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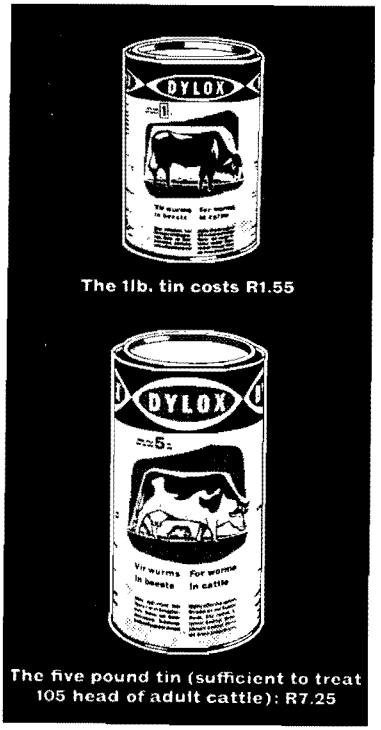

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Editorial

THE PLACE OF THE VETERINARY PROFESSION IN THE MODERN WORLD

Opening Address at the Thirteenth Annual General Meeting of the Cape Western Branch of S A V M A held at Cape Town on 30th November, 1962.

The ever increasing pace of scientific development in the modern world has affected all walks of human life, including the veterinary profession. With your indulgence I will attempt to review the present position very briefly and even make a few prophecies as to the future. I wish to stress at the beginning that these are entirely my own personal views.

In the early days the veterinary profession arose mainly as an ancillary to the army. This is understandable when war was the main occupation; the only troop carriers were horses and tanks were equipped with trunks and tusks.

The close association between the veterinarian and the army remained as long as "cavalry continued to lend tone to battles which would otherwise have been mere unseemly brawls." With the development of roads and large scale public and private horse drawn transport, the civilian veterinarian came into his own, but the horse remained his chief concern. The advent of mechanical transport changed the entire picture although shades of the past are still seen in some veterinary schools where the horse is still the basis for the study of anatomy.

Where do we stand today? The veterinary profession serves humanity through the maintenance and restoration of the health of animals. What are the present and possible future functions of animals with regard to humans in a progressively more mechanical and synthetic world? Briefly I would list them as follows:—

1. They act as converters of low biological value plant protein to high biological animal protein. You will notice that I stress the protein, not fats. Vegetable fats are better for us and can be produced more cheaply. The value of milk lies in its protein, not the butter fat, and the sooner we acknowledge it the better for the dairy industry.

   There is no foreseeable possibility of the synthesis of protein. We have read of the extraction of protein for human consumption from grass, but it must still be of low biological value unless fortified with synthetic amino acids. In any case I cannot visualise people preferring a grass protein pill to a braaivleis or a plate of bacon and eggs. I am therefore confident that meat and milk and eggs will long continue to form an essential part of the human diet.
2. Animals produce valuable textiles such as wool, mohair and leather. Here the animal industry is in fierce competition with the synthetic chemist but it would appear that the market for these natural products will long remain.

3. Animals play a very important and often underestimated part in the psychological life of human beings. We all know the joy and companionship pets can bring to children and adults alike.

What now of the veterinary profession? Although we have much in common with our medical collegues, the comparison between the two professions if often overstressed. With us the emphasis is much more on group prophylaxis and treatment and much less on the treatment of the individual case. We are much more confined by economic considerations so that long and expensive courses of treatment are frequently precluded. Euthanasia usually takes their place.

With the eradication or control of the major epizootic killer diseases of stock, our attention must now turn to the erosion diseases which do not cause high mortality but which cost the country millions of rand annually in lowered production. These include tuberculosis, verminosis, under- and malnutrition, mastitis and a host of others. Congenital conditions causing low fertility, tendency to abort and physical defects are also of an increasing importance.

To combat these conditions we will require wide-spread disease surveys, extensive research and large scale information services to farmers. These will have to be undertaken by the state. Here I see an enormous extension of the State Veterinary Services.

Although the co-operative employment of veterinarians by farming groups has caused much dissension and criticims in the past, it has come to stay, and is proving a very useful method of supplying veterinary services in areas where unaided private practice would not be possible. Here your council has done a tremendous amount of work in preparing contracts which do not conflict with our code of ethics and which allow the veterinarian to practise his profession unhindered by lay authority. As the areas concerned progress, these veterinarians will be able to become completely independant private practitioners.

Farming in the outlying areas is tending to become more extensive and more highly capitalized by syndicates and companies. This leads to greater efficiency and has already opened up an avenue of employment to veterinarians as employees.

The veterinary profession must and will play a much greater part in public health matters. The extension of municipal veterinary services is long overdue. I have high hopes for post graduate courses now being introduced in this aspect of veterinary science.

What of the private practitioner? Ill informed persons frequently criticise the private veterinarians for crowding into the cities and opening up "dog and cat" practices which they deride. What these critics do not realize is that the small animal practitioner supplies a very essential service to the city dweller otherwise he would not exist. I can vouch for this as I always take my own dogs to a vet if they seem off colour. Furthermore, the belittled dog and cat owners are actually subsidising veterinary services to farmers in the area. We all know of the struggle to make private practice pay in rural areas where long distances and the average low value of stock often make veterinary attention to individual animals uneconomical. Even a limited small animal practice can keep a veteri-

narian going in semi-rural areas. What is more, most town veterinarians have large farm practices in the surrounding areas.

