisfactorily, as far as the dye is concerned, and which have moderately rapid excretion rates, are available.

Whereas more work will have to be done to assess the application of Green S as tracer dye to other commonly used antibiotics, it is not unlikely that suitable formulations may be made.

In order to be effective in reducing the antibiotic contamination of the milk supply effective control of all preparations is essential and once dyed intramammaria are introduced no non-dyed preparations should be available. The obvious danger is that preparations not intended for intramammary use, will in fact be so used.

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The Director of Veterinary Services is asked for his permission to publish the review

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FLOCK IMMUNISATION OF SHEEP AND GOATS AGAINST HEARTWATER:

PART I—INVESTIGATIONS REGARDING ROUTINE FLOCK IMMUNISATION OF SHEEP

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INTRODUCTION

Infective heartwater blood in use for immunisation purposes is freely available from Onderstepoort and certain regional laboratories. Relatively inexpensive tetracycline antibiotics are also freely available for the purpose of treating natural cases of the disease and the reactions caused by the use of heartwater blood during the immunisation process.

In spite of the above facts, losses from heartwater are still surprisingly high in certain areas of South Africa, particularly amongst sheep and goats.

The control of the vector, *Amblyomma hebraeum*, by means of regular dipping has done much to reduce the incidence of heartwater but dipping is rarely carried out thoroughly enough completely to eradicate this disease. The relatively high price of modern efficient dipping materials appears to discourage farmers from making as much use of them as is necessary.

In areas where the most important infectious disease problem is heartwater, thorough tick control proves to be an expensive method of controlling this disease. If, on the other hand, flocks are immunised against heartwater, tick control in many instances need not be as thorough.

Immunisation, combined with partial tick control, is possibly the most economical practice in areas such as these, particularly in view of the fact that maintenance of immunity depends on periodic natural re-infection.

Mass immunisation by means of infecting flocks intravenously with heartwater blood and treating the subsequent reactions with antibiotics has not been carried out as extensively as seems warranted, for the following reasons:—

1. The fear of extensive losses during the immunisation process has bee a deterrent.
2. Many farmers and veterinarians are of the opinion that the cost of immunisation is prohibitive.
3. The fact that it has always been deemed advisable to take the body temperatures of all animals daily from about the fifth day until about the eighteenth day after infection, has rendered the process cumbersome and time-consuming.

The investigations and observations reported here were undertaken in an attempt to establish:—

1. Whether it was possible and safe to eliminate the necessity for taking temperatures of infected animals.

2. The best day or days on which to carry out flock treatment of infected animals.
3. The actual cost of immunisation when carried out on a flock basis where reactors and non-reactors are treated alike.
4. Whether any advantage could be derived from using dosages of chlortetracycline higher than the recommended 2 mgm. per pound bodyweight.

Method

Sixty-six adult Merino wethers from a heartwater-free area were infected with heartwater blood (Ball-3 strain) obtained from the State Veterinary Laboratories, Grahamstown. These sheep were part of a large flock introduced into the Grahamstown area about six weeks before these investigations commenced and considerable losses due to heartwater had already been experienced.

On the same day 135 4-month old lambs on another farm in the same district, were infected.

Experimental Groups and Treatments

Chlortetracycline suspension in oil* containing 25 mgm. chlortetracycline per cc was used for all treatments. This preparation was used because of its superior efficacy for this purpose[1, 2].

The infected sheep were divided into four groups treated as follows:—

Group 1.—33 Adult wethers were injected intramuscularly with Chlortetracycline suspension in oil at 2 mgm. per pound bodyweight on the 10th and 12th days after infection, regardless of the temperature. The temperatures were taken on the 10th, 11th, 12th, 13th, 14th, 15th and 16th days after infection, to observe the number of reactors in the group and the clinical effect of the treatment.

Group 2.—33 Adult wethers were injected intramuscularly with Chlortetracycline suspension in oil at 2.5 mgm. per pound bodyweight on the 10th day after infection in order to observe whether or not one injection at this dosage would suffice. Only sheep which showed temperature reactions were used in this group and temperatures were taken from the 10th to the 16th day after infection.

Group 3.—65 of the infected lambs on the second farm were used in this group. They were injected intramuscularly by means of an automatic syringe with 2 cc of Chlortetracycline suspension in oil (50 mgm.) on the 8th day after infection, regardless of temperature reactions. These lambs varied in weight from 12 lb. to 31 lb. and, therefore, received dosages varying from 1.6 mgm. to 4 mgm. per pound bodyweight.

Group 4.—70 of the infected lambs were used in this group and were treated intramuscularly with 3 cc of Chlortetracycline suspension in oil (75 mgm.) on the 8th day after infection, regardless of temperature reactions. These lambs varied in weight from 12 lb. to 31 lb. and, therefore, received dosages varying from 2.4 mgms. to 6 mgms. per pound bodyweight.

*Aureomycin injectable suspension—Cyanamid.

Group 1.—The temperatures recorded for the thirty-three wethers in this group appear in Table I.

TABLE I

CHLORTETRACYCLINE SUSPENSION IN OIL
200 MGM. ON 10TH AND 12TH DAYS ONLY

Group I

Sheep No.	10th Day	11th Day	12th Day	13th Day	14th Day	1t5h Day	16th Day	
1	*105.4	106.8	*106.2	104	104.8	102	101.6	o
2	*102.6	103.3	*104.4	103.1	102.4	103.2	103.9	
3	*104.3	103.8	*104.6	104.2	103.2	103.2	103.1	o
4	*105.8	103.8	*105	103.9	104.6	102	101.6	o
5	*105.8	105.8	*106.5	106	104	104	100.6	o
6	*105.6	105.4	*104.8	104	103.6	103.4	101.8	o
7	*103.1	102.3	*104.4	103.7	103	101.4	103.6	
8	*103	102.8	*103.8	103.2	101.8	100.6	103.2	
9	*103.2	103.1	*103.6	102.6	103.2	102.4	103.6	
10	*104	104.8	*104	103.4	103.2	103.4	102.6	o
11	*105.2	104.4	*103.4	104	103	102.2	101.2	o
12	*103.6	103.8	*102.8	103.6	102.2	101.8	103.8	
13	*104	103.2	*103	104	103.2	102.6	103.2	
14	*102.4	102.4	*103.4	103.6	102.2	101.6	102	
15	*106.4	106.4	*107.2	104.3	104	104.2	100	o
16	*104	105	*105.6	104.4	102.8	102.6	102	o
17	*104.1	103.2	*103.6	103.2	103	102	102.8	
18	*105.8	104.6	*106.4	105.2	102.4	101.8	102.8	o
19	*103.7	105.4	*104.6	104.7	104	101	101.8	o
20	*103.4	105.4	*104.8	105	103.1	102.2	103	o
21	*103.3	104.9	*104	104.2	104	101.6	102.4	o
22	*106	106.2	*107	105.6	105.4	101.4	101.6	o
23	*104	105.2	*105.6	105.8	103.6	104.2	101.2	o
24	*105.2	106.2	*106.4	105.9	104.5	102	103.4	o
25	*104.6	105.4	*104.4	104	104.4	103.4	104.2	o
26	*103.2	104	*104.6	103.6	103.6	102.8	103	
27	*102.2	102.6	*103.4	103	101.9	101	101	
28	*103.2	104.2	*102	103.2	101	101.4	100.2	
29	*106	106	*105.8	104.1	104.8	102.1	101	o
30	*105	107	*105.6	105	104.8	102	101.6	o
31	*106.2	104.7	*105.8	103	101.6	101.5	101.6	o
32	*103.4	103.6	*103.8	103.6	102.2	101.4	99	
33	*104.4	105.6	*104.6	104	102.9	103	102.2	o

* Treated here. o Definite reactors.

Twenty-one of the 33 sheep in the group can be regarded as having shown a definite reaction. There was no mortality in this group and it was therefore decided that treatment with Chlortetracycline Suspension in Oil at 2 mgm. per pound bodyweight on the 10th and 12th days may be a reasonable flock recommendation in spite of the relatively low number of reactors in this particular group (63.9%).

Two factors tended to influence this decision:—

(*a*) Experience under a variety of conditions has shown that sheep will not become visibly sick before the 11th day if not treated.

(*b*) Some of the sheep in the group may not have reacted because of the "blocking" effect of the treatment on the 10th day i.e. more than 63.9% of the sheep in this group may have been susceptible.

On the strength of these results it was decided to repeat this particular treatment on a larger scale. (See later under Subsequent Experience on Larger Numbers of Sheep).

Group II.—Table II gives the recorded temperatures of the 33 wethers in this group.

TABLE II

CHLORTETRACYCLINE SUSPENSION IN OIL
250 MGM. ON 10TH DAY

Group II

Sheep	10th Day	11th Day	12th Day	13th Day	14th Day	15th Day	16th Day	
1	*106.4	105.8	101	106.8	*106	101.8	101	
2	*105.2	106.4	106	104.4	*105.2	102.8	101.4	o
3	*105	104	102.9	103.2	102	103.8	102	
4	*104.8	105	105	103.6	103	102	102.2	o
5	*106.8	106.1	106.6	105.8	*105	103.4	100	o
6	*107.4	107.4	107	105.9	*105.2	101	101.6	o
7	*104.8	105.4	105.4	105.2	104	*105	101.8	o
8	*106.4	106.4	106.2	105	101.8	101	102	o
9	*105.6	103.7	104.8	*105.6	104.4	102	101	o
10	*104.5	105.4	104	104.6	103.6	102.4	101	o
11	*105.4	106.4	106.8	105.4	104.4	103.8	101.2	o
12	*105.5	105.4	106.2	104.4	103.6	*106	101.6	o
13	*105.3	106	105.2	104.8	103.2	101.2	101.4	o
14	*104.5	104		103.4	*104.8	100.6	102.8	
15	*106.4	106	105.4	104.6	*105.4	103.4	101.2	o
16	*105.4	105.2	105	103.8	101.2	*105	101.8	o
17	*104.6	105	104.2	104	103	*104.2	103.4	o
18	*105.4	106.4	106.8	104.8	104.2	102	101.6	o
19	*105	105.4	105.4	105.2	103		100.6	o
20	*104.8	105.4	105.7	106.6	105.2	*140.6	101	o
21	*106.2	105.8	106	103.4	*105	102.2	102.6	o
22	*105.2	106	105.6	103.6	103.8	101.6	101	o
23	*106.4	106	106.2	105.4	*106.1	102.1	102.2	o
24	*104.6	105	105	103.8	103	*104.6	102.2	o
25	*105.8	104.8	103.8	103.2	103.2	104	101.6	
26	*106.8	105.8	106.6	105.6	104.7	104.1	101	o
27	*105.8	106	106	105.6	104.4	100	100.6	o
28	*105.6	105.4	104.6	104	104.2	101.6	102	o
29	*105.8	105.6	105.4	104.8	*105	104.8	101.8	o
30	*105.6	105.8	106.8	*106.9	105	101.6	101	o
31	*105.6	105	105.2	105.4	*105	104.4	102	o
32	*106.6	105.8	106.6	105.1	103.6	102	101.8	o
33	*106.6	106	106.8	105.4	104.4	*105.2	101.4	o

* Treated here. o Definite reactors.

As can be seen from the above table, 29 (88%) of the 33 sheep showed definite reactions. It is also clear from the table that 18 (54.5%) of these sheep were re-treated once, between the 13th and 15th days after infection. This was done because the temperatures remained high in those particular sheep and mortality was feared.

For the purposes of this investigation, this group was considered a failure as soon as some sheep were retreated. However, it is interesting to note that in those sheep that showed definite reactions but were not retreated, the temperatures in some cases took as long as four days to return to normal. This seems to indicate that retreatment after 48 hours because of failures of the temperature to fall, is in many cases unnecessary with this formulation of Chlortetracycline.

Groups III And IV.

These lambs were treated on the 8th day as described under Experimental Groups and Treatments. They were not inspected on the 9th and 10th days.

On the 11th day just over 60% of these lambs had temperatures over 104°F and 10 (7.4%) of them were showing clinical symptoms of heartwater, one very severely and one in extremis.

The one in extremis subsequently died but the one showing severe symptoms recovered after being treated with Chlortetracycline suspension in oil at 4 mgm. per pound bodyweight, half the dosage being given intramuscularly and half intraperitoneally.

All the remaining lambs were treated on the 11th day with 2 cc (50 mgm.) of Chlortetracycline suspension in oil and recovered uneventfully.

The only concrete conclusions to be drawn from the results in these two groups is that a recommendation of one treatment on the 8th day, even at high dosages, would be risky. However, it is interesting to note that some of the lambs which were visibly sick and some of them that had high temperatures on the 11th day, were small lambs and belonged to Group IV which received the higher dosage. This seems to indicate that little advantage was derived from the higher dose and that two treatments appear to be necessary, no matter how high the dosage is.

Subsequent Experience Using Larger Numbers of Animals

(*a*) *Using Chlortetracycline Suspension in Oil on the 10th and 12th Days*

Due to the success of Group I in the above experiment, the remainder of the flock (approximately 1,000 sheep) from which Groups I and II were derived, was subjected to the same treatment as Group I.

No mortality was experienced and the whole immunisation process was easily accomplished, the animals only being handled on three occasions, once for intravenous injection of heartwater blood and twice (10 and 12 days later) for intramuscular injections of Chlortetracycline suspension in oil.

The cost of antibiotic in this immunisation process was approximately 57 cents per sheep (based on the current retail price of this product in South Africa).

In order to calculate the total cost of immunisation, the cost of the blood (in this case 5 cents per 2.5 cc infective dose) and labour costs must be added to the cost of the antibiotic.

(b) Using Chlortetracycline Powder on the 10th and 11th Days*

Due to the success achieved with the powder formulation of chlortetracycline in a previous experiment[1] and due to the fact that it is considerably less expensive than the oily suspension, it was decided to try it on a large scale.

In the three flocks mentioned below, this material was used to give intramuscular injections at a dosage rate of 2.5 mgm. per pound bodyweight on the 10th and 11th days after infection with heartwater blood. The higher dosage was used, to be on the safe side, and the shorter interval between treatments was used, because sustained effective blood levels are not to be expected with this formulation as they are with the oily suspension.

Flock I—280 Merino sheep in the Fort Beaufort area.

Flock II—450 Merino sheep in the Bathurst area.

Flock III—400 Merino sheep in the Grahamstown area.

All the above sheep were treated on the 10th and 11th days after infection and no temperatures were taken. No mortalities occurred and no re-treatments were necessary.

The cost of the antibiotic for these flocks was approximately 20 cents per adult sheep (based on current retail prices of this product in South Africa).

Conclusions

The practical conclusions to be drawn from the above are as follows:—

1. Two methods of immunisation of adult Merino sheep against heartwater described have proved both safe and economical, these are—
   (*a*) Treatment with Chlortetracycline suspension in oil at a dosage of 2 mgm. per pound bodyweight on the 10th and 12th days after infection with heartwater blood.
   (*b*) Treatment with chlortetracycline powder (mixed with water) at a dosage of 2.5 mgm. per pound bodyweight on the 10th and 11th days after infection with heartwater blood.
2. The two methods described above require a minimum of effort and skill as all treatments are carried out by the intramuscular route and no temperatures need be taken.
3. One treatment on the 8th day after infection will not suffice even with dosages of chlortetracycline as high as 6 mgm. per pound bodyweight.
4. One treatment on the 10th day after infection at 2.5 mgm. per pound bodyweight using Chlortetracycline suspension in oil would not be safe.

Discussion

Although the methods used in the successful groups in this investigation are very simple, it is the writer's opinion that an even simpler method could be used. Maré[3] has shown, using eight animals, that if sheep are treated on the fifth day after infection at 5 mgm. per pound bodyweight, they show very slight reactions or no reactions at all and are subsequently immune to challenge.

*Aureomycin powder (tinted)—Cyanamid

This "blocking" method should perhaps be tried on a larger scale in both sheep and goats because it would eliminate the necessity for handling the animals more than twice during the whole immunisation process.

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ON A FILARIA WORM FROM THE EYE OF A HORSE'

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SUMMARY

The presence of a female filariid worm, morphologically similar to *Parafilara multipapillosa* (Condamine and Drouilly, 1878) is recorded from the eye of a horse in the Brits district, Transvaal. The chief features of the worm are described and a short account of a probable phase in its life history is given.

INTRODUCTION

Dr. P. J. Meyer, Veterinary Practitioner, Pretoria, informed the writer that he had observed a fairly large living worm in the eye of a horse belonging to Mr. D. T. de Jager, Kareepoort, Brits, and asked for advice how to remove it. As the worm was lodged in the eyball behind the lens, surgical removal was advised. After removal the worm was killed and fixed in alcohol and passed on to the writer for study.

INVESTIGATION

The slightly twisted female worm had a light pinkish colour, was 45 mm long and 0.36 mm thick across its head; the body thickness increased slightly posteriorly to 0.42 mm after which the body gradually became thinner to end in a rounded tip 0.21 mm in diameter. The anterior end was cone-shaped, the cone being 0.3 mm high. The terminal mouth is small and inconspicuous and no lips could be seen. For a distance of 0.03 mm behind the mouth the cuticle was provided with an irregular series of small knob-like tubercles; these were followed for the next 0.06 mm by series of transverse ridges, the most posterior being the longest. The rest of the body cuticle, up to the posterior body end, was provided with very fine annulations.

The muscular oesophagus, 0.196 mm long and 0.03 mm thick, was joined to the mouth by a short and fine cuticular canal. At its junction with the oesophagus the intestine was much swollen and filled practically the whole of the body cavity; it became thinner posteriorly and finally joined the very thin cuticular rectum the minute ventral external opening of which was almost terminal. The body terminated in two small lateral papillae.

The vulva was a circular opening situated ventrally about 0.06 mm from the anterior end; it led into a straight vagina about 0.6 mm long which in turn joined the two uteri passing backwards with various twists; they were filled with numerous eggs, each containing a coiled-up larva. The egg-shell was very thin and appeared to be somewhat elastic so that the size and shape of the egg varied with the amount of coiling of the contained larva.

Discussion

From the descriptions available to the writer there does not appear to be any material character to differentiate the above described helminth from the female of *Parafilaria multipapillosa* (Condamine and Drouilly, 1878), the causative agent of haemorrhagic filariasis of equines in Europe, North Africa, South America and Eastern countries. The only difference appears to be a very slight one and concerns the area around the mouth on which the tubercles are found. From the published figures it would appear, that in the writer's specimen these tubercles occur only on the anterior 0.03 mm of the head, whereas in the named species they extend two to three times further back. As only a single specimen was available to the writer, he does not wish to place too much stress on this difference which on more material becoming available, may be found to be due to individual variation. The writer thus tentatively refers his specimens to the species *P. multipapillosa.* The location of the parasite in the eye is a new record; previous records show that it inhabits the subcutaneous and intramuscular connective tissues. For oviposition, the females approach the subdermal layers causing local hemispherical swellings, which appear on the body surface as nodules up to two centimeters across. They are generally found towards the dorsal areas of the hosts' body. An opening to the exterior is soon formed (probably due to the activities of the female), and through this opening the worm deposits its eggs accompanied by much bleeding through the opening. The life cycle of this parasite is still unknown but Fain and Herin[6] have shown that in the related bovine species (*P. bovicola* Tubangui) the domestic fly probably acts as the intermediate host. Flies ingested the eggs and larvae in the exuded blood, and a few days later, larvae were recovered from the intestine of the fly. These larvae had increased slightly in size. Flies probably also play a role in the life cycle of this equine parasite.

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THE SEASONAL INCIDENCE SURVEY OF INTERNAL PARASITES OF SHEEP — PART 1

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INTRODUCTION

This article will deal only with that part of the seasonal incidence survey being conducted in the Winter Rainfall Region of the Cape Province. The survey is based on information gained from egg counts, larval differentiation and post-mortem identification of the nematodes in three flocks of sheep located at:—

(i) Outeniqua Experimental Farm in the George district;
(ii) Oakdale Agricultural School in the Riversdale district; and
(iii) Hotomskloof in the Oudtshoorn district.

The following genera and species were identified in the course of the survey:

Dictyocaulis filaria;
Muellerius capillaris;
Protostrongylus rufescens;
Haemonchus contortus;
Ostertagia spp. (*O. circumcincta* and *O. trifurcata*);
Marshallagia marshalli;
Trichostrongylus spp. (*T. axei*, *T. vitrinus*, *T. falculatus*, *T. rugatus* and *T. colubriformis*).
Cooperia spp. (*C. curticei* and *C. oncophora*);
Nematodirus spp. (*N. filicollis* and *N. spathiger*);
Bunostomum trigonocephalum;
Oesophagostomum spp. (*O. columbianum*, *O. venulosum* and *Oesophagostomum* sp. Nov.);
Chabertia ovina
Trichuris globulosa.

OBSERVATIONS

From observations made on animals showing clinical helminthiasis, and subsequently confirmed at post-mortem examinations, it would appear that the following are the most important genera, (pathogenically and epizootiologically) in this area:

(*a*) *Trichostrongylus* spp.
(*b*) *Ostertagia* spp.
(*c*) *Chabertia ovina.*
(*d*) *Oesophagostomum* spp.

One or more of the other genera previously mentioned, may under certain favourable climatic conditions, become dominant, but generally speaking these are essentially in the nature of "fellow travellers".

A study of graphs made of the eggs per gram of faeces counts shows that these counts follow certain definite trends and patterns.

Adult Ewes

There are two main peaks or waves, the first occurring in spring (August-October) and the second in autumn (March-June).

The adult ewes included certain groups which lambed down during the spring, whilst the others lambed during autumn. The peak E.P.G. counts could thus not be solely ascribed to the so-called "post-partum rise".

From approximately the middle of October onwards, all three groups of ewes showed a marked decrease in E.P.G. counts. This trough in the graph reached a "low" during the latter weeks of November, while from the middle of December an increase in the counts resulted in a medium-sized wave which subsided towards the end of February. From the beginning of March a substantial increase in the number of eggs per gram was the indication of the autumn rise which reached its climax during May.

Lambs and Yearlings

A contrasting picture is formed by the graphs of the E.P.G. counts of these sheep.

The spring-born lambs (Outeniqua Experimental Farm) show a considerable and substantial peak which starts in the early weeks of January and which only declines at the end of June. This peak or wave is repeated on the graph of the yearlings.

The autumn-born lambs, however, have E.P.G. counts which, when graphed, indicate substantial spring and autumn waves, similar to those of the adult ewes, with a quiescent period over the summer months. This double peak or wave of the autumn lambs is in direct contrast to the single peak of spring lambs, which extends from January to June.

Prophylactic use of anthelmintics is based on Gordon's[1] principles and drenching may be of two types:

(*a*) *Strategic*, i.e. fixed time or seasonal;

(*b*) *Tactical*, i.e. short term, intermediate, or emergency drenching indicated by conditions which may favour an immediate increase in worm burden, or enhanced pathogenic effects.

It is, therefore, apparent, in the light of these observations, that *strategic* drenching will curb the infection in the animal and retard the massive infestation of the pastures. It is essential that only the very best anthelmintic remedies at present available, viz. Micro-fine Phenothiazine, preferably in the liquid form; Organic Phosphorus compounds, e.g. Neguvon A; Methyridene (I.C.I.) and Thiabendazole (Merck, Sharpe and Dohme), be used for these *strategic* drenches.

A *strategic* drench programme would be:

1st of August.
1st of December.
1st of March.

It is suggested that any one of the drugs mentioned above could be used successively. These *strategic* drenches should be administered to *all* sheep on the property, and be carried out with precision and regularity.

Vagaries of weather and climate govern the administration of the *tactical* drenches. Here one must be guided by the climate and the general condition of the sheep and other circumstances. For tactical drenching I would propose an alternation of the drugs mentioned above.

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NOTES ON THE USE OF NEGUVON A† AS AN ANTHELMINTIC BY SUBCUTANEOUS INJECTION

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SUMMARY

"Neguvon A" injected subcutaneously at dosage rates of 24–31 mg/Kg, had a marked anthelmintic effect against the common nematodes of calves.

INTRODUCTION

The efficacy of "Neguvon" and "Asuntol" as anthelmintics—when administered orally is well known[1, 3]. A small trial was carried out at the end of 1959, with "Neguvon A" administered by subcutaneous injection to test its efficacy as an anthelmintic, when administered by this route.

MATERIALS AND METHODS

An aqueous suspension of "Neguvon A" containing 200 mg/ml was prepared. The suspension was injected at dosage rates varying from 24–31 mg/Kg live weight.

Fifteen calves were used in the trial. Seven served as untreated controls and 8 calves were injected with "Neguvon A". Faecal specimens were collected from each calf on the day of treatment (18 September, 1959) and 11 days later (29 September, 1959). Egg per gram counts and larval differentiations, were carried out on each specimen using standard techniques[2].

RESULTS

These are summarised in Table 1.

† Neguvon A a proprietary preparation consisting of—

dimethyl-hydroxy-trichloro-ethyl-phosphonate	43.2% w/w
chloromethyl-coumarine-diethyl-thiophosphate	4.3%
Inactive ingredients	52.3% w/w

TABLE I

RESULTS OF A FIELD TRIAL USING "NEGUVON A" SUSPENSION (200 MG/ML) BY SUBCUTANEOUS INJECTION

Group	Date	Mean *Strongyle* e.p.g.	*H. placei.*	*Cooperia.* spp.	*B. phlebotomum*	*Trichostrongylus* spp.	*O. radiatum*
Controls	18.9.59	197	116	56	20	5	0
	Range	(64-416)	(35-240)	(0-349)	(0-25)	(0-17)	(——)
	29.9.59	187	156	15	15	1	0
	Range	(0-288)	(0-262)	(0-67)	(0-38)	(0-9)	(——)
Mean % difference		−5%	+34%	−55%	−25%	−80%	—
24–31	18.9.59	288	130	45	43	8	21
mg/Kg	Range	(32-448)	(21-367)	(0-255)	(0-140)	(0-36)	(0-9)
"Neguvon A"	29.9.59	49	20	14	13	2	0
	Range	(0-128)	(0-105)	(0-77)	(0-58)	(0-13)	(——)
Mean % decrease		−78%	−78%	−69%	−70%	−75%	−100%

The most marked effect was noted against *H. placei*, when the treated animals were compared with controls. In addition, although not shown in the table, half the treated calves were completely cleared of infestation. Only one of the controls lost its infestation.

No symptoms of toxicity were observed in any of the treated calves. Fairly large oedematous swellings, however, developed at the site of injection within 24 hours. These disappeared within a few days.

DISCUSSION

Due to the fact that the calves were privately-owned, the dosage rates were low and the optimum dosage rates could not be determined. It is possible that higher dosage rates would prove more effective.

ACKNOWLEDGEMENTS

The Director of Veterinary Services is thanked for permission to publish this article.

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VERBLOEMDE BESMETTING VAN *AKTINOBASILLUS LIGNERESI* DEUR *CORYNEBAKTERIUM* OP 'N PLAAS IN DIE SUID-VRYSTAAT

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(In Januarie 1962 vir publikasie ontvang)

OPSOMMING

Die verdwyning van *Corynebakterium* absesse en vervanging deur *Aktinobasillus ligneresi* absesse op 'n groter skaal na inenting met *Corynebakterium*-entstof, stam 9036 groep IX, aangehelp deur beserings opgedoen deur ongekerfde boontjiehooi te voer, word beskryf.

INLEIDING

Die boerdery metode op die plaas, waar 580 beeste aangehou was, bestaan uit Frieskoeie, vir vars melk produksie, hansgrootmaking van kalwers, Bonsmaras, Afrikaner osse om mee te ploeg, en vetmaak tollies en verse vir slagting.

Die pasgebore kalwers word van hulle moeders verwyder en in aparte hokke in 'n groot skuur gehou, afgeskort deur hout en sink, wat gereeld daagliks skoongemaak is. Weens gebrekkige watervoorsiening en omdat 'n besem nie daar kon inkom nie, is daar nie teenaan en onder die afskortings, skoongemaak nie.

Die eerste week van hul lewe is hulle van eie moedersmelk voorsien waarna hulle van die gesamentlike melk van die kudde gegee is. Op die ouderdom van twee maande is hulle geskuif na afgekampte kalwer krale, waar die vloer net om die hooirak en krip onder die afdak van sement voorsien was: om die waterkrippe was ook nie sement nie. Behalwe vir die melk, is hulle van kuilvoer en boontjiehooi voorsien wat op die plaas gekweek is. Die boontjiehooi was gekerf totdat die kapmasjien gebreek het waarna heel boontjiehooi aan al die diere gevoer is.

Selfs jong kalwers is van elders ingebring vir grootmaking. Die kalwers is snags in die kampies gehou en bedags laat wei op aangeplante weidings. Na spening is hulle snags in klein sementlose kampe met hooirakke en voerkrippe gehou en bedags laat wei op aangeplante weidings. Dieselfde geld vir alle groot diere.

Vir vetmaking op 24 maande is die diere permanent in klein kampe gehou en intensief gevoer tot ouderdom 30 maande.

Die hele sisteem is ideaal vir verspreiding van besmettings en kieme indien die higiene iewers nie gehandhaaf word nie.

Werkwyse

Op die plaas in die Suidelike Vrystaat is twaalf koeie ingebring vanaf elders gedurende Februarie 1958. Die koeie het op aankoms submaxillare-linguale en parotiede versweringe getoon, en geleidelik vermaer asook uierontsteking en bloedarmoede getoon. Die abses etter was tipies geelgroen en taaierig soos gesien by *Corynebakterium.*

Verskeie abses monsters is versend vir bevestiging van Corynebakterium en positief gevind deur drr. Abrams en van Drimmelen van die Onderstepoortse Navorsing Instituut.

Ten spyte van herhaalde waarskuwings dat oopgemaakte absesse se etter opgevang en verbrand moet word; is die vrylik oopgemaak, soms nie vernietig nie; andere het self oopgebreek en so die besmetting versprei onder die kudde, met letsels soos bo uiteengesit en selfs septisemie en vrektes. Op die stadium het reeds 33 gevrek en/of moes geslag word weens veelvuldige absesse gevolg deur granulomata om die keel en kop, en uierontstekings.

Die toestand het so vinnig versleg, dat om 'n *Corynebakterium*-entstof aangevra is, in 1960. Teen die middel van Junie 1960 is 'n entstof ontvang, stam 9036 groep IX, bedoel vir 'n ander eienaar, waar aborsies onder skape voorgekom het. Die entstof is verkeerdelik by die kudde gebruik.

Absesse en swelsels het dadelik begin wegdroë en die algemene toestand het verbeter.

Hierdie was die stilte voor die storm, daar na drie maande absesse op onrusbarende wyse voorgekom het onder die kudde. Diere van alle ouderdomme en geslagte is aangetas. Alle oppervlakkige kliere om die kop en keel het versweer, waarvan party tot ses duim in deursnee was. Met oopbreking is opgemerk dat die kleur van die etter nou geel was en nie meer geel-groen soos tevore nie, terwyl granulomata feitlik by iedereen voorgekom het, met verspreiding na die omliggende weefsels.

Monsters is weer versamel en in plaas van *Corynebakterium* is toe *Aktinobasillus ligneresi* vasgestel (deur dr. Cameron).

Die toestand het vinnig versleg en die verspreiding was geweldig. Gevalle het voorgekom van houttong, akute en kroniese opblaas, talle diere met geswolle submaxillare sublinguale en retropharyngeale kliere, aantasting van maseter groep spiere by kalwers, vermaering met bloedarmoede en vrektes. Van 144 tollies ondersoek, het 99 vergrote kliere getoon, tussen 30–40% van al die kalwers was aangetas en van 67 koeie getoets was net 29 negatief vir mastitis.

Lykskouings

Absesse van meeste kliere in kop en nek, is aangetref met verspreiding na omliggende weefsels; swere in longe en lewer; selfs aantasting van die ruminale wand in die cardia, met drukking op die oesophagus en trosse in die omaso-abomasale opening, milliere letsels en uierweefsel versweringe met cachexia het voorgekom.

Behandeling

Altesaam 52 beeste, groot en klein is met Natrium Jodied 10% behandel met 'n dosis van 10 onse per 1,400 lb. lewendige gewig, binneaars alle veertien dae, en tot drie keer herhaal. Tesame hiermee is penisil-

lien, 3 miljoen eenhede, vir vier agtereenvolgende dae saam met elke behandeling toegepas.

Sewentien het gladnie reageer nie terwyl by die res net 'n tydelike herstel ingetree het met heruitbreke.

Gevolgtrekking

Op die stadium het dr. Cameron ook 'n besoek ter plaatse afgelê en is dit bevind dat:

(i) Die koeie deur die hoë presentasie mastitis, moontlik te wyte aan *Aktinobasillus*, die kiem na kalwers versprei het. Vergrote limfkliere het selfs in kalwers voorgekom wat nog geen veevoer ontvang het nie.

(ii) Die droë ongekapte boontjie hooi het die mond, pharynx- en oesophagus slymvliese beseer wat gedien het as poorte van die ingang vir die kiem en bevorderlik vir verspreiding was.

(iii) Dat alle kampe en weidings besmet geraak het deur natuurlike oopbreking en onverskillige oopsny van absesse.

Verdere Voorkoming

(Hierdie maatreëls is deur dr. Cameron voorgestel)

Berus op twee pilare, naamlik:

(i) Van die teoretiese oogpunt gesien dat die hele kudde tot niet gemaak en die plaas leeg laat lê word vir minstens twee jaar voor herstokking, of

(ii) geleidelike opbouing van 'n skoon kudde deur:

(*a*) Uitskakeling van besmette diere, insluitende,

(*b*) Gedeeltelike ontruiming van kalwerstalle en deeglike ontsmetting met formalien 2–5% en seepsoda 5% en vir 'n tyd leeg laat lê.

(*c*) Alleenlik melk van mastitis-vry diere vir mens en dierlike gebruik aan te wend of net gekookte melk te gebruik.

(*d*) Waar kalwers nogtans besmetting opgedoen het moet hulle onverwyld verwyder word.

(*e*) „Skoon" diere, veral kalwers, moet in skoon kampe en krale gehou word.

(*f*) Hooi gevoer aan kalwers, moet van kampe kom waarop geen besmette diere gewei het nie.

(*g*) Boontjiehooi moet liefs nie aan kalwers gevoer word nie, maar vervang word deur lusern hooi.

(*h*) Waar dit wel gebruik word, moet die boontjiehooi sorgvuldig gekerf word.

(*i*) Bestaande kudde te verklein sodat kampe ontsmet kan word en leeg te laat lê.

(*j*) Sement blaaie om drink- en voerbakke te lê.

(*k*) Stormwater vanaf besmette kampe moet nie deur ontsnette kampe vloei nie.

(*l*) Behandeling van besmette diere kan geskied, maar Natrium Jodied het geen helende invloed gehad nie.

Bedanking

Die Direkteur van Veeartsenydiens word bedank vir die toelating gebruik te maak van ontledings op Onderstepoort uitgevoer en ook dr. Cameron vir raad en advies.

Summary

A veiled infection of Actinobacillus ligneresi, by *Corynebacteria* in a cattle herd of all age groups, is described. Abscesses due to Corynebacteria disappeared after immunization with *Corynebacterium* Vaccine Strain 9036 Group IX, but were replaced by others due to *Actinobacillus ligneresi.*

Injuries inflicted in the buccal and pharyngeal regions by feeding on unchaffed bean-hay probably assisted in the spread of the infection.

It is likely that the infection was introduced into the herd by the importation, in February, 1958, of 12 cows which showed submaxillary, lingual and parotid abscesses at the time of their introduction.

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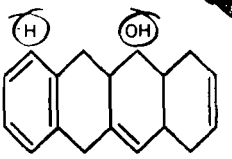

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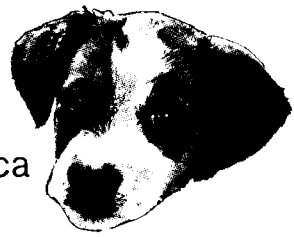

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SOME SURGICAL ASPECTS OF POST-NASAL RESPIRATOTY STRIDOR IN CATTLE

D. H. G. IRWIN — Department of Surgery, Faculty of Veterinary Science, Onderstepoort, University of Pretoria

(Received for Publication December, 1961)

SUMMARY

Observations concerning the aetiology, pathology, signs, diagnosis, treatment and prognosis of respiratoıy stridor in cattle are recorded, and 20 cases are summarized in a table. Techniques for performing tracheotomy and laryngotomy are described and complications following laryngotomy are mentioned.

Stridor ("a shrill, harsh sound")[1] associated with respiration is perhaps one of the most distressing afflictions which veterinarians encounter in animals. Older authorities[2, 3] describe various aetiologies, complications and treatments for the relief of respiratory stridor in cattle. A search through recent literature for further information was fruitless.

The 20 cases on which this paper is based are listed (Table I).

AETIOLOGY AND LOCAL PATHOLOGY

Foreign objects presenting sharp points like wire, thorn twigs and flat metal, which lodge in the pharynx and upper oesophagus, cause inflammation and swelling which reduce the diameter of the airway and cause stridor (see fig. 2). Rounded objects (apples, potatoes, etc.) are more likely to produce choking, or oesophageal occlusion, resulting principally in hoven.

Side to side narrowing of the trachea due to advancing fibrosis of lesions may develop as early as six weeks or up to six months after an attack of lumpy skin disease. Respiratory difficulty gradually worsened for five years after the inception of lumpy skin disease in one case (No. 20 in table).

Stridor was caused in two cases (11 and 12) by granulomatous fibrous tissue tumours, located in the larynx and the immediately adjacent parts of the pharynx and trachea. These growths were like circular plaques in appearance: 0.5–1 c.m. in diameter, 0.2–4 c.m. high and presented a greyish-white granular surface.

In one case (15) discrete sessile tumors, 0.4–1.2 c.m. in diameter, were removed and shown histologically to be caused by actinobacillosis. The stable mate (16) presented lymphadenitis, presumed to be of similar aetiology. *Corynebacteria* have been cultured from lesions which were causing stridor. In one case (4) stridor was caused by an abscess of approximately 12 ml. in volume in the dorsal pharyngeal wall, and in another (6) by two abscesses, of about 4.5 and 2.5 ml. in volume respectively; each located lateral to an arytenoid cartilage. Several organisms, viz. *Alcaligenes faecalis*, *Streptococcus faecalis*, *Micrococcus flavus* and a plant saprophyte of *Corynebacterium sp.*, were isolated from one case

(12). None of these organisms could be considered as primary pathogens. Material bearing resemblance to corynebacterial pus, and enclosed within a rubberlike pyogenic membrane (14) was shown, by culture and subinoculation, to be sterile, although many different organisms were seen on a stained slide. This abscess was remarkable: the outside of the pyogenic membrane was quite smooth, and the entire sac was easily lifted from its crypt, leaving healthy granulation tissue.

Clinical Signs

The pathognomonic sign, stridor, may be associated with inspiration, expiration or both. Various degrees of cyanosis and air hunger have been noticed. A cool environment and rest cause a diminution in the sound, whilst heat and physical exertion exacerbate it. Distress is often manifest: the head is extended, and in more severe cases the tongue is protruded. Salivation and dysphagia are present in cases associated with a foreign body and/or pharyngitis. A change in contour of the submandibular, pharyngeal or cervical tracheal areas, may be visible or discernible on palpation. As is the case with severe coughing, respiratory stridor may cause pulmonary emphysema. Should relief not be provided, pulmonary emphysema may proceed to the rupture of the alveoli, and dissection of air along the visceral pleura and thence via the mediastinum to the dorsal subcutis. In one case, (7) subcutaneous emphysema embraced the dorsal half of both sides of the body from the mid-cervical area to the ilium.

Examination and Diagnosis

Routine intradermal tuberculin testing is carried out and one positive reaction (3.5 m.m. to 27 m.m. rise) was observed in the cases reported here (19). After a complete general physical examination, a more searching examination of the respiratory system is undertaken, to determine the site and nature of the stridor. Lateral flattening of the trachea may be readily recognised by palpation, if not by inspection. Auscultation is of little assistance in locating the exact seat of pathology, and is only of assistance in recognising pulmonary emphysema once the stridor is relieved. Gentle pressure applied serially to the larynx and trachea may reveal the site of pathology by the fact that where narrowing of the airway is present, even slight additional digital compression from without will greatly aggravate the stridor and distress. Haussmann's gag facilitates manual exploration of the pharynx, larynx and upper oesophagus. A bovine vaginal speculum and good lighting (especially a mirror reflection of the sun) used together with the gag is highly satisfactory for direct visual examination.

Differential leucocyte count, and other blood examinations have not been helpful in differentiating septic from aseptic causes of stridor. Radiology proved useful in one case (20), in assessing the degree of tracheal pathology (fig. 5). Depending upon the degree of urgency of the case and fullness of the rumen, a compromise is made as to when further attemps at location and identification of the lesion are made. If distress is not marked and the rumen is replete, feed and water are withheld 24–30 hours before proceeding.

Tranquillization is recommended: chlorpromazine intra-musculary, 2·5 mgm. per kilo, is effective. Atropine sulphate, I mgm. per 7 Kg. is injected intravenously. As conscious effort by the patient may be necessary to maintain respiration, oxygen supply equipment is prepared before

proceeding with anaesthesia. Chloral hydrate, in 10–12% solution is injected intravenously until the patient goes down gently. If circumstances demand it, oxygen is supplied, (at rates varying from three to nine litres per minute) by a rubber tube passed up the nostril. The Haussmann's gag is applied, and using a lanoline lubricant, (strictly avoiding mineral oil lubricants), an equine stomach tube is introduced into the larynx and quickly passed down the trachea. Once the tube is past the seat of pathology, stridor ceases. The "stomach tube" is slowly withdrawn until stridor commences. Keeping the patient's head-neck angle constant, the tube is marked at the patient's lips, and, upon withdrawal, the tube is measured against the patient's lateral body surface, with the mark again opposite the lips. In this way the location of the lesion may be determined when palpation has not revealed it.

Instruments for the operation are best prepared before commencing the above examination, so that operative treatment may be carried out immediately if surgery is indicated.

Treatment

First Aid

Distressing cases may demand immediate oxygen therapy. Should oxygen supply via a nasal catheter be unrewarding, a canula inserted into the trachea may be lifesaving. In the latter case care is necessary least the lungs be overinflated: this may occur if the lesion precludes overflow of gas via the respiratory passages.

Operative treatment

Removal of foreign objects may be accomplished without recourse to the knife. After care may include parenteral antibacterial treatment, and/or electuaries.