I feel that the State must make greater use of the private practitioner, especially in semi-rural and peri-urban areas, either on a part-time employment or contract basis. Tuberculosis testing and mortality investigations are examples which immediately spring to mind. The adoption of this policy would bring the benefits of both state and clinical veterinary services to areas where neither could be justified separately.

I also feel that our students must be taught more of the practice and economics of stock farming, which is a commercial undertaking. Veterinary advice must be geared to the economics and business routine of the farm. Some people say we should confine ourselves to the diseased animal and leave the normal animal to others. To this I cannot subscribe. The veterinarian must know the healthy animal and its economic potential as well as he knows disease. His main function is to prevent disease not cure it. Nobody has ever contested the right of the medical profession to give advice to healthy humans as to how to remain healthy.

The proposed amendments to the Veterinary Act, which we hope will be passed next seassion, will add another milestone in the history of our profession and greatly assist its growth. Here I would pay particular tribute to the President, our secretary Dr. Diesel and members of Council who have brought this matter to its present position. We must also record our thanks to the Minister of Agricultural, Technical Services for his sympathetic attitude and support.

In conclusion I feel that if South Africa is to progress the veterinary profession must progress with it. The tasks ahead are enormous, the hands pathetically few. A second veterinary faculty may be nearer than we think.

R.C.

Editorial

CLINICAL DRUG TRAILS

Pharmaceutical manufacturers with well equipped laboratories and highly specialised scientific teams are spending large sums of money to supply the veterinary profession with potent and effective drugs in the fight against disease.

The manufacturer regards a drug worthy of clinical trail when *in vivo* and *in vitro* tests have indicated its possible application in the treatment of disease, and after pharmacological tests to establish levels of acute and chronic toxicity, have been successfull.

The era when the clinical use of a new preparation was a purely empirical matter has passed in Veterinary medicine. Before exposing the well being of his patient, his client's purse, or his own reputation to the effects of a new preparation, the clinician is entitled to know the results of accurate clinical trails which put the safety of the drug beyond doubt and promise a reasonable chance of success.

For the conduct of the therapeutic trail the manufacturer is completely dependent on the clinician who has the clinical material at his disposal. In this respect the profession in South Africa has a particular duty because we can test drugs under subtropical and tropical conditions; the results which are applicable to great areas of our continent where facilities for clinical trails are lacking or inadequate.

New drugs, backed by the scientific research of reputable manufacturing firms, are appearing on the South African market in steady numbers and it appears that the time has arrived for a realistic reappraisal of the role which the profession must play in clinical assesment of these products.

The veterinary art demands correct diagnosis and the best treatment available once the cause of the disease has been established. If the latter part of this statement is accepted, it follows that nobody in the profession can afford not to implement a therapeutic advance immediately it becomes available, and this is where the undertaking of therapeutic trails at the earliest possible moment and publication of the results, for the information of the whole profession becomes the responsibility of every clinician.

There are many reasons for the caution and reluctance with which therapeutic trails have up to the present, been approached by the profession. An important one seems to be the fear of the clinician of losing independance by attaching his name to a drug manufactured or distributed by a particular firm. Unfortunately the independence of the older veterinarian who could maintain his originality by concocting six or eight tinctures, roots, and powders in one prescription has disappeared, and we must accept the era of prescribing a scientifically formulated drug manufactured by a specific firm.

The greatest falacy lies in the assumption that a therapeutic trail is done for the manufacturer or distributor; this is perhaps enhanced by the legitimate attempts of the manufacturer to place every facility at the disposal of the clinician who is willing to undertake the testing of a drug.

The true facts are that the clinical investigator undertakes to test a certain drug and that the outcome of the trail is published regardless of the positive or negative results *for the information of the profession.*

Publication of favourable results has nothing to do with promotion or advertising for a pharmaceutical house. The trails are sponsored by a house because it has prepared and investigated the trail substance and is then ready to submit it for scrutiny by the people who must eventually use it. The fact that the house attempts early clinical evaluation before incurring heavy costs on promotion must be accepted as reasonable.

After careful analysis of the facts the profession must conclude that the clinical trail investigator's work is the *only* means of determining the value of a preparation and that it should be accepted as an honourable duty and a genuine contribution to veterinary knowledge and advancement of clinical science. A real sense of achievement awaits the individual who is able to conclude a trail successfully and he contributes to the profession's continued interest in modern chemotherapy.

K. v.d. W.

SHOCK

A paper delivered by Prof. R. Clark of the Department of Physiology faculty of Veterinary Science, Onderstepoort, Transvaal, at the Annual General Meeting of the Cape Western Branch of the S.A.V.M.A. held in Cape Town on 30th November, 1962.

Shock may be defined as a progressive failure of the circulatory mechanism which may follow a variety of body injuries and which gives rise to a fairly constant clinical syndrome. The cardinal feature of shock is a decreased cardiac output following on a decreased venous return.