A 23 c.m. long scissors was used to open a pharyngeal abscess (4) under chloral narcosis. The poll was raised and the nose depressed to lessen the chances of inspiration of pus. A mucoid cyst in the pharynx was incised per os.

Tracheotomy

This is indicated to keep heavily pregnant cows alive until the calf has been born, or, until the stridor causing lesion has been overcome. Sometimes lateral or dorsal recumbency is chosen in preference to the standing position. A tranquillizer is administered to restive patients otherwise infiltration of local anaesthetic is sufficient. Using the usual surgical methods and aseptic technique, the dewlap is resected in a deep notch at the site chosen for tracheotomy (see fig. 3). This facilitates the operation and after care. The muscles ventral to the trachea are divided in a mid-sagital plane and the tracheal rings examined. If the rings are wider antero-posteriorly than the radius of Mackinna's tracheotome, this instrument is used. Otherwise the opening into the trachea is made quite simply with the aid of rongeur or nibbling forceps, care being taken to avoid dividing a ring, lest it collapse and later embarrass respiration. Cartilage chips and blood are removed if they enter the trachea. One of the several types of metal tracheotomy tubes for horses or cattle may be used, although a 20 c.m. length of Tygon tubing of appropriate diameter (see fig. 4) is better. One end of this is bevelled to facilitate insertion.

A few centimetres lateral to each side of the tracheotomy wound, a nylon suture is placed through the skin in the form of a loop having a diameter of two or three centimetres. After placing the Tygon tube into the trachea, it is skewered with a silk thread, which is then secured to the previously placed nylon loop sutures. The tube is replaced daily; the silk thread is cut, but the nylon loops are left in for the duration of the intubation period. A fresh silk thread is used to anchor the clean tube, to the nylon loops.

Tracheotomy is of value in providing temporary relief from stridor arising anterior to the mid-cervical region. A month or six weeks seems to be the longest period a bovine can be tubed satisfactorily; cicatrisation of the tissues around the tracheotomy wound develops, making it increasingly difficult to introduce the clean tube each day. Various antibacterial lubricants do little to relieve the increasing amounts of mucopurulent discharge which starts forming about the second or third day after operation.

Laryngotomy has been performed on six patients: two bulls (11 and 12) were cured of stridor, caused by cauliflower-like granulations. A cow was partially relieved by shortening the soft palate (18). Two calves (14 and 15) were immediately relieved when space occupying lesions were excised. Finally, laryngotomy and tubing enabled blistering of cervical lymph nodes to be undertaken (16). Without tubing, the added inflammation and oedema due to the blister may have caused suffocation.

Technique

The patient is anaesthetized (as under diagnosis) and supported in dorsal recumbency, with the head well extended. Standard surgical practice is employed. The dewlap is grasped with Lane's tissue forceps and drawn upwards. A generous semicircle of the dewlap is excised to give ready access to the underlying larynx. The sterno-thyro-hyoid muscles are parted in their mid-sagittal cleavage line and held apart with retractors. A scalpel is used to puncture the cricothyroid ligament. A curved cartilage shear (see fig. 4), is then used to slit the body of the thyroid cartilage, whereupon the equine laryngeal dilator is used. Good exposure of the larynx is thereby obtained, whilst the soft palate is within fairly ready access. In the two bulls (vide supra) the tumors were excised with scissors and haemorrhage was controlled with the electrocautery. Upon dabbing a bleeding spot in the larynx of one bull with an adrenalin (1/1,000 solution) soaked swab, the pulse rate was noticed to rise from about 80 to 120 per minute. Pulse rate dropped to 80/minute in about five minutes after discontinuing adrenalin application.

In one cow (18), the thickened caudal border of the soft palate was excised by the usual technique employed in brachycephalic dogs which have soft palate hypertrophy.[8]

In all cases a Tygon tube was inserted into the trachea via the laryngotomy wound. The procedure adopted for this purpose was similar to that described under tracheotomy. Within a week the post operative oedema had subsided. When the animal breathes freely through the larynx (as proved by removing the tube and plugging the laryngotomy wound) use of the tube may be discontinued. The wounds healed in six to eight days.

In all the three calves in which laryngotomy was performed, an unpleasant difficulty arose during the post operative period. Ingesta was found to collect in the tubes, (15 and 16) and in one case an intercurrent

pneumonia developed but was diagnosed and successfully treated. Milk leaked from the laryngotomy wound of the baby calf (14) for three days after withdrawal of the tube.

This feed leak from the laryngotomy wound is a serious deterrent from undertaking the operation lightly, at least in cattle under six months of age. The cause is undetermined.

PROGNOSIS

Should the cause of stridor be removable, prognosis is good. Tracheotomy to provide relief for incurable conditions is considered in cows seven and one half months or more pregnant. It is obviously also indicated to provide relief until salvage by slaughter can be effected. Side to side tracheal ring collapse following lumpy skin disease usually involves a six to eight centimetre length of the trachea. We have not yet attempted correcting this condition, but the work of several surgeons points the way[4, 5, 6, 7].

Three months after laryngotomy the one bull was almost mute.

ACKNOWLEDGEMENTS

Professor C. F. B. Hofmeyr, Department of Surgery, made helpful suggestions, Dr. J. D. Smit of the Department of Pathology in this Faculty conducted the histopathological examinations. Dr. C. Cameron, Section of Bacteriology did the bacteriological examinations. Mr. du Bruyn made the photographs. To them my thanks are due as to the Director of Veterinary Services for authority to publish this article.

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Case	Breed	Sex	Age	Pathology	Aetiology	Operation/s	Outcome	Remarks
1	Afrikander	Ox	± 2 years	Undetermined laryngeal lesion	Presumably bacterial	—	Recovered	Mild Stridor, Antibacterial treatment
2	?	Heifer	3 months	Pseudomembraneous inflammation	F.B. Thorn bush twig	1. Tracheotomy 2. Removal F.B. per os	Recovered	
3	Friesland	Heifer	14 days	Inflammation & oedema	F.B. Thorn bush twig	Removed F.B. per os	Recovered	Mild Stridor.
4	Afrikander	Cow	± 3 years	Abscess in dorsal pharyngeal wall	Corynebacterium?	Incised per os	Recovered	
5	Brahman	Bull	9 days	Mucoid cyst in pharynx	Developmental? Retention?	Incised per os	Recovered	
6	Friesland	Bull	2 months	Abscess lat. dors. to rt. arytenoid cartilage	Corynebacterium	—	Destroyed	Uneconomic proposition.
7	Jersey	Cow	8 years	Collapse tracheal rings	Lumpy skin disease	Tracheotomy	?	
8	Jersey Fries	Cow	6 years	Collapse tracheal rings	Lumpy skin disease	Tracheotomy	Destroyed 6 weeks later	
9	Afrikander	Cow	3½ years	Laceration of oes. & pharynx inflam. oedema	Flat metal	1. Removal F.B. 2. Tracheotomy	Recovered	
10	Jersey	Cow	± 5 years	Collapse tracheal rings	Lumpy skin disease	Tracheotomy	Destroyed 3 weeks later	
11	Jersey	Bull	3 years	Granulomata, larynx & trachea	Undetermined	1. Tracheotomy 2. Laryngotomy	Recovered	Still mute 4 months later.
12	Afrikander	Ox	2 years	Granulomata, larynx	Mixed infection	Laryngotomy	Recovered	
13	Galloway	Bull	± 4 years	Bilateral laryngeal abscesses	Not cultured	—	Died	Died soon after arrival.
14	Friesland	Heifer	2 months	Bag inspissated "pus"	Sterile on culture	Laryngotomy	Recovered	Milk leak via wound.
15	Friesland	Heifer	4 months	Granulomata	Actinobacillosis	Laryngotomy	Recovered	Feed leak via wound.
16	Friesland	Heifer	4 months	Lymphadenitis	Actinobacillosis	Laryngotomy	Recovered	Feed leak via wound.
17	Friesland	Cow	5 years	Trauna & oedema, pharynx & larynx	F.B.-wire	Removed per os	Recovered	
18	Friesland	Cow	± 6 years	Hypertrophy soft palate Trachea collapse, intrathoracic	Lumpy skin disease	Laryngotomy (± 10% relief obtained)	Died	Two aetiologies: intrathoracic lesion considered inoperable.
19	Jersey	Heifer		Lymphadenitis	Tuberculosis	Lymphadenectomy (biopsy to confirm diagnosis)	Destroyed	
20	Friesland	Cow	9 years	Discrete intraluminal tracheal cartilage hypertrophy & Tracheitis	Lympy skin disease (secondary Corynebacterium)	Exploratory trachetomy (Biopsy)	Pending	

Incidence: 20 cases of post nasal stridor in bovines in 45 month period. Recovery is recorded in cases which were discharged symptom free, and when owners did not report reappearance of stridor.

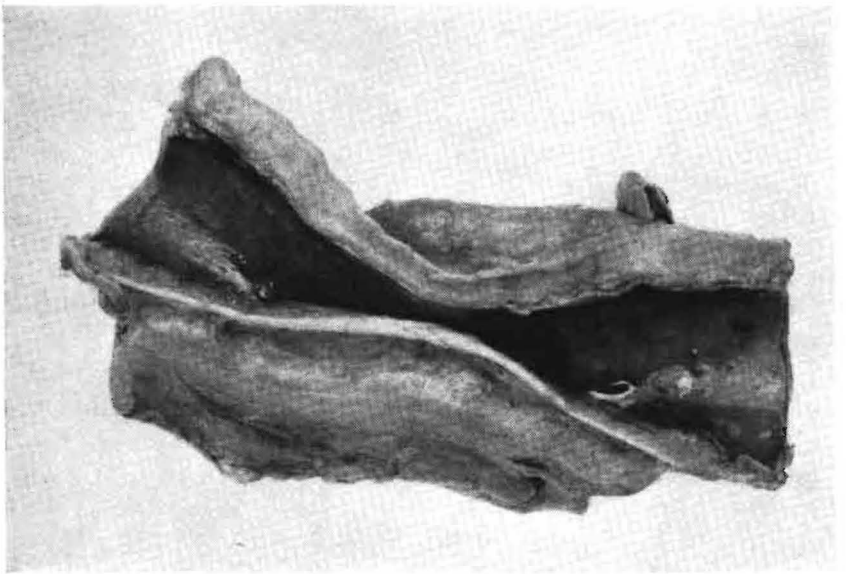

FIG. 1.—Lateral collapse of thoracic tracheal rings.

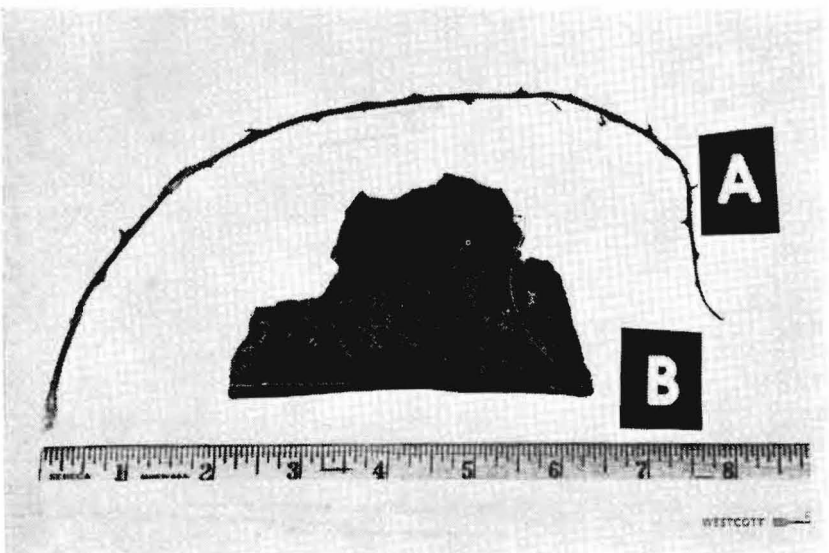

FIG. 2.—A. Length of thorn-tree twig removed from a calf's pharynx.
B. Piece of rusty metal removed from the pharynx of a heifer. Both animals revealed salivation, stridor and dysphagia.

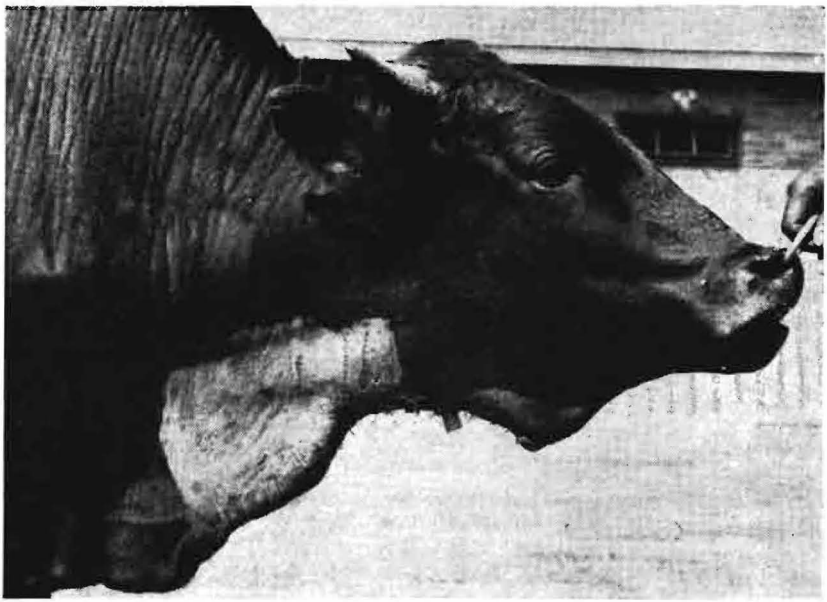

FIG. 3.—Afrikander bull with Tygon tube inserted into the larynx. Note the dewlap is resected.

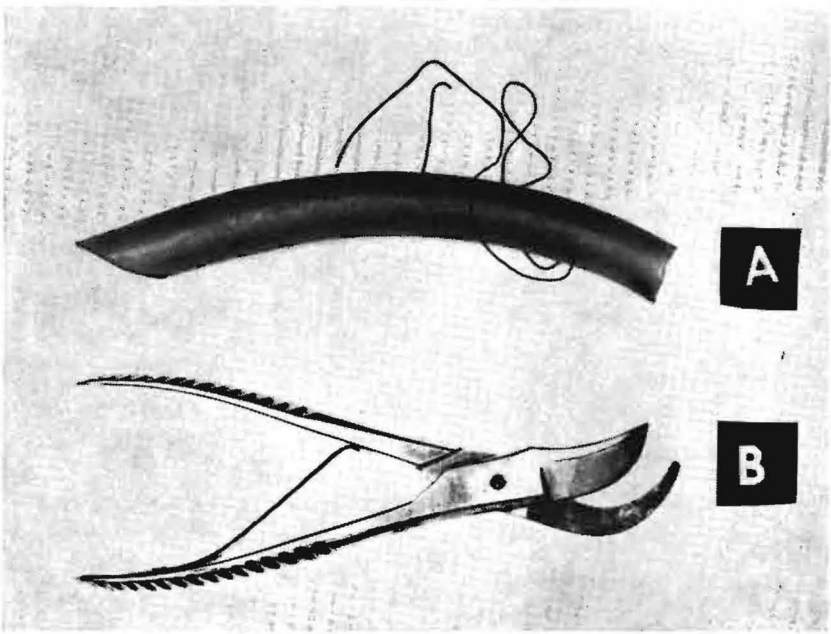

FIG. 4.—A. Tygon tube as used for intra-tracheal insertion.
B. Cartilage shears used to slit the body of the thyroid cartilage.

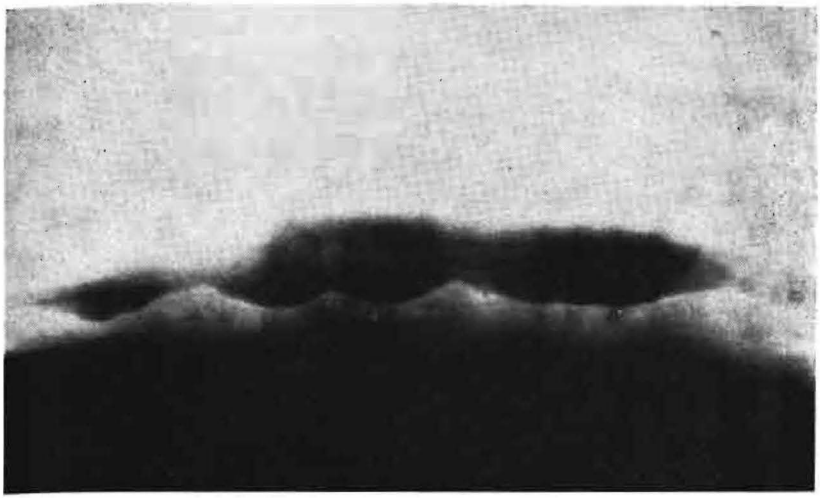

FIG. 5.—Lateral radiograph of trachea, case 20, notice narrowing of trachea, at several points, along the ventral surface.

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FORWARD ANCHORAGE OF RUPTURED LEFT DIAPHRAGM IN A DOG - THORACIC APPROACH

J. F. BROWNLIE—Veterinary Practioner. The Corner House, Cor. Main and Gabriel Road, Plumstead, Cape Town

History.—The dog, a large cross-bred Terrier had been caught a glancing blow by a car.

Clinical Picture.—Shock was evident; mucous membranes were pale; respiration was rapid. Dyspnoea was not marked. On ausculatation the left chest had an overall dullness with a significant lack of heart sounds. The right chest offered an exaggerated cardiac impulse which gave the impression that the heart abutted the chest wall.

Fluoroscopy.—Although usually of considerable help, in this case it was unsatisfactory; giving little thoraco-abdominal differentiation.

X-Rays.—These showed an opacity merging with the heart on the left side. The heart was swung to the right. The right diaphragm was indistinct, and the left not in evidence; the opacity from the left chest appearing continuous with the abdomen.

Treatment.—General anti-shock measures and complete quiet. Mucous membrane colour had improved in 24 hours, and the animal appeared more easy and drank a little water. A further X-Ray showed a clearing of the right chest and an intact right diaphragm. In view of his improved condition the operation was fixed for the following day.

Procedure.—A knock-down dose of $\frac{1}{4}$ Gramme of Intraval Sodium, given speedily and intra-venously, was followed by intratracheal intubation, the cuffed tube inflated and clamped, and linked to a closed circuit of Fluothane and Oxygen. The left chest was prepared and draped. A skin incision was made over the length of the *Eighth* rib (or as we usually find it easier to do, consider it as the *Sixth* rib from the back, -counting forward from the last rib).

Dissecting on to the rib surface, the periosteum was cut lengthwise and stripped posteriorly, under the rib. (*This very useful technique was passed on to me by Donald Lawson of Glasgow, and enables chest entry to be made through the avascular periosteal-pleural membrane*).

The first incision through this membrane produced a characteristic sucking sound. Manual "Bag" compression now took over lung function; the incision was extended and a self retaining retractor inserted. There was no apparent haemorrhage. The liver was pulled back; the spleen (which had swung over) and a tangle of intestine and mesentery which were in the chest cavity, packed posteriorly, and the torn curtain of diaphragm, picked up.

The costal attachments were found to be unusuable, and it was decided to attach the trimmed margin to the periosteal-pleural tissue, under the eighth rib. This was relatively easily carried out using interrupted sutures of No. 1 braided nylon. Before the last stitch was tied, full compression of the Bag inflated the lungs. After tying this, a slight sucking sound was still present, although breathing had resumed spontaneously. A small leak was detected and tied off after full re-inflation of the lungs.

Interrupted sutures, passing through the new diaphragmatic insertion medially, and surrounding ribs 8 and 9, were left untied until, after insertion, the ribs were apposed with Two Allis tissue forceps. Muscles and skin were then brought together routinely.

Within half an hour the dog was lifting his head. After 24 hours breathing was easy, colour good, and auscultation indicated good gas exchange and a normal heart sound on the left side. In ten days the skin sutures were removed. Primary union had taken place. Fluoroscopy this time showed clear lung fields and intact diaphragm, albeit slightly higher on the left.

A final check was made after a further week when the animal appeared lively with a good appetite and an apparently normal respiratory function.

Comments.—Although a simple tear is more commonly encountered, where careful suturing only is required, it is comparatively easy to improvise new diaphragmatic costal attachments, when the original ones are unable to be used: given ofcourse a fair amount of usable tissue.

I consider that an abdominal approach for repair in this case would have been abundantly more difficult.

ACKNOWLEDGEMENT

My thanks go to Dr. S. K. Bakker for the administration of a well co-ordinated anaesthesia.

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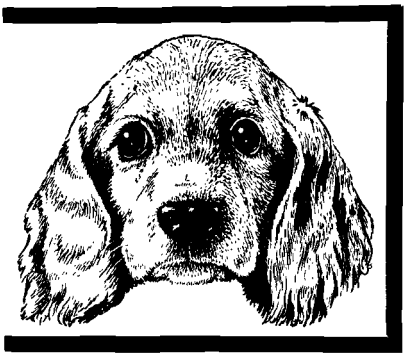

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DILATATION OF THE CAECUM IN DOGS

P. H. LE ROUX — 38 Rhodes Avenue, Parktown, Johannesburg

(Received for publication, December 1961)

INTRODUCTION

The author has identified these cases over a period involving 3,600 routine consultations in practice, and has found that the incidence of this condition is low. However, it is a complaint that must be borne in mind, whenever one deals with a case of acute or chronic digestive derangement, that proves refractory to conservative treatment.