May I remind you of some of the more important rules of haemodynamics? Within physiological liimts, the force of contraction of the ventricle is directly proportional to the degree of filling during diastole. The stroke volume is therefore also directly proportional to the venous inflow. The "output of the heart" is the amount of blood pumped into the arterial system in unit time. It is therefore the product of the stroke volume and the number of contractions per unit time. In man these figures are normally 60cc. per stroke and 72 beats per minute giving a cardiac output of some 4320 cc. per minute. Any decrease in the rate of venous return will therefore result, not only in a reduction of cardiac output, but also in the force with which the blood is pumped into the arteries. The arterial systolic pressure will therefore fall. Diastolic arterial pressure is due to the elastic recoil of the arterial walls, which have become distended during systole, and the resistance to the flow of the blood through the peripheral vessels, the arterioles, This peripheral resistance is governed by vasodilation and vasoconstriction of the arterioles. Normal blood pressure is maintained by reciprocal adjustment of cardiac output and peripheral resistance. The normal blood volume is maintained by the balance between the hydrostatic blood pressure and the osmotic attraction of the plasma proteins. In the capillaries the hydrostatic pressure tends to force fluid through the semi-permiable capillary wall while the osmotic attraction of the plasma proteins, mainly albumen, draws water from the interstitial fluid, which is virtually protein free, back into the vascular system. At the arterial end of the capillary the hydrostatic pressure in greater than the colloidal osmotic attraction, so that fluid leaves the vessel. At the venous end of the capillary the hydrostatic pressure has fallen to below the colloidal osmotic attraction, and fluid passes back into the circulation. The plasma volume is therefore largely dependent on the plasma protein concentration.

Another important fact is that normally not more than 10% of the capillaries in resting tissue are open at the same time. The total potential capillary and venule bed is enormous and capable of holding a considerable proportion of the total blood volume. The importance of this will be obvious later.

Shock Following Haemorrage

The sequence of events leading to post-haemorrhagic shock, are the easiest to understand and will be used as a basis for this discussion.

Normally some 20 to 30% of the total blood volume can be lost to the vascular system without shock developing. The compensatory reactions are as follows. The decreased venous return causes a decrease in both the force of cardiac contraction and the stroke volume. The cardiac output therefore falls. This is in itself a compensatory mechanism as, should the heart continue its normal output, it would very quickly pump the depleted venous stysem dry and complete circulatory failure would be precipitated. There is also vasoconstriction in the skin and muscles which reduces the volume of the vascular system, tending to restore its relationship with the reduced blood volume. This vasoconstriction also tends to raise the peripheral resistance and so maintain diastolic arterial pressure, but this factor is apparantly not of as great importance as previously thought . The spleen contracts, forcing stored blood rich in red cells into the circulation.

Normally over 25% of the total cardiac output passes through the kidneys. The kidneys are therefore extremely important organs in times of circulatory stress. Constriction of the renal vessels shunts the blood to by-pass the cortex. This naturally leads to decreased urine formation but is a most important temporary reaction for the maintenance of the circulation.

The coronary arteries dilate so that the cardiac blood flow is not reduced in proportion to the reduction in aortic pressure.

The reduced hydrostatic pressure in the capillaries is now acting against a normal colloidal osmotic attraction, with the result that less fluid passes out of the capillaries, and more interstitial fluid is drawn into them. The result is an increase in plasma volume and haemodilution.

It must be remembered that although vasoconstriction is an essential part of the compensatory reaction to a reduced blood volume, it has the adverse effect of still further reducing venous return.

If the haemorrhage is more severe or if these compensatory reactions fail, progressive shock may set in. This is a complex series of events many of which are not clearly understood.

The main contributory factor appears to be a progressive vasodilation and blood stagnation into the small blood vessels of the alimentary tract. The animal may be said to bleed into its own intestinal vessels. This reaction has been variously ascribed to anoxia, toxins, and nervous reflexes but none of these have been fully proved in experimental work. In any case this vaso-collapse leads to a vicious cycle, further reduced venous return, further reduced cardiac output, and further blood stagnation. Impending shock has set in, and even massive blood transfusions at this stage, may only cause a temporary rise in cardiac output. The prolonged and severe deficiency in circulation affects the vital organs especially the kidneys, liver and myocard. Nitrogenous waste products accumulate and the renal tubule cells show an advanced nephrosis. The blood sugar rises sharply due to uncontrolled glycogenolysis. The heart suffers from a progressively depleted coronary circulation. At the same time the low arterial blood pressure causes carido-acceleration which cannot augment the output because of the low venous return. The heart must ultimately fail. This then is "irreversible shock."

Shock Following Crush Injuries

Where large masses of tissue, usually muscle, are severely injured there may or may not be frank haemorrhage. There is however always a large loss of plasma, incluidng plasma proteins, which escapes from the damaged vessels into the tissues. This loss of plasma proteins from the circulating plasma causes further plasma shrinkage, by loss of fluid into the interstitial spaces. In this case there is therefore a haemoconcentration. The reduction in total blood volume sets up the same compensatory reactions as described for haemorrhage, and progressive shock may develop. There is however a further complicating factor. Myoglobin from the damaged muscles escapes into the blood and being of relatively small molecular size passes into the glomerular filtrate. It is then concentrated in the tubules where it may cause blockage. Furthermore iron is released which damages the tubular cells. Kidney damage is therefore of special significance in this type of injury and shock.

Shock due to Burns

When considerable areas of the body surface are exposed to severe burns there is again a large scale loss of plasma and plasma proteins through the damaged tissues. The same sequence of events may then follow.

Other Hypoproteinaemic Shock States

It may be of interest here to inform you that current work at Onderstepoort has shown that the main effect of infestation with immature paramphistomes on the host, is a catastrophic loss of plasma albumin through the parasitized intestinal mucosa. The plasma volume may fall to one quarter of its original figure, and the animal dies of typical hypovolaemic shock.

Permiability of the Capillary Wall

It has frequently been stated that in shock there is a generalised increased permeability of the capillary walls which allows the escape of plasma proteins, thus precipitating the fall in plasma volume. There is however no evidence that there is any such increased permeability in areas remote from the injury. In heartwater, however, we have an example of generalised increased capillary permeability with a large scale and sudden loss of plasma proteins, plasma volume shrinkage and death from what can only be termed shock.

A similar state probably occurs in Horse Sickness.

Shock due to Prolonged Diarrhoea

In prolonged diarrhoea there is not only a large scale loss of water but also of electrolytes, especially sodium. It is estimated that the entire pool of extracellular electrolytes passes into the intestinal tract, and is reabsorbed every twenty four hours. If this re-absorption is impaired, the

rate of loss is very high. The extra-cellular fluid volume is governed directly by the electrolyte concentration, so there is a concomitant extracellular dehydration and plasma volume shrinkage with haemoconcentration. The fall in total blood volume may then lead to progressive shock.

Shock due to Prolonged Vomiting

In prolonged vomiting, especially when due to high intestinal obstruction, there is again loss, and deprivation, of water as well as loss of electrolyte, in this case chloride. Sodium must then be excreted to maintain the electrolyte balance. The position is therefore as described for diarrhoea.

Normovolaemic Shock

Shock may supervene without any prior decrease in blood volume. It's main cause is vaso-collapse in the splanchnic area but the reason for this is unknown. Such shock may occur in prolonged anaesthesia or acute toxaemia. It may apparently also be precipitated by reflex action brought about by intense and prolonged pain. In humans at least, it may be of psychological origin.

Despite the fact that the total blood volume remains normal, the functional circulating volume is reduced by stagnation in the visceral capillary and venous bed. The sequence of events is essentially the same as for hypovolaemic shock.

The Clinical Recognition of Shock

Shock must be anticipated in all cases of severe injury, haemorrhage, burns or dehydration from whatever cause. It may appear immediately after the injury or be delayed for several hours, or even one to two days. The onset is usually rapid. The subject is apathetic but restless. The pulse is weak and the heart rate accelerated. The breathing is irregular, often interrupted by deep sighs. The skin and extremities are cold; the visable mucous membranes pale and dry.

The Prevention of Shock

As stressed above, shock is a progressive deterioration rapidly becoming "irreversible" i.e. unresponsive to any of our present methods of treatment. The aim must be to prevent it, or at least to treat it in the early reversible stages.

The primary aim must be the restoration of the functional blood volume. This is best done by blood, plasma, plasma substitute or saline infusions.

Where there is haemodilution and loss of red blood cells, as after haemorrhage, whole blood is the first choice.

In hypoproteinaemia, saline infusions will further dilute the plasma proteins and cause increased escape of fluid into the interstitial spaces.

Whole blood, plasma or plasma substitutes should be used. Of the synthetic commercially available plasma substitutes dextran gives good results. A home made but effective plasma substitute is a 10% solution of gelatine in saline.

In dehydration due to electrolyte loss, saline should be given in large amounts either intravenously, subcutaneously or intraperitoneally.

Here I must issue a note of warning against rapid intravenous infusions. These cause a rapid increase in venous return to the heart which immediately places a heavy load on the myocard. Especially if this is weakened by prolonged ischaemia, syncope may result. In emergency, intra-arterial infusions may be given. This raises the arterial blood pressure and increases the coronary circulation before the extra load is applied.

As to how much to give, the best rule is to give to effect, i.e. until there is an appreciable improvement in the pulse amplitude. The following facts may be used as a guide. The total blood weight is normally about 8% of the body weight. In impending shock at least one quarter of this has been lost, i.e. roughly the total weight required is some 2% of body weight or 200 cc. per 10 kg.

The fact that the shocked patient's skin is cold, led to the belief that warmth should be applied. The skin is cold because of vasoconstriction, an essential response. Warming the patient will reduce this vasoconstriction and cause a further drop in arterial blood pressure.

Alcohol is a vasodilator, especially of the cutaneous vessels, and should never be given in impending shock.

Adrenaline causes marked cardio-acceleration which may easily result in syncope.

No adrenaline has little effect on heart action and is a strong vasoconstrictor. It may be used with caution in the early stages but later the intestinal blood vessels fail to respond. Vasoconstriction in other areas may further impede the return of blood to the heart and so do more harm than good.

It is well known that the glucocorticoids and antihistaminics are of value in preventing anaphylactic shock and similar allergic reactions, but there is no evidence that they are of any value in the types of shock under discussion.

After the shock has passed off, the kidneys should receive special attention especially after crush injuries. Saline diuretics and a copious fluid intake are indicated.

In cases of prolonged vomiting or diarrhoea a state of starvation is superimposed on the dehydration. Such animals are usually in a state of ketotic acidosis and the administration of an unmetabolisable anion such as chloride may be highly dangerous. In such cases a 7% sodium lactate solution should be used in place of sodium chloride.

Even in advanced shock the administration of adenosine-triphosphate (A.T.P.), available as "Dynavis", is said to give good results in many cases. A.T.P. is well known to be the immediate source of energy in almost all metabolic processes.

The work of Markowitz has shown that anoxia of the liver almost invariably leads to infection with anaerobic bacteria. In shock the liver suffers from an acute anoxia so that the administration of antibiotics to impending or recovered cases is rational, even in the absence of other infections.