For the sake of clarity the cases can be classified as being acute or chronic. The acute cases seen were in dogs aged between four and nine months. The chronic or recurrent cases had histories of a severe enteritis, at about that time of their lives.

ACUTE CASES

1. FOX TERRIER BITCH (aged nine months)

History and Symptoms.—Persistent emesis for six days; small firm stools; inappetence. General appearance bright. Abdominal palpation produced pain and licking of the lips.

Laparotomy.—The caecum was tightly distended to the size of a golf ball, and could not be emptied by squeezing. It contained gas and a few small dry lumps. A side to side anastomosis between the caecum and colon was performed.

Convalescence.—Emesis ceased and normal feeding was resumed 12 hours later.

2. SCHIPPERKE BITCH (8 months)

History and Symptoms.—Persistent emesis for six days; small firm stools; inappetence. General appearance bright. Abdominal palpation produced pain and licking of the lips. Palpation of the caecum produced a popping sensation and a squeak.

Laparotomy.—The caecum was distended and held in a spiral by fresh adhesions. The condition of the dog deteriorated rapidly during anaesthesia and positive pressure respiration was applied. The adhesions were dissected free, the area sprayed with penicillin suspension and the operation completed as quickly as possible.

Convalescence.—Emesis ceased and normal feeding was resumed 12 hours later.

3. ALSATIAN DOG (5 months)

History and Symptoms.—Brown vomitus and diarrhoea for two days; severe depression; inappetence; temperature of 104.6°; colic. A lateral radiograph of the abdomen showed the caecum distended with gas. There were no gas accumulations elsewhere.

Laparotomy.—The caecum was flaccid and much enlarged. No occlusion of the caecocolic orifice. The caecum was anastomosed to the colon on one side and to the ileum on the other.

Convalescence.—Peritonitis was treated with oxytetracyclene for four days. Thereafter recovery was uneventful and complete.

4. Alsatian Dog (4 months)

History and Symptoms.—This puppy was a half-brother of the Alsation dog described in (3). The symptoms were similar except that the temperature was normal and the dog was fairly alert. Radiographic appearance was identical.

Laparotomy.—The caecum was flaccid and much enlarged. No occlusion of the ileocaecal orifice. After ligating the main bloodvessels to the caecum, the organ rapidly shrank to its normal size. The caecum was removed and a side-to-side anastomosis carried out between the ileum and the colon.

Convalescence.—Uneventful and complete.

CHRONIC CASES

5. Boxer Dog (7 years)

History and Symptoms.—Since the age of six months he had been subject to frequent attacks of diarrhoea and colic. Stools were passed with severe straining and were always soft. Excessive flatus and borborygmi. Palpation produced some squelching from the caecum.

Laparotomy.—The caecum was large and flaccid; partial occlusion of the caecocolic orifice; mesenteric lymph glands swollen; tortuous bloodvessels on the ileum caecum and colon. A side to side anastomosis between the caecum and colon was performed.

Convalescence.—Rapid. Weight increased (from 58 lb. to 70 lb. in three weeks); Stools normal except for an occasional soft stool.

6. Crossbred Fox Terrier — Alsatian Dog (4 years)

History and Symptoms.—Since the age of six months he had been subject to frequent attacks of diarrhoea and colic. Stools were passed with severe straining and were always soft. Excessive flatus and borborygmi. Palpation produced some squelching from the caecum.

Laparotomy.—The caecum was large and flaccid; partial occlusion of the caecocolic orifice; mesenteric lymph glands swollen; tortuous bloodvessels on the ileum, caecum and colon. A side to side anastomosis between the caecum and colon was performed.

Convalescence.—Rapid. Weight increased . Stools normal.

7. Boxer Dog (6 years)

History and Symptoms.—When acquired at the age of four years by his present owner, the dog showed frequent attacks of diarrhoea and colic. Stools were passed with severe straining and were always soft. Excessive flatus and borborygmi. Palpation produced some squelching from the caecum.

Laparotomy.—The caecum was large and flaccid; partial occlusion of the caecocolic orifice; mesenteric lymph glands swollen; tortuous bloodvessels on the ileum, caecum and colon. A side to side anastomosis between the caecum and colon was performed.

Convalescence.—Normal stools passed after two days. After two weeks the animal developed the same symptoms again and the condition is still unchanged.

8. Pointer Dog (18 months)

History and Symptoms.—Since the age of six months he had been subject to frequent attacks of diarrhoea and colic. Stools were passed with severe straining and were always soft. Excessive flatus and borborygmi. Palpation produced some squelching from the caecum. The animal had a voracious appetite; was emaciated; and showed a watery diarrhoea.

Laparotomy.—The caecum, colon and rectum were extremely distended with gas. A side to side anastomosis between the caecum and colon was performed.

Convalescence.—Rapid. Weight increased stools normal except for an occasional soft stool.

9. Bull Mastiff Dog (2 years)

History and Symptoms.—Since the age of six months he had been subject to frequent attacks of diarrhoea and colic. Stools were passed with severe straining and were always soft. Excessive flatus and borborygmi. Palpation produced some squelching from the caecum. General condition good.

Laparotomy.—The caecum was amputated. Unfortunately cardiac failure due to CO_2 accumulation in the anaesthetic apparatus caused its death.

10. Cocker Spaniel Dog (10 months)

History and Symptoms.—Since the age of six months he had been subject to frequent attacks of diarrhoea and colic. Stools were passed with severe straining and were always soft. Excessive flatus and borborygmi. Palpation produced some squelching from the caecum.

Laparotomy.—The caecum was large and flaccid; partial occlusion of the caecocolic orifice; mesenteric lymph glands swollen; tortuous bloodvessels on the ileum, caecum and colon. The caecum was amputated.

Convalescence.—The dog contracted distemper shortly after the operation, but after two weeks he made a complete recovery.

Notes

The Diagnosis

In acute cases the symptoms are those of ileus. The state of the patient demands an exploratory laparotomy in any case. In chronic cases an objective evaluation of the history as well as a thorough clinical examination is important. Samples of blood, faeces and urine had to be examined to differentiate dilatation of the caecum from the following conditions:

(1) Diet too high in meat content;

(2) Digestive upset due to eating too many bones or foreign material due to a depraved appetite;
(3) Disturbed protein or fat digestion;
(4) Stenosis of the bowel due to adhesion, scar tissue, old intussusception or neoplasms;
(5) Chronic nephritis.

There are doubtless other conditions that have to be eliminated, but these are the more obvious ones.

Preparation of the Patient

Vitality of these dogs is very low. It is therefore important that appropriate fluid therapy as well as prophylactic use of enteric sulfonamides and antibiotics be employed.

Anaesthetic

Thiambutene Hydrochloride followed by ether administered in a closed circuit apparatus was used in all cases.

Technique

The technique employed to correct the condition may vary from one case to the next, but amputation of the caecum appears to be the simplest. If doubt exists as to the patency of the iliocaecal orifice, a lateral anastomosis should be done. The most convenient method is to insert a Cushing suture alongside the intended line of the anastomosis, joining the ileum to the colon. The opposing incisions are next made and the cut edges joined with a continuous suture through all coats to arrest the haemorrhage. Continue the Cushing suture around the junction.

After Care

No special care is needed. If the diagnosis was correct, the progress should be rapid.

Prognosis

The improvement in these cases was satisfactory except for (7). The initial improvement followed by a relapse was due to correct diagnosis, but the technique was faulty. Since this case, amputation of the caecum has been preferred.

ACUTE VULVO-VAGINITIS POSSIBLY CAUSED BY A VIRUS

T. C. W. WESSELS — Veterinary Practitioner, P.O. Box 2, Tweespruit, O.F.S.

(Received for publication, November 1961)

INTRODUCTION

During the driest part of our season last year; (on the 11th of September, 1961), a request was received from a local farmer to examine 16 Friesland females of breeding age, as he had noticed a peculiar genital infection among them.

HISTORY

These females consisted of 5 cows heavy in calf, the remainder being heifers of breeding age, which were running in a camp in which the grass was tall, dry and unpalatable.

Two weeks previous an insufficiently Burdizzoed ox had jumped the fence and started serving these females. He was a vigorous server. After he had remained with the females for a week, the owner noticed the peculiar genital condition. The ox was then removed from the females.

CLINICAL EXAMINATION

These females were in a poor condition. Nine of them showed elevated tails as is seen with a metritis; the vulvas were acutely swollen and painful. An acute vaginitis extended from the vulva, forward to a third of the distance of the vagina. Some parts of the mucous membrane had an angry red appearance while other parts were diphtheritic. Some cases showed pinpoint haemorrages within the angry red areas. There was a profuse discharge of an haemorragic nature in a few of the cases. Four of the very acute cases were cows heavy in calf. The remainder were not pregnant. The anterior two thirds of the vagina and cervix showed only slight inflammation.

This herd had a very severe vibrio foetus infection 5 years previously when A.I. was introduced and maintained up to two years ago. The possibility of an atypical vibrio foetus infection due to adverse conditions, was therefore borne in mind.

Nine swabs with puss were sent to Onderstepoort for vibrio foetus tests, but through an error the tests were not applied.

The condition was discussed with Dr. John Maré of Onderstepoort, who suggested that more puss swabs and also serum from the severe cases, should be sent so that virus identification could be undertaken.

This was done about a month later (1st October, 1961), when the 16 head concerned were re-examined.

The virulence had now considerably subsided. The vulvas were no longer swollen and painful. In all cases a few pinpoint haemorrhages were still discernable especially around the clitoris and also at the junction of the vulva and the vagina.

In only one case could a fairly profuse muco-purulent discharge be found. The last third of the vagina was still slightly red and haemorrhagic,

probably intensified as a result of the introduction of the speculum. In a few cases small purulent pustules the size of a rice grain were seen. The granular nodules in the posterior vagina were more prominent than is normally seen.

Not one of the pregnant cows aborted. Two swabs and 5 serum samples were forwarded to Onderstepoort.

One of the swabs was returned positive for vibrio foetus. Dr. John Maré reported that of the 5 serum samples, 3 were positive for virus vaginitis F.H. 335 antibodies.

Therapeutics

No treatment was undertaken.

Conclusion

The condition was not regarded as Vibriosis.

The ox was considered to be the carrier of the virus. He must have served the incalf cows as well as the heifers; hence the prominence of the lesions in the posterior part of the genital tract.

Adverse climatic conditions might also have influenced the virulence of the infection.

The rains came and the condition has passed like a mist before the morning sun.

ACKNOWLEDGEMENT

My sincere thanks are due to Dr. John Maré of Onderstepoort for his endless enthusiasm and help.

TWO CASE REPORTS

T. C. W. WESSELS — Veterinary Practitioner, P.O. Box 2, Tweespruit, O.F.S.

CASE 1. A DWARF FRIESLAND COW AND FAMILY

On the 31st of October 1961, I was called upon by a prominent farmer to examine and treat his son's pet dwarf Friesland cow.

Upon arrival it was obvious that this patient was indeed a dwarf Friesland. She was a true Black and White, standing 3 ft. 7 in. at the shoulders: had four permanent incissor teeth and weighed 275 lb. In her lifetime she had produced two normal live calves from two different bulls, the last in August, 1961.

She and her maternal family had been with this farmer as pets for the last 14 years.

Her mother was an undersized Friesland which had originated from a prominent Friesland herd and could be described as a dwarf. In her lifetime the old cow had seven calves from various normal Friesland bulls, and four were dwarfs. Of her seven calves two were Red and Whites and one of these was a dwarf—the only male.

The old cow and her daughters were all "good doers" with the exception of this patient. She drank milk for the first week in her life, and then refused it, in favour of food for a grown bovine. She consequently did not attain the size of her dwarfed half-sisters.

The clinical examination revealed a moribund subject: lying down and rising with reluctance. The abdomen was tremendously distended and atonic.

On percussion it was obvious that there was a lot of fluid in the abdomen. The rectal temperature was 103°; the heart was audible on the left side of the chest but not on the right. The heart rate was 80 per minute and the pulse soft and feeble. On percussion, the chest was normal on the left, but on the right there was a deep dull sound over the cardiac area. The lungs were normal but the breathing laboured. The animal moved stifly and with difficulty.

Bloodsmear examination revealed a neutrophilia. The metal detector gave a positive indication. The case history revealed a deterioration of her condition since her last calving in August. Two days before this examination she refused to eat any solids and only drank water, which was reguritated periodically and associated with grinding of the teeth. There were bouts of diarrhoea.

Considering all these facts a diagnosis of foreign body and a poor prognosis was given.

The owner insisted upon a rumenotony to satisfy his son; which was undertaken reluctantly.

Upon opening the rumen 15–20 gallons of greenish watery ingesta, with very little vegetable material, gushed through the incision.

When the flow had subsided a search was made for foreign bodies. The reticulum was enlarged and distorted, and showed a pouch which entered a breech of 5 in. in the diaphram to the right of the heart. With difficulty this was penetrated; the heart being encountered. A diaphragmatic hearnia had been exposed which accounted for the cardiac dullness

over the right area. Initially it resembled an abscess. The floor of the rumen extended from the diaphram to the pubis and gave a slippery soapy feeling.

Without closing the rumenotomy wound the animal was destroyed and a post mortem examination conducted. This revealed extensive adhesions of the ventral portion of the rumen with numerous purulent focci from the diaphram to the pubis. There was a hernia through the diaphram to the right of the heart with well developed adhesion between the herniated reticulum and the diaphram. There were some iron filings in the abdominal part of the reticulum, which at the time of the operation was thought to be sand. On finding the hernia at the operation, it was decided not to use the magnet. All the other organs revealed nothing unusual but appeared to be on the small side. The ruminal wall appeared very thin.

This condition of hearniated reticulum possibly started at calfhood, when the animal refused milk as a week old calf and gradually worsend as time went on. The weakness may have been hereditary.

CASE 2. NOCARDIOSIS IN A FRIES BULL

This bull was purchased by a prominent farmer in this area at the September stud sales in Bloemfontein during 1960.

A month after his arrival on the farm he developed acute foreign body peritonitis. Rumenotomy was performed promptly on him and he made a satisfactorily recovery, primary intention healing having taken place.

Eight months after the operation, at the very site of the incision, a lump developed over the full length of the scar. This increased considerably in size. The animal became less active but was not uncomfortable nor sick. A month later I was consulted and was at a loss.

As satisfactory results had been obtained with anthiomaline in the case of some tumour cases, this and penicillin was tried but without success.

It was decided to operate. The tumour was 8 in. long and 5 in. wide. It was wedge-shaped and appeared to be malignant. Specimens from it, preserved in formalin were sent to Onderstepoort. A report of Nocardiosis was received together with a request for more material, in order that, bacteriological examination could be undertaken. The only available material was some necrotic blood clots. This was forwarded in the hope that something could be made of it. A report indicating the presence of *Corynebacterium pyogenes* was received. The bull was given large doses of penicillin and streptomycin up to the time of receipt of the report indicating Nocardiosis, when four intravenous injections of 1 oz. sodium iodide at weekly intervals were administered. The crater was dressed twice a day with a proprietary remedy called "Iodised Oil".

Recovery was uneventful and the animal is gain being used in the herd, where he is as active as ever.

ACKNOWLEDGEMENT

My thanks are extended to Drs. Smit and Cameron of Onderstepoort for undertaking the examinations on the material submitted.

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'N PAAR LOSSTAANDE ONDERVINDINGS IN PRIVAAT PRAKTYK

J. P. KRIEL — Praktiserende Veearts, Baxterlaan 14, Durbanville, Kaap

(In Desember 1961 vir publikasie ontvang)

INLEIDING

Privaat praktyk bied uit die aard van die saak nie veel geleentheid vir navorsing nie. 'n Paar losstaande ondervindings word hier beskryf en motiveer, wat miskien ook vir iemand anders nuttig mag wees.

OOFOREKTOMIE OP BRONSTIGE TEWE

Dikwels, ontdek die eienaar dat die teef bronstig is, met alles wat daarmee gepaard gaan. Hy raak desperaat en teen heug en meug moet die teef gesteriliseer word. Om haar in 'n hondehok te laat sit, bring heelwat koste mee en dikwels wil hy, om sentimentele redes, dit ook nie graag doen nie.

Met geringe voorsorg kan die operasie met min moeite en met veiligheid onderneem word. Eerstens word die teef net voor die operasie 100 mg. *vit. K* (SYNKAVIT Roche Products Ltd.) gespuit. Tenspyte van alle teoretiese bespiegelings, in praktyk werk dit. Tweedens word van 'n dik dermsnaar gebruik gemaak; gewoonlik 'n No. 4. Die dik dermsnaar is minder geneig om deur die sagte weefsel te sny as die dunne. In plaas van die ligatuur té styf te trek, word dit net redelik styf getrek en drie of vier maal herhaal. Die gesamentlike drukking sluit dan die bloedvate volledig af, maar omdat dit oor 'n breë oppervlakte is, sny dit nie die weefsel nie.

Die operasie is nie moeiliker nie; daar is geensins meer bloeding en geen groter risiko as aan die gewone operasie verbonde nie. Daar is ook nog nie enige tekens waargeneem dat die dermsnaar nie geabsorbeer word nie. Hier word 'n ooforektomie op 'n bronstige teef nooit geweier of ontmoedig nie. Daar word net 30 sent vir die ampule *vit K* by die fooi gevoeg.

DIE ONTHOORNING VAN GROOT BEESTE

Dit is nouliks nodig om 'n saak uit te maak vir horinglose groot beeste. Op Onderstepoort het ons geleer dat die onthoorning van groot beeste so ver moontlik ontmoedig moet word, hoofsaaklik weens die sinusitus wat agterna ontstaan. In 'n Amerikaanse tydskrif het ek ook gelees, „Moet nooit 'n Keystone horingknipper besit nie." Ons het dan ook nie die tegniek juis geleer nie, hoewel ek toegee dat daar heelwat van my kollegas is, wat onthoorning toepas. In 'n kudde van byna 300 beeste wat onthoring is, het die melk vir slegs een dag geval terwyl slegs in twee gevalle 'n sinusitus aan die een kant ontstaan het, wat ook nie veel probleme opgelewer het nie.

Die tegniek wat gebruik word is kortliks soos volg: 'n Aantal koeie word in 'n drukgang gejaag en die horing verdoof soos beskryf in *Veterinary Anaesthesia* van WRIGHT. Die hare rondom die horing word

dan deur helpers, vooruit, met 'n skaapskêr weggeknip. Dit het die voordeel dat die hare nie in die wond val nie en ook dat 'n mens presies kan sien waar die groeisone is. Die horingknipper staan in 'n emmer met 'n betroubare ontsmettingsmiddel. Aan die end van die drukgang word die bees se kop in 'n klamp gevang. Die horingknipper en die bees se kop word hanteer, volgens die metode wat beskryf word op die pamflet wat saam met die knipper gegee word. Ek kan nog daar byvoeg dat dit noodsaaklik is dat die buitenste lem van die knipper onder is, en dat daar 'n persoon by is wat op die punt van die knipper kan druk, en toesien dat daar beslis onder die groeisone geknip word. Daarna word die knipper terug geplaas in die ontsmettingsmiddel. 'n Tou word styf om die basis van die horings gebind om bloeding te beheer. Op die wond en in elke sinus word 'n teelepeltjie Terramycin poeier gegooi, en die gate word so styf moontlik met skoon watte gestop. Die ontsmettingsmiddel moet ook nou-en-dan vervang word, en die persoon wat met die watte werk, moet sy hande in ontsmettingsmiddel was, en nie die wond hanteer nie. Buiten dat die toue die volgende dag afgehaal word, is geen verdere aandag nodig nie.

Dit is wenslik om 'n stukkie embriotoom-draad by-der-hand te hou vir die knyphorings. Ook is sommige van die baie ou koeie se horings so hard dat dit skare in die lemme van die knipper maak. Bulle se horings kan ook te hard en te dik vir die knipper wees. Genoemde gevalle word dan liefs met die embriotoom-draad afgemaak.

Retikulo Peritonitis

Ek wil graag iets sê na aanleiding van die artikel van dr. O. Dietz oor „Differential diagnosis of traumatic reticuloperitonitis," in die Maart 1961 uitgawe van *Tydskrif* van die S.A.V.M.V.

Terwyl die gevalle van draad by beeste steeds toeneem, nie alleen weens draad in die bale voer nie, maar ook weens die ophoping van ou drade op die plase, en miskien ook weens die toename in die melkbeesbevolking, is 'n mens baie bly oor so 'n uitstekende artikel soos dié van dr. O. Dietz.

Die doel van hierdie skrywe is dan net om die ondersoekings rumenotomie wat hy ook daar noem te beklemtoon. In hierdie praktyk gaan selde 'n dag verby sonder een, of 'n paar rumenotomies, en by 'n paar geleenthede is vyf per dag gedoen. Genoemde gevalle is gedoen vir draad, en sluit nie in die gevalle waar 'n klomp diere hulle oorvreet het nie. Om die totaal oor 'n tydperk van 14 jaar op 'n paar duisend te stel, sal seker nie 'n oordrywing wees nie. Ek het tot die gevolgtrekking gekom dat die sukses van die operasie afhang van hoe gou dit gedoen word, nie alleen wat betref die uiteindelike herstel van die koei nie, maar ook hoe gou sy weer in produksie gaan kom. 'n Koei in die laaste helfte van laktasie mag heeltemaal opdroog, en met die klein winsgrens in die melkery, kan dit heeltemaal onekonomies wees om die bees aan te hou. Dit hang dus af van hoe oplettend die eienaar is en hoe snel jy optree nadat jy ingeroep is.