In conclusion, gentlemen, I would again like to stress that, where shock can be anticipated, prevention is much better than attempted cure. In fact, the accepted term "irreversable shock" indicates that from a certain stage of the downward spiral there is no know cure. The timely administration of a few cc.'s of blood or saline may often make all the difference to the ultimate outcome of long and intricate surgical or therapeutic treatments.

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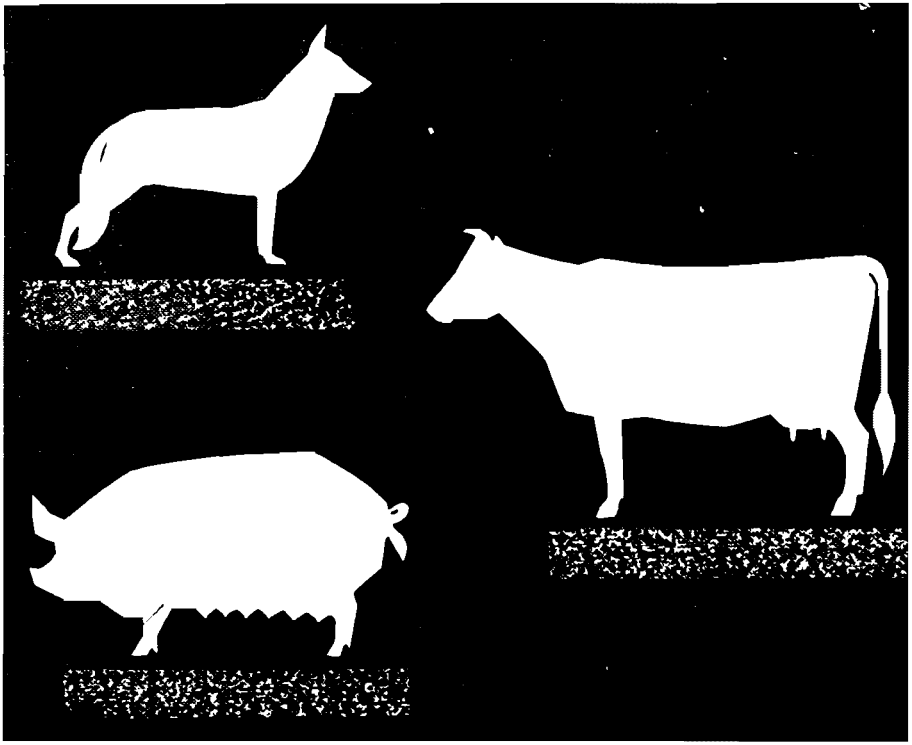

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MICROFILARIASIS IN THE HORSE

A. D. THOMAS — Senior State Veterinarian, Veterinary Field Services, Louis Trichardt, Transvaal.

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SUMMARY

A preliminary description is given of a clinical condition in the horse, associated with the occurrence of microfilaria in the blood.

INTRODUCTION

The condition was first seen in two horses, a mare and a gelding, in 1957 on a farm in the Levubu Settlement, 30 miles East of Louis Trichardt. The owner was worried because the animals were unthrifty and lethargic in spite of adequate feeding. They also showed swollen genitals, a fact which had already led to blood samples being submitted to serological test for Dourine. The result was negative, and besides the one animal was a gelding.

CLINICAL APPEARANCE AND SYMPTOMS

The gelding, an aged chesnut, was in poor condition and languid, and had not been worked for a long time. The skin was in a very bad state. The hairy coat was coarse, unkempt, tufted and matted, with "moth eaten" patches over the neck and legs. (Skin scrapings and biopsy later revealed the presence of a fungus.)

The skin over the abdomen was distinctly thickened and hidebound. Just in front of the sheath it was swollen and pendulous, as well as rough, deeply fissured and crusty with dried exudate. The sheath itself was also swollen and oedematous, but firm (not pitting readily on pressure and not hot or painful). There were a few irregular pink (unpigmented) flecks around the orifice, on the otherwise black skin. The surface was wrinkled and crusty—from the dried, sticky ooze that was present.

At no time did this animal show signs of irritation or itch.

The mare (about 10 years old) was in good condition. The hairy coat was coarse and lustreless. The skin was somewhat hidebound, and over the entire belly, but especially between the two external mammary veins, it was much thickened, hard, harsh and fissured. This thickening became more pronounced and softer to form a central ridge running back into the udder.

The udder itself was not enlarged, but its covering skin was irregularly swollen or lumpy, with a deep fissure separating the two halves. The surface had a peculiar "mushy" and crusty appearance due to a sticky material oozing out of the skin and partly drying out. There were unpigmented patches in the otherwise black skin. The word "erysipelatoid"

used in human pathology to describe similar lesions due to microfilaria could fit this picture equally well.

The skin of the vulva seemed slightly thickened and presented several unpigmented pink flecks.

Irritation of these affected parts, must have been intense at times. The animal was seen quite often rubbing itself against posts or tree trunks. When lying down the mare also used to do a slow wriggle or undulating movements of the body as if trying to rub its belly and udder on the ground. On a few occasions it was seen to assume a sitting posture like a dog and thus do a wriggle-rub on the ground.

Diagnosis

In the first instance microfilaria were found in an ordinary blood smear taken from the thickened belly skin. This of course could not be relied upon to give a consistant diagnosis except where the parasites happen to be very numerous. For lack of something better, a simple concentration technique was evolved, which besides diagnosis, was useful in estimating the degree of infestation.