Dit spreek vanself dat so 'n uitgebreide studie van elke geval net nie moontlik is, in 'n eenmans praktyk nie. Voeg daarby dat die afstande dikwels groot is, dan het 'n mens aan reiskoste feitlik meer bestee as die fooi vir die operasie. As jy dan drie of vier dae neem om 'n besliste diagnose te maak, of voordat jy besluit om 'n ondersoekings-operasie te doen, is die prognose ook nog swakker.

Die beleid is dus om die instrumente altyd gesteriliseer in die motor te hou. Op die plaas word 'n kliniese ondersoek so deeglik moontlik gedoen. 'n Aseton toets kan ook ter plaatse gedoen word. As daar dan enigsins twyfel bestaan oor die moontlikheid van draad al dan nie, word onmiddellik 'n ondersoekings-operasie gedoen. As alles voorspoedig gaan, is die geval binne 'n halfuur afgehandel. Dit is in hierdie omgewing waarskynlik nie in meer as 1% van daardie gevalle dat draad nie die oorsaak van die siekte is nie. 'n Koei wat nie draad het nie en wat geopereer word, is gewoonlik binne vier dae terug op volle produksie, so ook 'n koei waar die letsels van die draad gering is.

Verplasing van die abomasum is 'n paar keer gediagnoseer en twee keer op afgekom gedurende 'n ondersoekings-operasie, maar dit is relatief skaars. Torsie en dilatasie van die abomasum het ek nog nie gediagnoseer nie, terwyl intesusepsie ook relatief skaars is. Metritis as 'n differensiale diagnose sluit beslis nie draad uit nie, omdat ou draad-gevalle dikwels net na kalwing simptome van draad begin wys.

Samevattend kan dus gesê word dat die ondersoekingsoperasie die mees waardevolle enkele middel is vir die diagnose van reticulo-peritonitis en kondisies wat daarmee verwar kan word, en dat draad verreweg die algemeenste is van al die kondisies.

Summary

The author relates some experiences connected with his practice, and in particular refers to oophorectomies, dehorning and reticulo-peritonitis.

PRACTICAL EXPERIENCE IN THE USE OF THE CAP-CHUR GUN

H. EBEDES — Veterinary Practitioner, P.O. Box 449, Springs, Transvaal

(Received for publication January, 1962)

INTRODUCTION

We have all read or heard of the magnificent and important part tranquillisers, sedatives, muscle relaxants and anaesthetics have played in the capturing of wild game at Kariba and various South African game reserves and for controlling animals at zoos. The tranquillising gun has been used for a number of years by veterinarians in the U.S.A., for capturing and immobilising deer and wild range cattle.

DESCRIPTION

Because of the simplicity of its operation, the gun can be used successfully by veterinarians, game wardens and stockmen. The principle on which it works is as follows:—

The correct amount of the drug of choice, based on the approximate weight of the animal, is measured into a cylindrical capsule having the appearance of a syringe barrel. A barbed needle is fitted to the anterior end of the capsule, and a rubber plunger and power-pill, to the tail piece. This "dart" is then fired from a special long range rifle, or short range pistol, by means of compressed carbon dioxide. *The rifle is effestive up to a range of fifty yards and the pistol up to twenty yards.*

EXPERIENCE IN THE USE OF THE GUN

The Cap-Chur Gun (designed and manufactured by the Palmer Chemical and Equipment Co., Atlanta, Georgia) was recently used to anaesthetise a few penned buck, which were to be moved from the Olympia Park Zoo to the Casseldale Game Reserve at Springs. The buck comprised three Springbuck, A Gemsbok and a Bushbuck. Cap-Chur-Barb (Palmer Chemical Co.) 500 mg./cc. was used in all the cases. This is a barbiturate compound developed as an intramuscular anaesthetic. The darts were shot into the thick muscles of the rump. As little knowledge regarding the correct dosage was known, small doses were given initially.

RESULTS

The following were the results:

1. *Gemsbok*

Estimated weight 600 pounds. Female. Good condition. Kept in penned enclosure for nearly two years.

Average distance from buck, 30 yards.

1st dose	9.10 a.m.	7cc Cap-Chur-Barb
2nd dose	10.00 a.m.	5 cc Cap-Chur-Barb
3rd dose	12 noon	5 cc Cap-Chur-Barb

At 12.30 p.m. the animal was very groggy. It was pulled down by a rope over the horns and 4 cc Trilafon (Sherag) administered intramuscularly.

At 12.45 p.m. complete anaesthesia prevailed and she could easily be loaded and transported.

At 4.00 p.m. 3,000,000 *units of penicillin i.m. and* 3,000,000, *units s.c. were administered.*

The animal started to recover at 5.30 p.m. At 7.30 p.m., although dazed, it was standing. Complete recovery occurred at 9.30 p.m., although it walked with a stiff gait for about five days.

Suggested Dosage: 1 c.c. Cap-Chur-Barb per 40 lb. body weight.

2. *Bushbuck* (Male):

Estimated weight 120 lb. Good condition. Average distance from buck, 30 yards.

1st dose	9.30 a.m.	3 cc Cap-Chur-Barb
2nd dose	11.30 a.m.	1½ cc Cap-Chur-Barb

At 12.30 p.m. it was very groggy but was not down. It was caught with a net and given 1 cc Trilafon (Sherag) i.m. By 1.15 p.m. complete anaesthesia had taken place. *Three million units* of penicillin were administered. The animal had recovered satisfactorily by 11 p.m. It was not stiff and was running around normally the next day.

Suggested Dosage: 1 cc Cap-Chur-Barb per 25 pounds body weight.

Photo No. 1.—Aiming the Cap-Chur Gun at the Gemsbok. Distance approximately 30 yards.

3. *Springbuck* (Male):

Estimated weight	65 pounds. Range 30 yards.
1st dose	2 cc Cap-Chur-Barb
2nd dose	½cc Cap-Chur-Barb

Complete anaesthesia occurred two hours after the first shot. *Nine hundred thousand units of penicillin were administered i.m.* A satisfactory recovery from the anaesthetic occurred eight hours after the first dose.

4. *Springbuck* (Female):

Estimated weight	50 lb. Range 30 yards.
1st dose	2 cc Cap-Chur-Barb

The animal went down in 30 seconds because the dart struck a bloodvessel anterior to the hip. Complete anaesthesia occurred in sixty seconds. *Twenty mg* (20 *mg.*) *prednisolone* (*DELTACORTRIL-Pfiser*) *and* 1½ *cc Methedrine* (*Burroughs Wellcome*) *were injected i.m.* A second dose of 1 cc Methedrine was given one hour later. Recovery was satisfactory by 4 p.m. No after effects were observed and the animal showed very little excitement on recovery: no muscular stiffness was noted.

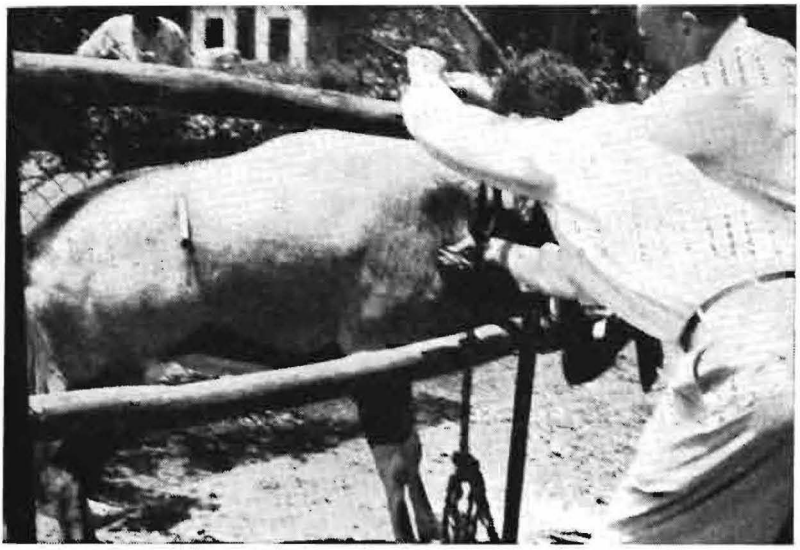

Photo No. 2.—Injecting 4 cc Trilafon. Gemsbok caught by the horns. A dart can be seen lodged in the hip muscles.

5. *Springbuck* (Male):

Estimated weight	45 lb. Range 30 yards.
1st dose	1 cc Cap-Chur-Barb
2nd dose	1 cc Cap-Chur-Barb ¾ hour after 1st dose.

The animal was startled by a photographer and ran into a tree stump breaking the olecranon process of the left ulna. It became completely

immobilised two hours after first dose. X-ray photographs were taken to confirm the diagnosis and the fracture of the olecranon process was wired with stainless-steel wire while under anaesthesia. The animal recovered completely nine hours after the first shot, but died next mornig from post operative shock.

Suggested Dosage for Springbuck: 1 cc per 25 lb.

Observations

From the above it can be seen that Cap-Chur-barb is a safe and satisfactory preparation for the immobilisation of game. Initial small doses were used because of limited knowledge of the anaesthetic. It is felt, however, that if the suggested dosages are adhered to, and the darts placed correctly, no difficulties should be encountered.

As with any anaesthetic, the aftercare is very important. The animals should be kept warm. They should be propped up on their sternums with the head down, to prevent inhalation of ruminal fluids, and turned a few times an hour to prevent bloat.

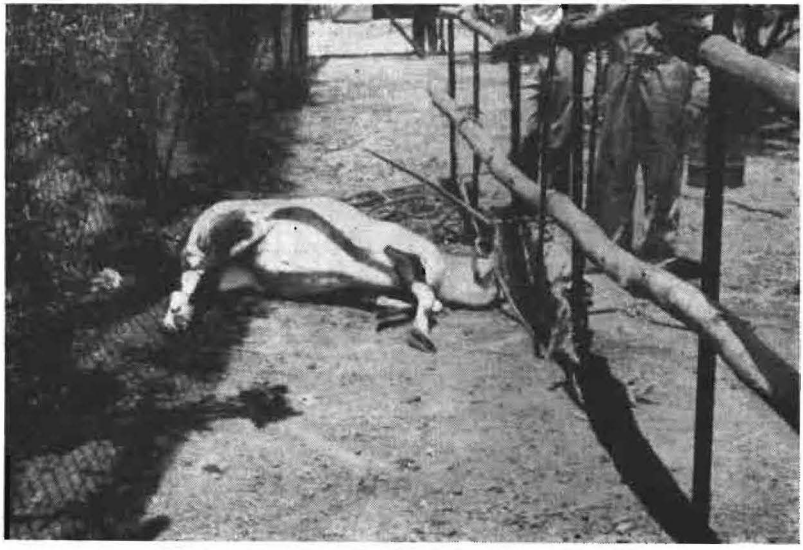

Photo No. 3.—Gemsbok completely anaesthetised.

Alternative Tranquillising Agents

Other drugs which can be used for immobilising game are:

Cap-Chur-Sol. This was the first drug developed as an immobiliser with the Cap-Chur Gun. The immobilisation time varies from thirty seconds to twenty minutes. A complete range of dosages for different animals has been determined by the company which manufacturers the drug.

Cap-Chur-Gem. A faster acting intramuscular anaesthetic than Cap-Chur-Barb having a reduced safety margin.

Flaxedil.—A synthetic curare-like preparation which blocks the neuromuscular transmission in skeletal muscles. Used in the correct dosage, the animal will be immobilised in five to fifteen minutes. After the administration of the antidote- (prostigmine .02 mg./lb. and atropine. 1 mg./lb. given simultaneously) the animal will regain its feet in a few minutes. There is usually complete recovery within 30 minutes,

Anectine (*Succinylcholine chloride*). A short-acting muscle-relaxant. The immobilization time varies from five to twenty minutes. Recovery is rapid viz. three to fourty minutes. The antidote is cortisone acetate 50 mg./100 lb.

ACKNOWLEDGEMENT

The writer wishes to express his thanks to Mr. Red Palmer of the U.S.A. and and Mr. B. Kaplan of A. S. Ruffel & Co. for the loan of the Cap-Chur Gun and for their assistance in these trials: Mr. Red Palmer is thanked for the photography.

The Director and Staff of the Springs Parks Department are thanked for their cooperation.

THE USE OF STEVENEL'S BLUE AS A ROUTINE STAIN IN GENERAL PRACTICE AND IN THE FIELD

J. K. THOMSON, Senior State Veterinarian Veterinary Quarantine Station, Cape Town Docks

INTRODUCTION

Stevenel's Blue was brought to the notice of the writer in the Sudan, by F. W. Priestly, who introduced it to the Sudan Veterinary Services as a routine stain for diagnostic purposes. It is a rapid, reliable, and simple stain, is inexpensive to prepare and keeps well.

The writer used it mainly for Pasteurellae and Anthrax smears in the Regional Veterinary Laboratory at Cape Town. The results were exceptionally good in both cases. A few bottles were given to local Practitioners during an outbreak of Anthrax, most of whom became enthusiastic about its use, especially for the diagnosis of Canine piroplasmosis. Avian spirochaetes and cryptococci can also be demonstrated with this stain.

Preparation.—Dissolve separately (*a*) 5 gms. methylene blue in 375 c.c. distilled water and (*b*) 7.5 gms. Potassium permanganate, in 375 c.c. distilled water. Leave standing overnight. Mix the two solutions; a heavy precipitate forms. Place the mixture in a water bath and bring to the boil and keep in the boiling bath for 30 minutes. Filter through paper. Store in a tightly stoppered bottle (Stevenel Blue keeps for some months if not freely exposed to air: otherwise it precipitates).

Immediately after use it should be poured back into the bottle.

Staining Method.—Fix smears in Methyl alchol for ½ minute. Allow to dry in air after pouring off excess alchol. Stain by immersion in a staining bath for half to one minute. Wash and dry.

In an Anthrax smear the capsules are a light purple and the bodies of the bacilli are blue.

It is hoped that this stain may prove useful to Veterinarians both in private practice and in the field.

WELCOME TO THE NEW GRADUATES OF 1961

At a very pleasant ceremony held in the Auditorium of the Faculty Building at Onderstepoort on November 23, 1961, the Dean, Professor R. M. du Toit, hailed the new graduates and Professor R. Clark, Vice-President of the South African Veterinary Medical Association, welcomed them to the ranks of the veterinary profession in South Africa.

Addressing the small group of Faculty members and others who had gathered to congratulate the successful final year students, PROFESSOR DU TOIT referred to the extensive and intensive courses of study which veterinary students had to undergo before finally emerging as qualified to practice the Art of the learned profession.

In his view the past year had been a difficult one for both students and teachers, and the past few weeks had demanded considerable concentration on the part of everyone connected with the yearly veterinary examinations.

He extended hearty congratulations to the students and thanked the Faculty staff sincerely for their conscientious application to duty throughout the year.

He intimated that from 1962, 45 students instead of the present 30, would be granted entry to the veterinary course at Onderstepoort, if the necessary increased facilities for their training could be made available. These increased facilities would have to be considerable and would call for much concentration and effort by all concerned with Veterinary Education at Onderstepoort.

Professor du Toit extended a particular welcome to the representatives of the organisations and firms which had presented prizes for competition by the students, viz Mr. Buys of I.C.I., Mr. Holmshaw of Maybaker, Dr. Anderson of Pfizer Laboratories, Mr. Caplan of A. S. Ruffel (Pty.) Ltd., Mr. van Rooyen of the Farmer's Weekly, and Dr. Purchase of Messrs. Cooper and Nephews. The representatives of Messrs. Agricura of Silverton and Optical Instruments of Johannesburg could unfortunately not be present.

In asking each successful final year student to stand as his name was called, Professor du Toit referred to the change in status which the new graduates suddenly enjoyed—a few hours previously they were known as "Mr."—now they were to be called "Dr."

The names of the new graduates were then disclosed by Professor du Toit, each being given a rousing cheer; they were Messrs: Campbell, M. C. O.; Coetzee, L.; Conradie, S. W.; Cook R. C.; Coubrough, R. I.; de Klerk, W. A.; de Vos, V.; du Buy, W. J. C.; Gaenssler J. G.; Gouws, D.; Lademann, A. G.; Marnewick, J. J.; Neethling, D. A.; Petrick, S. W. T.; Schmidt-Dumont, A. M. A. (Miss); Smit, P. J.; Trace, C. G. N.; van der Westhuizen, B.; van Tonder, E. M.; Vercueil, L.

Amid great rejoicing Professor du Toit then announced the names of the final year students who had been awarded prizes.

1. *The Theiler Medal.* This was the most cherished prize of all. It was donated yearly by the S.A. Biological Society to the most industrious student and is to be handed to the recipient by the Society when it meets at some future date. It was won by MR. LADEMANN.

2. *The Clinical Medal*, also a cherished prize and donated annually by the Witwatersrand Branch of the S.A. Veterinary Medical Association for the best student in clinical practice, was won by Mr. Marnewick.

3. *The two I.C.I. Prizes of* R21.00 *each*, given yearly by Messrs. I.C.I., South Africa (Pharmaceuticals) Ltd., for presentation to the best students in (i) Medicine and Infectious Diseases and (ii) Surgery and Genesiology. They were won respectively by Mr. Marnewick and Mr. Lademann.

4. *The Maybaker Instrument Case.* Granted annually to the student showing the greatest improvement in the clinical subjects through persistent devotion to study, was won by Mr. van Tonder.

5. *The Pfizer Instrument Case.* Donated annually by Messrs Pfizer Laboratories S.A. (Pty.) Ltd. to the final year student showing the greatest practical application of the clinical aspect of Veterinary Medicine, was won by Miss Schmidt-Dumont.

6. *The Agricura Prize of* R50.00. Presented yearly by Messrs. Agricura Laboratoria of Silverton, Pretoria to the most industrious student in pathology assessed over the last three years of the veterinary course, was won by Mr. du Buy.

Awards made to Junior Students

Professor du Toit then disclosed the names of the prize winners who had not yet entered the final year of study. They were:

1. *The Farmers' Weekly Medal.* Donated each year by the Farmers' Weekly for presentation to the best Fourth Year student in Zootechnics, including animal management, animal nutrition, veld management, was won by Mr. J. J. v.d. Watt.

2. *The A. S. Ruffel Prize of* R40.00. Given annually by Messrs. A. S. Ruffel (Pty.) Ltd. of Johannesburg to the Fourth Year Student showing the greatest promise in the study of pharmacology and toxicology, was won by Mr. J. A. Erasmus.

3. *The Two Prizes of* R50.00 *each by Messrs. Optical Instruments (Pty.) Ltd. of Johannesburg.* These two prizes are offered each year for award to the most promising student in each of the second and third years of study.

Mr. Young was awarded the prize for the most promising third year student, while Mr. T. Fuchs and Mr. S. M. Shave shared the prize for the most promising student in the second year.

A Prize for the Class Captain

Professor du Toit intimated that he had been requested by the final year students to present a prize, on their behalf to their Class Captain, Mr. W. A. de Klerk in appreciation of his services to them during the year.

Welcome by Professor R. Clark, Vice-President of the South African Veterinary Medical Association

Professor du Toit then asked Professor Clark to address the new graduates on behalf of the President, Dr. H. P. Steyn, who could unfortunately not be present.

In addressing the new graduates Professor Clark reminded them that while they had been subjected to intensive and extensive study courses over the past five years in order to obtain the degree of B.V. Sc., their work was actually only just starting. They would soon understand the difference between being taught and learning. There was a very big difference, particularly as the scientific approach had always to be kept in the foreground. If they developed on the lines of logical sequence, they would become good veterinarians and good citizens. Up to the present they had all been taught the same things in the same way. When they all met again at the next Veterinary Conference each would be able to relate his experience regarding the treatment of a particular disease, and these experiences, even over a short period would doubtless be enlightening, and even critical of the teachers. This was quite a normal development.

In welcoming the new graduates to the profession, Professor Clark gave an explanation of the meaning of the word "profession".

The word had lost a lot of its original significance; it was derived from a word meaning a "statement of belief"—something done for the good of the work itself—undertaken for the benefit of the country and for mankind as a whole—a task commenced for the love of the work and not so much for the wage it earned. The professional man must first do the job and thereafter think in terms of collecting the money. If he did the job well the money would come. It was of no value to say one belonged to a learned profession unless one lived up to the standards of that learning.

Professor Clark consoled the new graduates by assuring them that they were not going out into a cold hard world. The South African Veterinary Medical Association had over 400 members with whom they could collaborate and who would be prepared to assist them in every way.

The graduates were eligible to join the South African Veterinary Medical Association. They would discover in its constitution nine objects for which it stood, all of which centered around the first one, viz. to promote and protect the interests of the veterinary profession.

Professor Clark bid the new graduates a sincere and cordial welcome to the profession and to membership of the South African Veterinary Medical Association.

The ceremony was concluded with refreshments in a very pleasant atmosphere.

STUDENTE IN VEEARTSENYKUNDE FINALE JAAR 1961.

1ste Ry: L. Coetzee, J. G. Gaenssler, C. Trace, W. W. van Heerden, A. M. A. Schmidt Dumont, W. A. de Klerk, M. C. O. Campbell, J. H. Viljoen, E. M. van Tonder.
2de Ry: A. J. Richardson, J. H. du Preez, E. Leeb- du Toit, V. de Vos, R. I. Coubrough, D. A. Neethling, S. W. Conradie, S. W. Petrick, L. Vercueil.
3de Ry: J. J. Marnewick, B. van der Westhuizen, A. G. Lademan, W. J. C. du Buy, E. C. Bauling, P. J. Smit.
Heelagter: D. Gouws, J. W. Nesbit, R. C. Cook.

THE FORTY-ONE SECOND-YEAR STUDENTS 1962

Top Row: B. van Graan, B. Irvine-Smith, P. Fourie, F. du Plessis, J. Olivier, J. Malan, S. de Wet, H. Schneider, J. Rens, E. Maruis, F. Snyman.
Third Row: N. Descroizilles, M. Versfeld, C. Cook, I. Schlesinger, W. Venning, O. van Niekerk, P. Chambers, L. Fourie, A. Hyver, I. van Rensburg, B. Jones.
Second Row: N. Schutte, P. Carey, A. de Kock, R. Hazel, L. Loots, D. de Lange, J. Richter, B. Rudolph, L. Theron, P. le Roux.
Front Row: A. Morley, B. Wessels, B. Jones, N. Orford, G. Faber, G. Dobbie, N. Kriek, P. Kieviet, O. Marais.

PARTICULARS OF VACCINES PRODUCED AT THE ONDERSTEPOORT VETERINARY LABORATORY

Published by Courtesy of the Director of Veterinary Services

Vaccine	Animals to be Vaccinated	Dose	Method of Application	Time and Age Recommended for Vaccination	IMMUNITY	
					Period of Development of	Duration
ANTHRAX	Cattle, Horses Donkeys, Pigs, Sheep, Goats, Camels	1 c.c. (all species)	Subcut	Any age	14 days	9–12 months
BLACKQUARTER	Cattle Sheep	5 c.c. 2 c.c.	Subcut Subcut	Cattle 6 months to 3 years Sheep 14 days prior to shearing	14 days 14 days	9–12 months 9–12 months
BLOEDPENS	Sheep (pregnant ewes)	2 c.c.	subcut	Inoculate ewe twice: (1) 2 months before lambing (2) 1 month before lambing Booster dose: Two months before lambing	Lamb: Few hrs. after suckling	Ewe: About 1 month after first course of vaccination. Two months after Booster dose.

Vaccine	Animals to be Vaccinated	Dose	Method of Application	Time and Age Recommended for Vaccination	Immunity	
					Period of Development of	Duration
BLUE TONGUE	Sheep	1 c.c.	Subcut	Lambs from immune ewes 6 months of age Lambs from susceptible ewes any age Ewes 3–6 weeks before mating in "Spring", otherwise after lambing in "Spring" Advocate Autumn lambing Rams after mating season in Spring Immunize annually Immunize 3 weeks before shearing	2–3 weeks	Probably life against homologous strain but annual injection recommended.
BRUCELLOSIS 19	Heifers	5 c.c.	Subcut	6–8 months old (heifers). For other age-groups consult Veterinary Surgeon	1 month	Life
BRUCELLOSIS REV. 1	Sheep, Goats	1 c.c.	Subcut	Weaners (males and females)	1 month	Life
CHICKEN POX	Turkeys, Fowls	Single stab	Intraderm	4–6 weeks of age	7 days	Life
DISTEMPER	Dogs	1 c.c.	Subcut	12 weeks of age. Booster injection 6 months —2 years	14 days	Life
BLOEDNIER (ENTEROTOXAEMIA)	Sheep	2 c.c.	Subcut	Any age. Preferably 2 months and older. Before changing pasture	14 days	1 year
FOWL TYPHOID	Turkeys, Fowls	1 c.c.	Subcut	2 months of age: 2 Injections with an interval of 8 days	1 week after second injection	9 months
GALLSICKNESS (ANAPLAMSOSIP)	Cattle	5 c.c.	Subcut	Any age	6–8 weeks	Life
HEARTWATER	Cattle & Sheep	5 c.c.	Intravenous	Preferably under 3 weeks old	1–5 weeks after injection	Variable depending on exposure

Horsesickness	**Horses**	**5 c.c.**	**Subcut**	**Breeding season arranged to have foals born in period-Febr. to April. Immunize mares annually at least 3 months before HS season starts. Foals from susceptible dams any age but also 3 months before HS season. Foals from immune dams at 6–7 months**	**2–4 weeks**	**Probably life long against Homologous strain but annual inoculation recommended**
Lamsiekte (Botulism)	Cattle Sheep	2 c.c. 1 c.c.	Subcut Subcut	Two injections with an interval of six weeks Late Summer (May–July). Booster dose: one injection only	2 months	1 year
Newcastle Disease	Turkeys & Fowls	Stab through wing web	Stab through wing web	*Only used by state* (1) In outbreaks at any age (1–2 day, chicks mortality up to 40% and adult birds paralytic symptoms 1–2%) (2) Chicks from immune fowls: 3 weeks and older	7 days	3 months
Calf Paratyphoid	Cattle	5 c.c. to be injected twice	Intramuscular	(1) *Cows (pregnant)* 1st injection ± 2–3 months before calving 2nd injection not less than 30 days later (2) *Calves* (i) If cows not immunized. Inject calves at 2–3 days of age and repeat after 8 days. (ii) If cows immunized, inject calves twice when six weeks old (8 days interval)	14 days	About 1 month
Rabies	Dogs	3 c.c.	Intramuscular	2–3 months and older	21 days	3 years
Redwater	Cattle	5 c.c.	Subcut	At any age	6–8 weeks	Life
Rift Valley Fever and Wesselsbron Disease	Sheep Cattle & Sheep	1 c.c. 1 c.c. 1 c.c.	Subcut Subcut Subcut	*Do not vaccinate pregnant animals.* Lambs from immune ewes 6 months of age. Lambs from susceptible ewes 1 month or older. Vaccinate ewes before mating in "Spring". Advocate autumn lambing. In "Spring" lambing vaccinate *after* lambing but before January	9–14 days	Life but annual inoculation recommended.

BOOK NEWS

The *Second Edition* of that well known and indispensable handbook for practitioner and student, MERCKS VETERINARY MANUAL is now available (R7.90). It has over 200 more pages and is more informative than ever.

The literature on reproduction, reproductive failure and artificial breeding has been greatly enriched by Salisbury and VandeMark's PHYSIOLOGY OF REPRODUCTION AND ARTIFICIAL INSEMINATION OF CATTLE (R9.50).

A void of many years in veterinary literature has now been very ably filled by the publication of an outstanding book on veterinary radiology, namely Carlson's VETERINARY RADIOLOGY (R13.95), which has 460 pages and over 1,000 illustrations.

The *Sixth Edition* (1962) of Hagedoorn's ANIMAL BREEDING (R2.35) has been enhanced (if that is possible) by numerous appropriate annotations by that famous scientist-research worker-farmer-breeder, *Dr. Allan Fraser*, whose thought provoking and entertaining ANIMAL HUSBANDRY HERESIES (R1.90) is rapdily finding its way on to the bookshelf of everyone interested in breeding.

The new *Fifth Edition* of Wright & Hall's VETERINARY ANAESTHESIA (R4.05) has been described by the "*Veterinary Record*" as the classic of veterinary anaesthesia in the English language.

The veterinarian who does not subscribe to any other journal can nevertheless obtain a review of all veterinary publications, and information on latest techniques, apparatus, books and new drugs, by placing a standing order with us for THE VETERINARY ANNUAL (R4.45)—the "*Blue Book*" of the profession. The *Third Issue* is now available.

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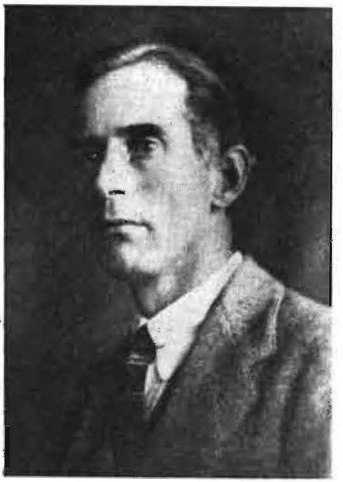

DR. HENRY HAMILTON GREEN,
D.Sc., O.B.E. Hon. Assoc.
R.C.V.S.

A MEMOIR

The death at a London Nursing Home on December 4th, 1961, of Harry Green as he was known to his colleagues at Onderstepoort, brings back memories of his long association with that Institution. Before he went to Onderstepoort in February 1914, he had already been associated with Professor E. P. Cathcart and others in the then new subject of biochemistry, at Glasgow University and may safely be considered as having been one of it's pioneers. Before coming to South Africa, he spent a year at Leipzig University in Germany, working under Professor Löhris a pioneer of industrial bacteriology, which was of great value to him in his later career. At Onderstepoort he was from the outset, engaged on problems related to research on lamsiekte, which at the time was a first priority with Sir Arnold Theiler. He may be said to have founded biochemical research at Onderstepoort and his first years were spent mainly on work on vitamin deficiencies, thought to be a possible cause of lamsiekte, as well as much other work bearing on the subject. Actually this did not lead to a solution of the problem but was of great value nevertheless. When, as had long been suspected, it was found that phosphorus deficiency played a definite role in the causation of lamsiekte, Green started a series of experiments on mineral deficiencies which attracted world wide attention. This work he continued over a period of about seven years, until he left Onderstepoort in 1927. In 1920–21 he spent a year in study in the United States of America. From this he returned physically and mentally exhausted. The writer has often felt that this was a predisposing factor in the breakdown which occurred later. When the Veterinary Faculty was instituted in 1920, he was appointed Professor of Biochemistry and for a time lectured on general bacteriology as well. He was awarded the South Africa Medal and Grant of the South African Association for the Advancement of Science in 1927 in recognition of his scientific work.

In that year he suffered a severe mental breakdown and after some months of illness, returned to Great Britain with his family. He was not able to work again until 1930 when he made a remarkable recovery and very soon, under the wing of Dr. Andrews, Director of Weybridge,

he regained his confidence and did some very fine work, more particularly on tuberculin. He was instrumental in producing a greatly improved type of tuberculin which was to become known as P.P.D. or Purified Protein Derivative and did much other valuable biochemical work. He was in charge of the Biochemistry Department at Weybridge from 1933 to 1953. Later his health broke down once more and he went to live with his son Kenneth, a medical man.

Green was very fortunate in his married life as all who knew his wife will agree and her death in England as a result of a motor accident came as a great shock to him. He had three sons one of whom, Nigel, is a leading actor on the London stage.

To sound a personal note, the writer was associated with Harry Green throughout his career at Onderstepoort and feels that in his death the veterinary profession has lost a good friend. He understood the veterinarians point of view very well and was very successful in his collaboration with them. Green had a degree of genius and his work showed marked creative ability. Mentally his concentration was such that he sometimes worked himself to the point of exhaustion, which probably accounted for his breakdowns. When the history of Onderstepoort comes to be written he is certain of an honoured riche.

He was 76 years of age.

OBITUARY

JAMES (JACK) GEORGE

James, (Jackie) George, one of the best known and efficient Veterinary Research Assistants in South Africa, passed away peacefully at his home in Grahamstown on 22nd October, 1961, at the age of 76 years.

He joined the Grahamstown Bacteriological Institute (as the Grahamstown Laboratory then was) on 1.3.1900, as a boy, with little or no education. He retired from the State Service on 13.6.1956 as a very efficient and knowledgeable veterinary technical assistant.

For years he ran the Grahamstown Veterinary Laboratory on his own when there was no State Veterinarian available and almost became a legend in his own right. He claimed to know every road, every footpath and track, for miles round Grahamstown and many who knew him intimately agreed that his claim was in no way exaggerated.

He made a worthy contribution to Veterinary Science and will be sadly missed by those of us who had the privilege of knowing him.

DOODBERIG

DANIEL JOHANNES DE WAAL

Op 21 Desember 1961, is Danie de Waal naby Rusape, Suid Rhodesië in 'n motor ongeluk tragies dood.

Daniël Johannes de Waal is 33 jaar gelede op Boshof in die O.V.S. gebore. Hy het in 1950 op Onderstepoort gekwalifiseer en na hy 'n tydlank „lokum" gedoen het, hom op Volksrust gevestig. In September 1953 het hy 'n praktyk in Rusape Suid Rhodesie oorgeneem, waar hy tot en met sy oorlyde gepraktiseer het. Hy het sy Kerk gedien, en was lid van verskeie kultuur organisasies.

Danie het die respek afgedwing van albei taalgroepe in sy werkskring. Hy sal onthou word deur sy vriende in Suid Rhodesie en Volksrust. Hy word oorleef deur sy vrou en drie kinders—'n dogter en twee seuns; die jongste maar ses maande oud.

Aan Annetjie en kindertjies, die innige meegevoel van die professie.

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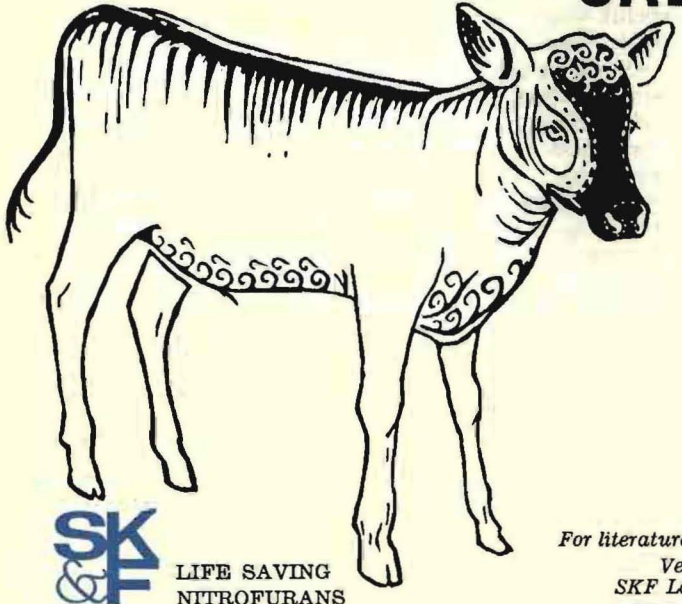

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THE ROYAL SOCIETY FOR THE PROMOTION OF HEALTH

L. W. van den Heever.

The Royal Society for the Promotion of Health, previously known as the Royal Sanitary Institute, was founded in 1876 with the object of promoting the advancement of Sanitary Science in all its branches, and the diffusion of knowledge relating thereto. Membership is open to those gathered together by a common interest in the objects of the Society, and included in these are members of the medical, dental, veterinary, engineering, architectural and legal professions as well as health visitors, nurses, surveyors, health inspectors etc. The membership is approximately 10,000.

The Society has affiliated branches throughout the English speaking world, including one in South Africa. The Society is responsible for the training of health inspectors, health visitors etc. and in South Africa this is done in collaboration with the Government of the Republic. A journal is published bi-monthly, and Annual Health Congresses are arranged.

The Fellowship of the Society is granted to persons "who in the opinion of the Council have done noteworthy work in connection with the promotion of health"—usually on recommendation of the branch council.

Dr. M. C. Robinson is a Fellow, and Drs. Meara, Louw and Horwitz are past and present members of the S.A. Council.

Dr. L. W. van den Heever has just been made a Fellow.

PUBLIC NOTICE

University of Edinburgh

ROYAL (DICK) SCHOOL OF VETERINARY STUDIES

DIPLOMA COURSE IN TROPICAL VETERINARY MEDICINE

The Course of Instruction for the post-graduate Diploma in Tropical Veterinary Medicine (D.T.V.M.) extends over two terms. Part I (January to March) comprises systematic instruction and practical work in the following subjects:—Bacteriology and Immunology, Pathology, Entomology and Parasitology. Part II (April to June) provides instruction in Tropical Veterinary Hygiene and Epizootiology, Animal Nutrition in the Tropics, Animal Breeding in the Tropics and Animal Industries in the Tropics.

Classes are held at the Veterinary School, Veterinary Field Station and in appropriate Departments of the University. Written, oral and practical examinations qualifying for the diploma are held at the end of each part (*viz.*, March and June).

Candidates desirous of taking the Course must have a veterinary qualification registrable with the Royal College of Veterinary Surgeons or such other veterinary qualification as may be recognised for the purpose by the University Court.

Applications for admission should be lodged with the Director, Royal (Dick) School of Veterinary Studies, Summerhall, Edinburgh, 9, on or before 30th June of the year prior to that in which the applicant desires admission.

January, 1962.

CHARLES H. STEWART,
Secretary to the University.

University of Edinburgh

ROYAL (DICK) SCHOOL OF VETERINARY STUDIES

DIPLOMA COURSE IN VETERINARY STATE MEDICINE

The Course of Instruction for the post-graduate Diploma in Veterinary State Medicine (D.V.S.M.) extends over an academic year. During the first two terms (October to March) classes are held at the Veterinary School, Veterinary Field Station and in appropriate Departments of the University, where systematic and practical instruction is given in the following subjects:—

(a) Bacteriology, Pathology and Immunity as applied to Veterinary State Medicine, (b) Veterinary Preventive and State Medicine and (c) Food Hygiene (including Meat and Milk Inspection and Control). During the third term (March to June) candidates are required to undergo field training gaining practical experience in (a) diagnostic and investigation services in an approved veterinary laboratory, and (b) veterinary duties with a State or approved authority employing one or more whole-time veterinary surgeons. Written, oral and practical examinations qualifying for the Diploma are held at the end of the session (June).

Candidates desirous of taking the Course must have a veterinary qualification registrable with the Royal College of Veterinary Surgeons or such other veterinary qualification as may be recognised for the purpose by the University Court.

Application for admission should be lodged with the Director, Royal (Dick) School of Veterinary Studies, Summerhall, Edinburgh 9, on or before 30th June of the year prior to that in which applicant desires admission.

January, 1962.

CHARLES H. STEWART
Secretary to the University.

KENNISGEWING

RUNDVEEKLINIEK EN KLINIEK VIR KLEIN HERKOUERS EN VARKE VAN DIE VEEARTSENY-HOËRSKOOL IN WEENEN,

Direkteur: PROF. DR. KARL DIERNHOFER, Linke Bahngasse 11, Weenen 40

Linke Bahngasse 11,
Weenen 40.
2 November 1961.

Geagte Editeurs,

Ek sou dit baie waardeer as u bygaande vooruitkennisgewing reeds in die eerskomende nommer van u tydskrif kan laat druk.

Vermoedelik sal vir hierdie vergadering oorheersend voordragte in die Duitse taal (ook van uitlanders) aangemeld word, sodat dit twyfelagtig is of vir die voordragte in vreemde tale spesiaal 'n altyd veeleisende, ingewikkelde inrigting vir gelyktydige vertaling aangebring kan word. Maar miskien sal dit moontlik wees om in die aankondiging en agenda van die vergadering ook 'n kort verslag van die inhoud van die voordragte te gee in die by die Kongresse gebruiklike tale.

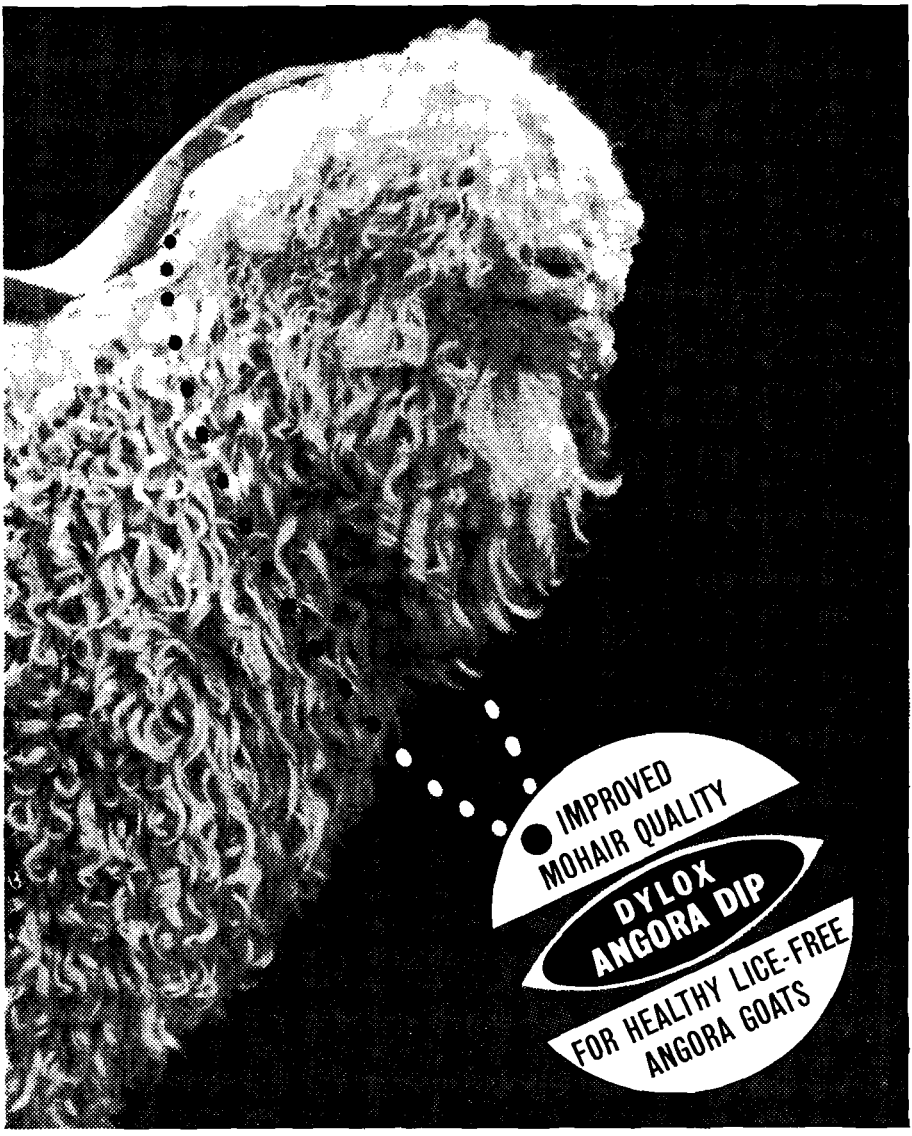
Hoogagtend,
Dr. K. Diernhofer.