Method

One hundred ml. vials were marked to 80 and 100 ml. volumes. They were filled to the 80 mark with 0.4% sodium citrate solution. Into these vials blood was drawn from the jugular or mammary vein to reach the 100 ml. mark. This total volume of dilute, laked blood was then centrifugalised and washed once or twice with the same solution. Finally all the haemoglobin-free sediment was spread evenly on as many microscopic slides (2—3) as necessary. They were then dried, fixed and stained with giemsa.

Examination with a low power was usually sufficient to pick out the microfilaria among the leucocytes and other cell debris. A traverse count of all the slides, gave the total number of microfilaria in 20cc. of blood.

In both the horses the presence of two kinds of filaria was demonstrated. The slender bare forms usually associated with onchocera—and a sheathed form with a delicate membranous flagellum or sheath. The late Dr. P. L. le Roux, helminthologist at the London School of Tropical Medicine to whom these preparations were submitted, expressed the opinion that they were the filarial forms of an onchocerea sp. and of *Setaria equina* respectively.

In man the belief has been held that some microfilariae never or seldom occur in the blood stream. It has also been stated that there is a diurnal migration of some microfilariae from the skin to the lungs and that preparations made from the blood at night are more likely to show microfilariae than at other times.

In all the horses examined, blood was taken from the jugular vein (or external mammary vein) during the course of the day, usually in the morning.

It would appear that clinical changes can be correlated to the high incidence of microfilariae in the blood. As an example of the order of counts obtained; the gelding on:

24/1/58 showed sheathed filariae 62 per 20 ml. of blood.
unsheathed filariae 42 per 20 ml. of blood.
17/4/58 showed sheathed filariae 83 per 20 ml. of blood.
unsheathed filariae 162 per 20 ml. of blood.

In a small survey made on clinically unaffected animals in the neighbouring area, 13 horses were bled at various times. Of these, eight showed only unsheathed microfilariae, in counts ranging from two to fifteen per 20 ml.

No special study of the morphology of these filariae was undertaken, as the above concentration technique is rather rough on the delicate flagellum sheath of the setaria filarids. Very roughly taken, the measurements of the latter are in the order of 0.2 to 0.3 mm. long × 0.006 mm. thick, and of the onchocerca ones 0.1 to 0.15 mm. × 0.003 to 0.004 mm.

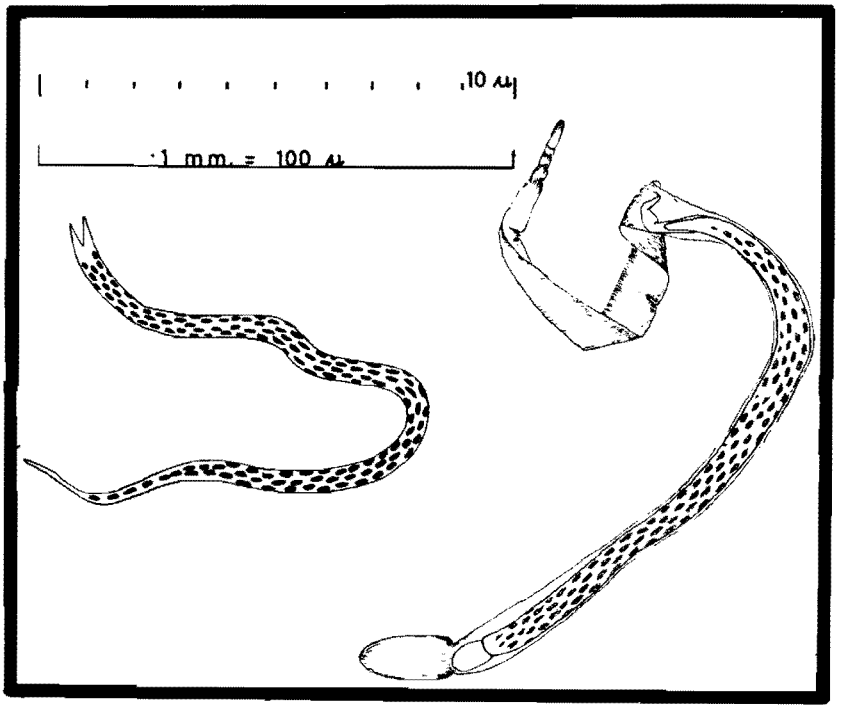

FIG. 3—Types of Microfilaria sheathed on right unsheathed on left.

TREATMENT

Through the courtesy of Dr. Neitz of Onderstepoort, "Hetrazan" was suggested and a supply made available for trial.

Hetrazan (Diethylcarbamazine) Lederle, is used in *Onchocerca* and *Wurchereria* filariasis in man and is given by mouth only, as it is considered dangerous by any other route.

The chestnut gelding was given 500 mg. Hetrazan by intramuscular injection. The next day the animal was in a very bad way. All the limbs and the sheath were enormously swollen and breathing was laboured.

The owner did not expect the animal to live. In three days, however, it was back to its previous state and feeding. Fifteen days later another 500 mg. was injected by the same route. This time there was no reaction. A blood sample taken on the same day showed that the sheathed filaria were still present but the *Onchocerca* filariae had disappeared.

One month, and two months later, counts showed that both types of filaria were back to their previous level in the blood. This would suggest that the parent *Onchocerca* and *Setaria* had not been affected by the drug and continued producing microfilaria.