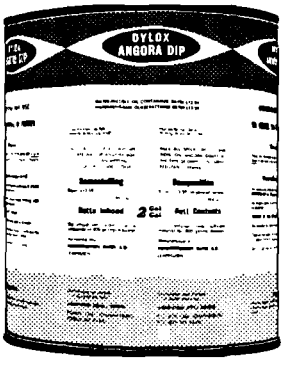
INTERNASIONALE VERGADERING OOR RUNDVEESIEKTES

Ingevolge die verlange van die deelnemers aan die vergadering van die Duitse Veeartsenykundige Mediese Vereniging vir Rundveesiektes, gehou in Hannover in 1960, dat sodanige vergaderings in die toekoms gereeld gehou moes word, reël die Veeartsenyhoërskool in Weenen op 17, 18 en 19 Mei 1962 'n internasionale vergadering waarop oor nuwe navorsingsresultate, kliniese ervarings en praktiese waarnemings op die mees onderskeie gebiede van die gespesialiseerde patologie, diagnostiek en terapie van die siektes van rundvee verslag gedoen en bespreek sal wrod.

Die reëling van die vergadering word onderneem deur Prof. Dr. K. DIERNHOFER, Rundveekliniek van die Veeartsenyhoëskool, Weenen III, Linke Bahngasse II.

Geliewe voordragte en kort referate met aangifte van voorgenome spreektyd voor 31 Januarie 1962 aldaar aan te meld.





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Printed and offered for sale by the Association in both languages and obtainable from the Secretary, P.O. Box 2460, Pretoria.

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EXPIRY PERIODS OF SOME ONDERSTEPOORT VACCINES.

The Director of Veterinary Services, Onderstepoort, intimates that the expiry periods of some Onderstepoort Vaccines have been revised. The maximum periods for which these vaccines can now be kept are shown below.

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Lumpy Skin Disease	3 months
Rabies.	3 months
Newcastle Disease	3 months
Distemper	1 month *
Enterotoxaemia	6 months
Lamb Dysentry	6 months
Lamsiekte	6 months
Black Quarter	6 months
Anthrax	6 months
Calf Paratyphoid	6 months
Brucella (Str. 19)	1 month
Brucella (Rev. I)	1 month

* The expiry period of 1 month for Distemper vaccine is applicable when the vaccine is stored at 4°C in an ordinary refrigerator. If the vaccine is stored in a deep-freeze at 18° the vaccine can be kept for 3 months.

Although the expiry periods for the other vaccines have been calculated for storage on the shelf, it is nevertheless advisable to store all vaccines, much are not used immediately, at temperatures ranging from 4 to 8°C.

NEW PREPARATIONS AND APPLIANCES

(Compiled by the Firm)

SQUIBB LABORATORIES (PTY.) LTD., ISANDO, TRANSVAAL

The introduction of three new veterinary products has been announced by Squibb Laboratories (Pty.) Ltd. of Isando, Transvaal.

MYCOLOG OINTMENT VETERINARY

Mycolog Ointment Veterinary is an anti-inflammatory, anti-prutitic, anti-bacterial, anti-fungal ointment for a wide range of dermatological and non-dermatological disorders in small animals. Mycolog Ointment is supplied in 5 Gm. tubes—each Gm. providing triamcinolone acetonide 1.0 mg., Neomycin 2.5 mg. (base), Gramicidin 0.25 mg. and nystatin 100,000 u. in a non-irritating protective vehicle, Plastibase.

Indications: Mycolog Ointment Veterinary is indicated in the treatment of otitis externa, contact dermatitis, cutaneous moniliasis, interdigital cysts, anal gland infections, pruritus and many other dermatological and non-dermatological disorders in dogs, cats and other small animals.

VETALOG PARENTERAL VETERINARY

Vetalog—Squibb triamcinolone acetonide aqueous suspension for veterinary use—is a highly potent corticosteroid with anti-inflammatory activity 40 times greater than hydrocortisone acetate and 10 times that of prednisolone. It also possesses glucocorticoid properties 90 times greater than cortisone acetate with virtually no mineralocorticoid activity in animals. When administered parenterally as recommended, Vetalog provides prompt symptomatic relief in many articular and related disorders. It alleviates pain, improves motion, reduces inflammation and swelling. It also induces rapid and prolonged relief in inflammatory and pruritic dermatoses of animals.

Developed at the Squibb Institute for Medical Research, Vetalog is chemically designated as 9-alpha-fluoro-16-alpha, 17-alpha-isopropylidenedioxy-delta one-hydrocortisone.

Action: In arthritis and related conditions.—Intra-articular or intrasynovial injection of Vetalog provides rapid relief from pain, decreases inflammation and swelling in many instances. Lameness due to articular surface damage is promptly relieved. The symptomatic response pattern invariably shows improvement of motion and decrease of pain (noted within 24 hours) followed by reduction in swelling. Restoration of joint function is limited only by the degree of irreversible pathological change present. Vetalog will not reverse permanent pathological changes of chronic rheumatoid arthritis.

Indications: Vetalog is valuable symptomatic therapy in articular and other related conditions, notably traumatic arthritis and tenosynovitis and in the management of such dermatological disorders as summer eczema or non-specific pruritus in dogs and allergic dermatoses n cats and dogs and horses not intended for human consumption.

Side Effects: As with any corticosteroid, animals should be watched for evidence of polydipsia or polyuria. If these signs are observed, therapy should be discontinued.

Contraindications: Vetalog should not be administered to relieve joint pain arising from infectious states, unless concomitant anti-microbial therapy is given.

Supply: Vetalog is supplied as a sterile aqueous suspension in 5 cc. vials containing 6 mg. triamcinolone acetonide per c.c.

Vetame Parenteral Veterinary

Vetame—Squibb triflupromazine hydrochloride—is a highly potent behaviour modifier for veterinary use. By virtue of its specific pharmacological properties Vetame finds application in the Veterinary field for the management of psychomotor overactivity, anxiety, nervousness, in the prevention and control of nausea and vomiting and as a pre-anaesthetic agent.

For intravenous, intraperitoneal or intramuscular administration, Vetame is supplied as an aqueous solution in 10 cc. multiple-dose vials providing 20 mg. per cc.

Action: The site and mode of action of phenothiazine derivatives including triflupromazine are largely a matter of speculation. Experimental and clinical studies suggest that these compounds act on the hypothalamus. These drugs are believed to depress various components of the mesodiencephalic activating system which is involved in the control of basal metabolism and body temperature, wakefulness, vasomotor tone, emesis and hormonal balance. In addition, the drugs exert a peripheral autonomic effect. Like other phenothiazines, triflupromazine may prolong and intensify the action of the central nervous depressants such as barbiturates, narcotics and anaesthetics.

Indications: Representative uses for Vetame are: castration in horses and pigs, dentistry, restraint of restless animals for therapeusis, bandaging and X-ray, grooming and clipping, as an adjunct in the management of pruritus, as an aid in the training of cattle for shows, pre-operatively in conjunction with local anaesthesia, pre-operatively in conjunction with general anaesthesia, post-operatively to ease pain and prevent self-multilation, prevention of cannibalism, as an anti-emetic for motion sickness, for the management of nausea and vomiting associated with various clinical disorders.

Precautions: To date no contraindications to the use of Vetame have been reported and there is no known evidence that contra-indications exist. Some horses may respond with temporary motoractivity such as determined trotting. If they are allowed to trot on a lead, this will quickly pass and tranquillisation will set in. Following the last administration of Vetame, sheep intended for human consumption should not be slaughtered for at least three days, and cattle intended for human consumption at least two days. Pigs should not be slaughtered for at least six days following intramuscular administration. The preparation should not be used for horses intended for human consumption or in lactating animals whose milk is used for food.

'chloramphenicol possesses a higher activity against mastitis staphylococci than any other antibiotic or sulphonamide used in mastitis therapy.'

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Alficetyn (chloramphenicol) . . . . . 0.15 gm • Dapsone . . . . . 0.3 gm

FOR RESISTANT CASES OF BOVINE MASTITIS

Dapsetyn is highly effective in the treatment of staphylococcal mastitis. It has been demonstrated that chloramphenicol possesses a higher activity against mastitis staphylococci than sulphathiazole, penicillin, streptomycin, oxytetracycline or chlortetracycline; in addition, a marked degree of synergism exists between chloramphenicol and dapsone against Gram-positive organisms thus giving increased anti-staphylococcal activity.

Dapsetyn is active against a wide range of organisms and has been shown to be a valuable therapy in cases of mastitis resistant to penicillin particularly those due to infection with B. coli and staphylococci. Dapsetyn is non-toxic and non-irritating.

INDICATIONS: Dapsetyn is indicated in the treatment of coliform and staphylococcal mastitis and resistant mastitis caused by Str. agalactiae, Str. dysgalactiae, and Str. uberis. In the treatment of mastitis caused by C. pyogenes, Dapsetyn usually prevents the appearance of systemic symptoms.

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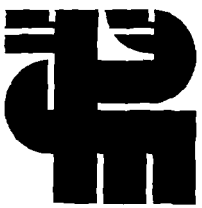

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extremely economical.

Of proven value in the treatment of both large and small animals.

Cattle:
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Horses:
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Pigs:
Mastitis, agalactia.

Small animals:
Joint diseases, otitis, eye diseases, skin diseases, canine distemper, feline distemper.

In general:
Severe infectious processes (in combination with chemotherapeutic agents or antibiotics), debility states, prevention of post-operative adhesions, etc.

Particularly indicated for the local treatment of joint diseases:
" , , , inflamed joints (in horses) were treated with 25 to 200 mg. Vecortenol per injection. Average number of injections was 1.4-2.5 per joint depending on the joint treated and the severity of the condition."

" . . . it is our opinion that Vecortenol comes closest to being the ideal corticosteroid for single intrasynovial injection therapy in the management of inflammatory conditions of the joints of horses."
(R.F. Vigue: Southwest. Vet. (U.S.A.) **13**, 103, 1960.)

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BOOK REVIEWS

"ATLAS OF AVIAN HEMATOLOGY"

by

ALFRED M. LUCAS, A.B., Ph.D., cytopathologist and CASIMIR JAMROZ, B.S., A.B., Medical illustrator. United States Dept. of Agric.

(Monograph 25), Washington, 1961. VI + 243 pp., 413 figures (including 48 full-sheet colour plates), 24 tables. Clothbound, $4.00 (50c additional for foreign mailing)

The "*Atlas of Avian Hematology*," being the first publication of its kind, fills a long-felt need in professional teaching and practice and in biological research. As such it should meet with an enthusiastic reception by a wide variety of research and field workers.

The text includes a detailed description of normal and abnormal cells found in embryonic and adult chick blood smears as well as in smears from the haematopoeitic organs. These cells are all beautifully illustrated in colour plates, being an exact representation of the colours these cells assume in smears satisfactorily stained with May-Grünwalds Giemsa or Wrights' stains.

In the interpretation of the smears all possible contaminants, artefacts and the results of defective techniques are considered.

The terminology used parallels that of mammals except in a few cases where new terms had to be introduced.

A chapter is devoted to comparative haematology of other avian species. Of special interest for the practical worker is the chapter on a variety of blood techniques ranging from the collection of specimens to staining and some chemical and physiological determinations.

W.H.G.

"VETERINARY HEMATOLOGY"

by

OSCAR W. SCHALM

Published by Bailliere, Tindall and Cox, London. 386 pages, 24 figures, 10 plates. *Price* 75s.

This is a book that has been long awaited; a book on hematology by a veterinarian and specifically for veterinarians.

The Chapter headings are as follows:—

1. Blood Volume and Water Balance.
2. Materials and Methods for the Study of Blood.
3. Standardization of Nomenclature of Cells and Diseases of the Blood and Blood Forming Organs. Characterisation of Immature and Mature Blood Cells.
4. Normal Values in Blood Morphology.
5. Hematopoiesis.
6. The Erythrocytes: Their Production, Function and Destruction.
7. The Erythrocytes in Disease.
8. The Leukocytes.

9. The Leukaemia Complex.
10. Blood Pictures in some Common Diseases of Domestic Animals. There is also an Appendix giving haematological findings in 27 actual clinical cases of various types.

Perhaps the most valuable parts of the book are the tables of normal haematological values for the different species; figures which have hitherto been scattered in the literature or unobtainable. Each chapter is accompanied by a very useful list of references.

It is a pity that the many excellent plates could not have been reproduced in colour which would greatly have enhanced their value.

The chapter on blood volume and water balance is unnecessarily condensed and the interrelationships of the fluid compartments of the body are not sufficiently stressed. The value of total plasma protein concentration as an aid to interpreting the haematocrit is also not emphasised. It is also rather curious to see such an outmoded measurement as the "icterus index" used in such a book. In the reviewer's experience this index is useless in herbivore and a van den Bergh test is within the scope of any clinician.

Despite these minor criticisms the book is a very useful addition to veterinary literature and should certainly be on the shelf of any veterinarian engaged in diagnostic work or doing clinical research. It should stimulate workers to publish more findings in veterinary hematology which can be included in subsequent editions which demand will doubtless make necessary. R. C.

VETERINARY DIETETICS

A MANUAL OF NUTRITION IN RELATION TO DISEASE IN ANIMALS

J. O. L. KING

Published by Baillière, Tindall and Cox, London. 1st Ed. 1961. *Price* 30/-

The points especially stressed in this book are the clinical signs, causes and prevention of those nutritional diseases which are of practical importance.

The first four chapters serve as a general introduction, outlining the principal causes of dietetic disease which are applicable to all species. The following seven chapters deal individually with the various classes of livestock, and the next refers to the nutritional factors affecting reproduction. Then come two chapters on the use of antibiotics and other additives, followed by two on poisonous foods and infections conveyed by food, while the final chapter covers the feeding of sick animals.

The book is free of serious mistakes. However, it should be pointed out that on p. 3 the sparing action of cystine on methionine is stated erroneously—the last part of the sentence ending in line 14 should read: "when cystine is not fed." Moreover, on p. 117 the amount of Calories required per pound of body weight per day is stated to be 1,000 instead of 100 for growing puppies. J.H.K.

VETERINARY TOXICOLOGY

R. J. GARNER—Second Edition Baillière—Tindall & Cox

The 2nd edition of Garner's Veterinary Toxicology published 1961, has been brought up to date by the addition and discussion of the latest

literature. The pesticide section has been more fully dealt with: an excellent step because of the growing importance of these substances on the health of man and beast alike.

The section on radio-active material is certainly new, interesting, and most important and although not yet of economic importance in the R.S.A. will certainly take prominence as radio-active research and the economic use of radioactive materials are developed and extended in this country.

The section on toxicological analysis has been omitted; a loss as far as the analyst is concerned, but justified to allow new material to be discussed, whilst analytical procedure really deserves a publication of its own.

Where chemical analyses are used as a basis of veterinary diagnoses, one would like to see more figures published in this connection. Figures are mentioned under the well-known poisons like arsenic, copper, lead etc. but are lacking where the chlorinated hydrocarbons, organic phosphates etc. are concerned.

This publication is certainly one of the most practical published to date. The style is simple and the text reads well. It has been in use as a text-book for students and is again recommended as such, as well as for research workers and practitioners in general. T.F.A.

TUMOURS IN DOMESTIC ANIMALS

J. E. MOULTON—University of California Press, Los Angeles

In the veterinary literature the subject of tumours has been very much neglected. Since the publication of Feldman's book in 1932, this is the first veterinary book to be devoted to neoplasms. In the interval major contributions to our tumour knowledge were made by the monograph of Cecil Jackson and a series of articles by E. Cotchin. The veterinary profession will therefore wellcome this publication wholeheartedly.

Dr. Moulton has succeeded in covering the field very well. In a systematic way he describes the various tumours with special reference to: incidence, age, breed, sex, sites, gross appearance, microscopical appearance and prognosis. The latter is a very valuable addition and will make the book very usefull not only to pathologists but also to the clinician. Most of the tumours are illustrated by excellent macro- and microphotographs. An extensive reference list on tumours is also included.

The only criticism that I may offer is that the author is sometimes a bit dogmatic in his statements e.g. in classifying meningioma as a rare tumour. In view of the work by Luginbule and Smit, meningiomata is a fairly common tumour especially in the cat.

The book is well produced. It can be whole-heartedly recommended to students, teachers and private practitioners. J.D.S.

VETERINARY RADIOLOGY

W. D. CARLSON, D.V.M., M.S., Ph.D., Lea and Febiger, Philadelphia, 1961. 474 pp., 1,091 Illustrations (one in Colour)

(Acute column. 12 pt. solid. Imitation art paper. *Available Westdene Products*)

For many years Schnelle's "Radiology in Canine Practice" has been

the only veterinary work in English devoted entirely to radiology. The time was long since ripe for some one to collect and collate the many items of radiological interest which have appeared in veterinary journals over past years. With his considerable formal and practical knowledge of the subject, the author has done more than simply collate the work of others.

"Veterinary Radiology" contains two main parts, the first of which describes the apparatus required for radiography, the techniques of exposing and developing films, and their interpretation. Part two is entitled *Atlas of Radiographic Pathology*. In this, the head and neck, the thorax, the abdomen and the extremities are discussed in turn: first in small and then in large animals. The same sub-classification is used for each region, viz developmental anomalies, metabolic disturbances, traumatic, infectious neoplastic and degenerative conditions, and those of unknown aetiology. This is a practical and satisfactory arrangement of the subject. A shorter third part of the book, Radiation Therapy and Nuclear Medicine, is brief and informative.

Language usage is often clumsy, and detracts much from the pleasure of reading what is otherwise a good book. For example, "In no other way can the results of radiography be duplicated by any other means" (p. 5)appears. In a first edition one excuses, almost expects, one or two errors in the nature of muddled cross references (e.g. p. 40, reference to apron fig. 10–3 should be 10–2) and misprints ("beterinary medicine", p. 456), but grammatical errors like the following "the compensating advantage with screened carsettes has been enumerated" (p. 38) are inexcusable.

The illustrations are good, with one or two exceptions, e.g. 5–17, p. 79.

The text is studded with useful references, quoted almost exclusively from North American journals. References to Continental works would enhance the value of this book. If the reader can overlook the linguistic and grammatical shortcomings of Veterinary Radiology, the content is so valuable that no clinician can do without it. D.H.G.I.

VETERINARY ANAESTHESIA AND ANALGESIA

J. G. WRIGHT and L. W. HALL

Pp. VIII x 386. 5th Ed. 1961. Bailliere, Tindall and Cox, London. *Price* 37.6d.

This book is the successor to the widely known Veterinary Anaesthesia by Professor Wright—a book which has been reviewed before in this Journal (Vol. xxx (1) 1959). The junior author of the present issue is the university lecturer in charge of Anaesthesiology in the University of Cambridge Veterinary School.

The scope of the book has been widened to meet the needs of the specialist in anaesthesiology, as well as of workers in experimental surgery and physiology.

The advance of surgery and anaesthesiology have been mutually dependant and each stimulated the other. The material in this book is presented in such a way as to meet the demands of advanced surgery. Greater attention has been paid to the physiology and pharmacology of anaesthesia—a welcome elaboration. The uses of tranquillizers, muscle relaxants and newer inhalation anaesthetic apparatus are adequately

described, besides of course, the more routine and conventional methods.

Local, regional, spinal and para-vertibral anaesthesia are fully dealt with but not in as great a detail as works particularly devoted to this branch of anaesthesia.

Taken as a whole the book has certainly kept abreast of developments in anaesthesiology. To the student, the practitioner, as well as the physiologist-experimental surgeon, it is highly recommended. C.F.B.

DIE NARKOSE DER TIERE

M. WESTHUES and R. FRITSCH

Vol. II. Pp. 404. 70 Figs. 1st Ed. 1961
Verlag Paul Parey, Berlin and Hamburg

This book is the second volume of a set of two, the first one being devoted to local anaesthesia.

The first 58 pages are devoted to the fundamentals of anaesthesiology. The next 130 odd pages describe drugs used in association with anaesthesia like narcotics, analgesics, sedatives, muscle relaxants and, finally, analeptics and antiodites.