The violent reaction (possibly capillary embolism or allergy or both due to killed filaria) is probably one reason why the drug is not used parenterally in man.

The mare received by mouth in a mash 1 mg. Hetrazan per lb. live wt. once a day for a week.

There was no reaction noticeable and little if any reduction in the blood filariae.

This animal was transferred to Louis Trichardt and kept under observation for a year. There was a gradual reduction in number of blood microfilaria and a noticeable improvement in the clinical state. The mare was served and later gave birth and successfully reared the foal. The drug was also used in 2 other horses in which a light infestation with onchocerca type filaria had been established. One received 250, 500, 750 and 1,000 mg. intramuscularly at fortnighlty intervals. The other 500, 750 and 1,000 mg. in the same way. There were no reactions and the blood filaria disappeared temporarily but re-appeared later.

Remarks

1. The occurrence of microfilariasis in the horse and other animals in tropical regions in this country is probably more prevalent than is suspected[14].

2. It would appear that visible lesions and symptoms occur when infection is severe and that lighter infections remain subclinical.

3. Hetrazan seems effective against the blood microfilaria of onchocerca, but not against the sheathed microfilaria of *Setaria equina* and at the dosage rate used, it had no effect on the parent worms of both species. Unless the latter can be destroyed as well, there seems no point in a treatment that gives only temporary relief from the microfilaria — while the parent worms continue producing the larval forms which infest the blood and skin.

Discussion

The occurrence of microfilariae in the blood stream and tissues of animals in tropical regions is nothing new. Indeed, there is a considerable amount of literature on the subject, some of which unfortunately being in Rusian and Japanese, is not readily available.

From the few references consulted, the following observations have been gleaned.

McQueen[12], mentions that as far back as 1884, Veterinary Surgeons in India were much troubled by a skin disease of horses which was extremely refractory to treatment. There was marked pruritus, with gnawing and rubbing. The skin was wrinkled and thickened with an abundant form of scurf on sides and neck, shoulders, chest and base of tail.

Brumpt[2] writing about filarial mange in man, (socalled "craw-craw" or cutaneous onchocerciasis) says that dermatosis is characterised by a papulo-pustular eruption, pruritus, lichenification of skin and some elephantiasis, coinciding with numerous microfilariae in the skin.

In Japan a form of summer mange in horses ("Kasen" disease) and in cattle ("Kose" or "Wahi" disease) is described by Ishihara[7] and likened to "Queensland itch", equine dhobie itch", and "microfilarial pityriasis" of other countries.

In Central Europe socalled "summer sores" in cattle are associated by Dirksen[3], with stephanofilariasis.

It would appear that a great deal of uncertainty still exists concerning the pathogenesis of the many and varied types of microfilarial infestations that occur in animals. Considering the difficulties in identifying the larval forms and in working out their life cycles and modes of transmission, this is not surprising.

Somewhat happier results have attended the efforts of Innes and his associates[4], in elucidating the cause of lumbar paralysis or cerebrospinal nematodiasis of goats, sheep and horses in India. They believe that this condition is due to the larval forms (microfilariae) of *Setaria cervi*, being transmitted by biting insects from their normal host, the bovine, to abnormal hosts e.g. goats, sheep and horses. In this unfavourable environment they tend to locate in the cerebro-spinal tissues instead of the skin and so produce the typical lesion, encephalomyelomalacia, and consequent paralysis.

Laing *et al*[10] working in Malaya have shown that wild animals are also carriers of microfilariae transmissible to man. There is thus much scope for further investigation in this field of animal and human parasitology.

ACKNOWLEDGMENT

The Chief Veterinary Field Services is thanked for permission to publish this article.

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PRETORIA

THE HISTO-PATHOLOGY OF *SHIGELLA VISCOSUM* EQUI INFECTION IN NEW-BORN FOALS

J. L. Du Plessis — Section of Pathology, Veterinary Research Institute, Onderstepoort.

Received for publication December 1962.

Summary

The microscopic lesions of *Shigella viscosum* equi infection in new-born foals are recorded. Emphasis is placed on the lesions in the adrenal cortex and a suggestion as to possible additional therepy is made. The relationship of the adrenal cortical lesions to the rapid fatal course of the disease is discussed. Support for the view of a prenatal infection is derived from the character of certain lesions.

Introduction

Shigella viscosum equi (Synonyms: *Bacillus nephritides* equi, *B. equirilis*, *Bacterium pyosepticum* and *Actinobacillus equili*) is regarded as one of the most important causal agents of disease amongst horses of all ages, from the fully developed foetus to adult animals. The organism was first isolated in 1909 by Meyer[1], who concluded that infection by this bacterium was of a pyaemic nature and that abscess-formation resulted from lesions in the blood vessels of the kidneys or the lungs. Subsequently, this organism has been recognised throughout the world as a cause of septicaemia in equines of all ages.

Manifestations of infection by *S. viscosum* equi occur as abortion during the last months of pregnancy, pyosepticaemia in the new-born foal, (sleepy foal disease) and infection of older foals and adult horses.

Langhoff[2] recorded abortion in mares during the last months of pregnancy, with the mare showing few, if any, symptoms before or after the abortion; the only lesions in the foetus being sub-serous haemorrhages. The causal organism, *S. viscosum* equi, could generally be isolated from all the organs of the foetus.