The next section of nearly 100 pages is concerned with anaesthetic technique and complications. The final section of just over 100 pages describes the application of anaesthesia in the domestic animals, laboratory animals as well as wild animals, birds, fish and frogs. The bibliographical list at the end contains the impressive number of more than 2,000 references.

In order to avoid confusion about the large number of trade names which indicate a particular drug, a list of pharmacological synonyms is provided.

This text book carries evidence on every page of the great care with which it has been prepared. As a matter of fact, the undergraduate may find it somewhat too complete. All veterinary clinicians who can read German will find „Die Narkose der Tiere" authoritative and a profitable investment. C.F.B.H.

LOKALANAESTHESIA

I. I. MAGDA

1960. Pp. VIII + 276. Fig. 179. V.E.B. Gustav Fisher Verlag, Jena

This book was originally published in Russian and then translated into German.

A glance at the list of references shows that most are from Europe—very many from Eastern Europe and Russia. Countries outside these are poorly represented. This distribution of sources of information is, to those veterinarians outside Europe, and advantage in certain respects. Even though practices with which we are familiar may be omitted, other methods which may be completely or comparatively unknown, are mentioned as will be indicated later.

The historical version of certain discoveries differ from those from other sources e.g. credit for discovery of the local anaesthetic properties of cocaine is given to a Russian, while there is another version namely that Sigmund Freud (of psychoanalysis fame) of Vienna discovered this

without being aware of its significance, although some of his associates had worked on this aspect. However, Halsted (after whom the Halsted suture was named) did a great deal of pioneering research on cocaine in America.

The first fifty odd pages comprise the general sections including the forms of local anaesthesia, the signs, indications, contraindications, complications, etc.

The next two hundred pages are devoted to regional anaesthesia and each region of the body is dealt with separately. As noted, this includes techniques not generally applied in the English speaking countries. For tongue anaesthesia e.g. the processus lingualis of the hyoid bone is palpated in the intermandibular space. The needle is inserted perpendicular to the longitudinal axis of the head, 2–3 fingerbreadths orally. This is the external site for anaesthesia of the tongue, by blocking the N. lingualis and N. hypoglossus where they are in proximity. A further example is sacral anaesthesia. Reference to this technique has only been seen once by the reviewer in a publication from Hungary. Numerous other examples can be cited.

Many of the methods will never come into routine use because of the more recent developments in general anaesthesia. At the same time tranquillisers have widened the scope of local anaesthesia, as many an intractable animal can be made manageable without a general anaesthetic. This book provides a great deal for the enquiring mind and for the student of anaesthesia. C.F.B.H.

ABRISS DER KLINIK DER HUNDEKRANKHEITEN

H. J. CHRISTOPH

1960. Pp. XV + 456. Figs. (some coloured) 425. V.E.B. Gustav Fisher Verlag, Jena

Professor Christoph heads the Department of Small Animal Diseases in the Leipzig University. This Department includes all the diseases of small animals in its curriculum. According to his own admission, Christoph regards himself mainly as a surgeon; a fact reflected in the perusal of the book.

The contents are divided into a general section occupying 75 pages. This includes examination, control, chemotherapy, bandaging and analgesics. The next 460 pages are mainly devoted to a discussion of pathological conditions and therapy of the various organs and systems. This includes more than 50 pages on orthopaedics. This section is concluded by a discussion of infectious diseases and poisoning.

As the author states, the book has been written for veterinarians and especially for students. The large number of illustrations and good quality paper enhance the pleasure of reading this book. The facts are well represented. It is perhaps a pity that references are not included: they are of considerable help where the reader wishes to learn more of a condition. The reviewer feels that as a work emanating from an academic institution and intended for institutional use certain parts could have been elaborated somewhat more fully e.g. the technique of operation for perineal hernia if done exactly as represented will perhaps not be uniformly successful. Another example is that of diaphragmatic hernia, where more mention could have been made of items under diagnosis, differential

diagnosis and treatment. It is fully realized that the scope of the work is a very wide, and that this consideration limits the space available for discussion. This perhaps supplies the reason for abbreviating the handling of some conditions. A more extensive evaluation of clinico-pathological features would be welcomed.

The fact remains that Christoph has presented a work of high general standard and one which would be of material aid to the clinician.

C.F.B.H.

ORTHOPEDIC SURGERY OF THE DOG AND CAT

ELLIS P. LEONARD

Pp. XII + 296, 1961

Many illustrations—W. B. Saunders Company, Philadelphia and London

As is widely known, surgery in general and veterinary surgery in particular, have made tremendous strides during the past quarter of a century, orthopaedic surgery perhaps even more than the rest. The result is that, particularly with regard to orthopaedics, a large number of new techniques have made their appearance, some good, some bad. Because of individual facilities, abilities and idiosyncrasies, certain surgeons prefer certain techniques to the exclusion of others, perhaps as good or better. Professor Leonard has bravely ventured into this contemtious field and has, in the process, collected one or two unfavourable reviews.

The present reviewer, to be fashionable, also differs from Leonard in some instances—yet he would like to congratulate Professor Leonard for producing the book. Veterinary literature needs books written about a restricted specialised field—like this one. It has numerous good illustrations, reads easily and presents a great number of interesting and good techniques.

It is not intended to draw up a catalogue of deviating opinions—a few would suffice.

The list of reference shows a large number from America, fewer from England and very few from the European Continent and elsewhere. This explains the absence of any mention of some very useful methods. Orthopaedic instrumentarium has become very impressive (and expensive) Care should be taken not to minimize, through under-emphasis, the very good results obtainable with a plaster cast. Femoral head prosthesis has been used with reported good results. It is open to grave doubt whether as good (or better) results cannot be obtained by amputation of the head and neck of the femur. But enough It is hoped that Professor Leonard will continue the good work he is doing. Also that he will include a special chapter on electrolysis, the behaviour of metals and other foreign materials in tissues, the lines of stress, etc.

C.F.B.H.

PRAKTIKUM DER HUNDEKLINIK

HANS GEORG NIEMAND

1962. Pp. 528 + 345. Figs. + 12 Figs. + 2 Tables in Colour.

Verlag Paul Parey, Berlin and Hamburg. *D.M.* 78.00

Dr. Niemand has interested himself particularly in the diseases of small domestic animals. The first part of his career was spent as a lec-

turer in this field at Berlin University and subsequently he has had a private small animal practice. It is with the private practitioner in mind that he has written this book. The first hundred pages are devoted to general considerations like the fitting out of a practice, sterilization, bandages, etc. A section deals with practice tips and procedures. This is followed by consideration of the normal dog and its clinical examination. Laboratory equipment, facilities and clinico-pathological methods together with indications and interpretation are discussed fairly extensively. Towards the end of this section very valuable data are given as to the diseases to which the various canine breeds are particularly prone.

The next three hundred pages are taken up by a systematic description and discussion of disease of individual organs. There is no division into gynaecological, medical or surgical conditions.

After touching on poisons, the next 30 pages are devoted to infectious diseases and the final 50 to a discussion of drugs.

The author has made it his objective to provide information in a condensed, compact form. This book is therefore very useful to the clinician who wishes to look up a condition quickly. The absence of references may be felt as a deficiency but can be justified by the consideration that those for whom the book is primarily intended seldom have the time or the library facilities at hand to indulge in extensive reading. Within the limits the author has set himself, he has made a valuable contribution to the clinical veterinary library.

The numerous good-quality illustrations, format, and matching paper make the book a pleasure to handle. C.F.B.H.

VETERINARY BACTERIOLOGY AND VIROLOGY

by

I. A. MERCHANT, D.V.M. Ph.D., M.P.H.

and

R. A. PACKER, B.S., D.V.M., Ph.D.

Balliere Tindall and Cox, London — Sixth Edition

Pp. VIII — 899. Price

This, in parts conservative and rather elaborate textbook on Fungi, Bacteria and filtrable virusses, which are important to the veterinary profession, appears to be written for students of Infectious Diseases. It is quite comprehensive and particularly well documented as far as precedents of scientific discovery in the American and English speaking world are concerned. Many common historical errors and omissions are very carefully avoided giving a sound background for study.

As a reference book for the post graduate veterinarian in many walks of life it has great value; but suffers from the defect that it attempts to cover details in too many fields. Consequently the final sentence on many phenomena gives no conclusive answer to the reader e.g. p. 25, "complex polysaccharide capsular materials . . . seem to be responsible for the specific reactions which are obtained in the serologic study of bacteria." Also p. 373 "*S. enteritidis* var. *dublin* . . . This strain is one of the important causes of food poisoning in man"; and p. 505. "*Cl. novyi* infection can be diagnosed correctly only by isolation and identification of the organism. Lesions produced in the guinea-pig are not sufficiently different from those caused by *Cl. chaevoei* and *Cl. septicum* to be of value."

It is to be regretted that the authors, who were able to include the outstanding data on newly discovered virus diseases e.g. Mason and Neitz p. 753 van den Ende et. al. p. 863; Weiss, Haig and Alexander p. 865; new bacteria e.g. *Actinobacillus lignieresi* Baynes and Lignieres, 1960 p. 458; new vaccines and vaccine media e.g. Sterne p. 489, Sutton, p. 489; did not find space for more than a passing mention of "transduction" p. 873. The great new concepts of transformation, transduction, recombination, variation and mutation basically affecting all bacteriological principles and such works as those of Lederberg and Tantum and many outstanding bacteriologists have not found a place in this book. Some aetiology and epidemiology, which has already since been proved erroneous has been published e.g. Lumpy Skin Disease virus p. 864. In spite of having more than 15 pages devoted to *Brucella* including *B. neotomae* there is no reference to the ovine genital *Brucella* infections reported from New Zealand, Australia and South Africa and also studied in Tunis, Great Brittain and California.

The informed reader will nevertheless find the work extremely helpful, the text is attractively arranged with ample references and quite useful illustrations and informative tables are plentiful. The publishers have presented this in a well bound imposing volume.

G.C. v. D.

LISTS OF VETERINARIANS

The S.A.V.M.A. compiles and offers for sale the following list of Veterinarians residing within and beyond the Republic.

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The S.A.V.M.A. undertakes on request, to circularise its members on all urgent and important matters, at *R5–00 per intimation for members and R10–00 per intimation for non members.*

These circular letters are usually dispatched to members every 14 — 21 days.

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T. H. White *The Book of Beasts*

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NEWS OF MEMBERS

PROMOTIONS

Dr. J. G. Louw. We offer our sincere congratulations to Dr. J. G. Louw, Sub-director of Veterinary Services, Onderstepoort, who has been promoted to the post of Public Service Commissioner. Dr. Louw was actively engaged in the Biochemistry Section at Onderstepoort for 31 years. He became head of the Section and later Sub-director of Veterinary Services.

He played an active and prominent part in public service matters. He was elected Vice President of the Public Servants Association in 1949 and President in 1954, which position he held up to the time of his promotion to Commissioner.

He is the second public servant employed in the Division of Veterinary Services, to be appointed a Commissioner, the first being Dr. C. J. van Heerden.

GOOD TIDINGS

Dr. Daan Verwoerd is doing post-graduate study and research in biochemistry at the Max Planch Institute, Munich, under Professor Butenandt, a Nobel Prize Winner.

Dr. Len Black is working for his Ph.D. at the Department of Experimental Surgery, Post-Graduate Medical School, London.

Dr. B. A. Matson is engaged in post-graduate study at the Veterinary School, Cambridge.

Dr. I. F. H. Purchase is undertaking a specialised course in anaesthesiology at the Veterinary School at Cambridge.

Dr. H. Graham Purchase is working under Dr. Burmeister at the Regional Poultry Research Station, U.S. Department of Agriculture, East Lansing, Michigan.

Dr. C. M. T. Meldal-Johnson writes cheerfully from the Department of Agriculture, Hamilton, New Zealand, where his main duties are Tuberculin Testing and Supervision of the export of high quality mutton to overseas markets.

Dr. S. N. Bayer is engaged in private practice in Essex, England.

Dr. G. H. R. Bisschop is employed in private practice by Dr. G. K. Weir of P.O. Box 820, Lloydminster, Alta, Canada, where he has just been joined by Dr. John W. E. Adams.

Dr. R. Coubrough has been awarded a Rotary Foundation Scholarship for post-graduate study at the Ontario Veterinary College, Guelph, Canada.

International Congress at Vienna

Professor Dr. K. Diernhofer of the Bovine Clinic, Veterinary College, Vienna, advises that an International Congress on bovine diseases is to be held at the College on 17th–18th and 19th May, 1962. A communication from Porf. Dr. Diernhofer appears on page 113 of this issue.

Meeting of the Veterinary Board

A full meeting of the Veterinary Board, under the Chairmanship of Dr. B. C. Jansen, took place on December 18th, 1961, when several important matters were dealt with.

Amendments to the Veterinary Act

The Veterinary Board is presently giving its attention to amendments to the Veterinary Act (Act No. 16 of 1933). Any member interested in submitting suggestions in this regard should communicate them to the Secretary, P.O. Box 2460, Pretoria, as soon as possible.

International Association of Veterinary Food Hygienists

An International Conference of the above Association is to be held at Nice on May 27th–June 2nd, 1962, when an extensive Symposium on Food Hygine will be arranged. Further particulars can be obtained from Dr. L. W. van den Heever of Onderstepoort.

Royal Agricultural Society Show 1962

The Secretary, Royal Agricultural Society of England, 35 Belgrave Square, London S.W. 1, intimates that the Royal Show will be held at Newcastle-upon-Tyne from 3rd to 6th July, 1962.

Guest tickets can be obtained from the Secretary, if he is advised of the addresses in England to which the tickets are to be sent, with an indication of the days on which the Show will be visited.

Bicentenary National Veterinary School at Lyon France

The Bicentenary of the National Veterinary School at Lyon in France is to be celebrated on 25th–28th May, 1962.

Lyon was the first Veterinary School to be established in the world and the celebration of its two hundredth Anniversary is likely to be very spectacular.

Suitable messages of congratulations are being sent by both the Association and the Faculty of Veterinary Science of the University of Pretoria. Certain members of the Onderstepoort staff may be present.

Schedule of Fees

The Witwatersrand and Cape Western Branches of the Association have recently amended their Schedule of Fees and converted them to the new currency.

Extension of Good Wishes

Dr. L. W. van den Heever has been elected a Fellow of the Royal Society of Health. We congratulate him on his election to the fellowship of this well-known Society.

A short review of the Society's aims status and existence appears on page 111 of this issue.

Dr. P. J. Meara. Has been appointed representative of the S.A.V.M.A. on the Advisory Committee of the Department of Education Arts and Science, which arranges the training and examination of Health and Meat Inspectors, Health Visitors and School Nurses.

Transfers

Dr. Vogelnest has returned from Europe and intends practising on the Witwatersrand.

Dr. van Aart has joined the Staff of the Division of Veterinary Services and is stationed at Grahamstown.

Dr. C. W. A. Belonjé has resigned from the Division of Veterinary Services and has established a private practice in the Colesberg area.

Dr. H. D. P. Dames has joined the Field Section of the Division of Veterinary Services and is on Foot and Mouth Disease duty in South West Africa.

Dr. P. D. de Wet has been appointed lecturer in Anatomy at the Veterinary Faculty, Onderstepoort.

SAVMA COUNCIL MATTERS

Standing Committees

The following are the Standing Committees for the year 1961/62.

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Permanent Committee, World Veterinary Association:

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Veterinary Board:

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Dr. M. C. Lambrechts.
Dr. A. M. Diesel.

A.I. Board:

Dr. S. W. J. van Rensburg.

Advisory Committee on Training of Meat Inspectors—Department of Education, Arts and Science:

Dr. P. J. Meara.

Editor of the Journal:

Dr. A. M. Diesel, P.O. Box 2460, Pretoria.

Secretary/Treasurer and Chairman of all Committees:

Dr. A. M. Diesel, P.O. Box 2460, Pretoria.

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Corrections

Our apologies to Dr. T. C. W. Wessels of Tweespruit who writes as follows in regard to pages 473 and 490 of Vol. XXXII, No. 4 (December, 1961), where he and not Dr. C. C. Wessels should have been reported.

"Re your recordings of the proceedings at the Durban Congress as reported in your issue, Vol. XXXII; I would like to point out to you that you are confusing the vessels in our ocean.

C.C. is the expert on Cobalt and Trace Elements. T.C. is the Bovine Animal Psychologist and Clinician."

Through an oversight the article by Dr. H. G. Purchase "*Phenothiazine Poisoning in a Thoroughbred Racing Stable*," appearing on page 403 Vol. XXXII (3) 1961, was not included in the Index. We make our sincere apologies for this omission.

Notice to Contributors

A notice to guide contributors in the preparation of manuscript for publication in the Journal of the S.A.V.M.A. is in the course of preparation. It will be published in the June, 1962 issue and copies will be available to authors free of charge.

Anyone who in the meantime desires of the details on the preparation of typed copy for publication in the Journal can obtain these from The Secretary, P.O. Box 2460, Pretoria.

BICENTENARY: NATIONAL VETERINARY SCHOOL LYONS, FRANCE

The Bicentenary of the National Veterinary School at Lyons in France is to be celebrated on 25th — 28th May, 1962.

Lyons was the first Veterinay School to be established in the world and the celebration of its two hundredth Anniversary is likely to be very spectacular.

The following message of congratulations will be delivered in person by a member of the S.A.V.M.A. who will attend the function.

THE SOUTH AFRICAN VETERINARY MEDICAL

ASSOCIATION

SENDS GREETINGS AND CONGRATULATIONS

TO THE

NATIONAL VETERINARY SCHOOL

OF LYONS

FRANCE

ON THE COMMEMORATION OF THE TWO HUNDREDTH ANNIVERSARY OF ITS FOUNDATION AND CONVEYS ITS SINCERE BEST WISHES FOR THE FUTURE PROSPERITY OF THE SCHOOL

H. P. STEYN
PRESIDENT

VERSLAG VAN UITBREKINGS VAN GEPROKLAMEERDE SIEKTES VIR DIE TYDPERK JANUARIE—MAART 1962.

REPORT OF OUTBREAKS OF NOTIFIABLE STOCK DISEASES FOR THE PERIOD JANUARY—MARCH 1962.

Siekte/Disease	Distrik/District
Gonderiose—Milde Bees Gonderiosis—Benign Bovine	Bizana Carolina. Durban. Entonjaneni Elliotdale Estcourt Ermelo. Kranskop. Mt. Ayliff. Mt. Fletcher. Mt. Frere. Mahlabatini. Msinga. Nelspruit. Ngqwleni. Pilgrimsrust. Port Shepstone. Paulpietersburg. Piet Retief. Tabankulu. Tsolo. Umlazi. Umvoti. Umzinto. Vryheid. Wakkerstroom.
Gonderiose—Kwaadaardige Buffel Gonderiosis—Malignant Cynerine	Barberton
Hoendertifus Fowl Typhoid	Bethelehem. Bloemfontein. Gordonia. Kroonstad. Lions River. Pietersburg.
Hondsdolheid Rabies	Bloemfontein. Brandfort. Durban. Dewetsdorp. Entonjaneni. Eshowe. Heilbron. Hlabisa Ingwavuma Kuruman. Koppies. Kroonstad. Lower Umfolozi. Lindley.

Siekte/Disease	Distrik/District.
Hondsdolheid (vervolg)	Letaba
Rabies (Contd.)	Mafeking.
	Mtunzini.
	Ngotshe.
	Nongoma.
	Pietersburg.
	Piketberg.
	Potchefstroom.
	Pietermaritzburg.
	Schweizer—Reneke.
	Ubombo.
	Venterstad.
	Van der Byl Park.
	Vryburg.
	Victoria Oos.
	Vrede.
	Waterberg.
	Wolmaranstad.
Knopvelsiekte	Bethlehem.
Lumpy Skin Disease	Bothaville.
	Boshof.
	Barkly Wes
	Delmas
	Dundee.
	Ermelo.
	Elliot.
	Frankfort.
	Gordonia.
	Herbert.
	Hoopstad.
	Indwe.
	Johannesburg.
	Kroonstad.
	Kuruman.
	Klerksdorp.
	Kimberley.
	Lichtenburg.
	Lower Umfolozi.
	Mafeking.
	Marico.
	Piet Retief.
	Standerton.
	Schweizer Reneke.
	Taungs.
	Trompsburg.
	Umvoti.
	Vryburg.
	Ventersdorp.
	Worcester.
	Warrenton.
Laringotrageitis Aansteeklik	Bellville.
Laryngotracheitis Infectious.	Klipheuwel.
Miltsiekte.	Bloemfontein.
Antrax.	Lady Brand.
	Mahlabatini.
	Mafeking.
	Potchefstroom.
	Rustenburg.
	Stutterheim.
	Theunissen.
	Vryburg.
	Winburg.

Siekte/Disease	Distrik/District.
Newcastelsiekte..... Newcastle Disease.....	Pretoria.
Slapsiekte ..... Dourine.....	Gordonia.
Skurfte .....Bok Mange .....Goat	Glen Grey. Hlabisa. Kingwilliamstown. Middledrift. Mqanduli. Nongoma. Ubombo.
Tuberkulose .....Bees Tuberculosis.....Bovine	Kranskop. Koppies. Malmesbury. Namaqualand. Ngotshe. Pretoria. Potchefstroom. Piet Retief. Pietermaritzburg. Riversdal. Somerset Wes. Viljoenskroon Volksrust. Vryburg.
Hoender Avian	Caledon. Potchefstroom. Schweizer Reneke. Thabanchu.

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