The mode of infection of both the foetus and the new-born foal, has been the subject of dispute since the organism was first incriminated as a cause of abortion and infection of the new-born animal. Reinhardt[3], in support of Langhoff, isolated *S. viscosum* equi from organs of aborted foetuses and considered that intra-uterine infection occurred. Further support for this mode of infection was derived from the histological examinations set out below.

Sleepy foal disease is a well known disease complex in horse-breeding areas in the U.S.A., Britain and South Africa. It occurs as a per-acute, acute, or sub-acute septicaemic fatal disease of new-born foals, with a sudden onset and rapid course. It is characterised by fever, rapid breathing, accelerated pulse rate, severe prostration, injected mucous membranes, various degrees of colic, diarrhoea and frequently septic arthritis of one or more joints. The disease has been well described by Belonje[4] and Little-

john[5]. There is no doubt that it can be held responsible for a considerable percentage of deaths in throroughbred foals. In this country several breeders are forced to resort to the unscientific but essential measure of administering broad-spectum antibiotics to all foals, immediately after birth.

S. viscosum equi is responsible for a high percentage of cases of septic arthritis (joint-ill), in the absence of generalised symtoms in foals one week to three months old, and for septicaemia in foals six months to two years of age. In the latter syndrone, according to Szeky[6], the infection is brought to a septicaemic climax by stress factors such as heavy helminth parasitism, faulty feeding and poor management.

Langhoff[1] described *S. viscosum* equi infection of trombi due to *Strongylus vulgaris* in the cranial mesenteric artery and terminal aorta. The trombus is decreased in consistency and is partially or totally transformed into a reddish-brown paste.

The macroscopic pathology of the various forms of *S. viscosum* equi infection has been well described by various authors. Thus Mieszner and Wetzel[7] describe the characteristic abscessation in the kidney, and the presence of haemorrhages on all serous membranes and epicardium, tumour splenis and metastatic pneumonic areas. With the exception of Szeky's description of the microscopic lesions in *S. viscosum* equi infection in horses eighteen months to two years of age, no other histo-pathologic account of this disease could be traced in the literature.

Materials

Specimens, preserved in 10% formalin, from five foals one to three days old, were presented for histological examination. Material from three of these cases was examined bacteriologically and *S. viscosum* equi isolated from two of these. No bacteriological specimens were available from the other two foals.

Observations

A description is presented of the lesions observed in the various organs occurring in: (i) per-acute cases of foals one day old and younger, with a rapid fatal course of three to twelve hours, severe prostration and collapse; and (ii) acute cases in foals two to three days old, that clinically show less marked symptoms and a more protracted course of twelve to 72 hours.

Liver.—In per-acute cases at post mortem there may be no significant changes exept marked congestion and sub-capsular haemorrhages. Microscopically, a diffuse distribution of neutrofiles in the sinusoids, giving the appearence here and there of forming a minute abscess and isolated colonies of the causal organism, may be the only lesions observed.

In acute cases, dull grey pinhead areas can be distinguished macroscopically, upon section of the organ. Histologically, typical micro-abscesses, consisting of neutrofiles, some of which undergoing necrosis, appear focally throughout the substance of the liver. The micro-abscesses usually contain one or more colonies of organisms. Hepatic cells in the immediate vicinity of the abscesses show necrobiotic changes.

Kidney.—At post mortem sub-capsular haemorrhages and an intensely congested cortex, are usually the only lesions noted in per-acute cases. Microscopical examination reveals accumulations of small numbers of neutrofiles between the tubules, and in some Bowman's capsules A limited number of glomerular tufts exhibit plugging of capillaries by colonies of the organisms. Aggregations of bacteria also appear intertubularly. Early necrotic changes of the tubular epithelium, indicated by their pygnotic nuclei, are seen.

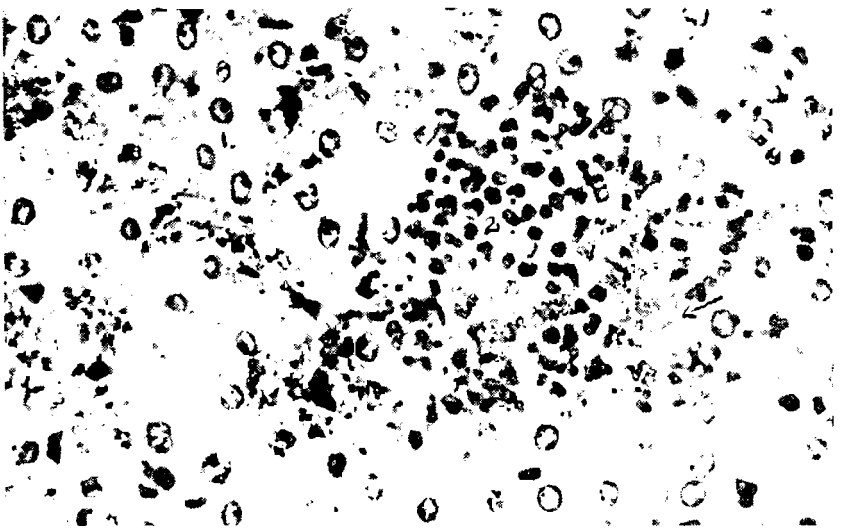

Fig. 1. Liver. Necrobiotic hepatic cells (1), micro-abscess (2) and bacterial colony, (arrow). H and E staining. X 480.

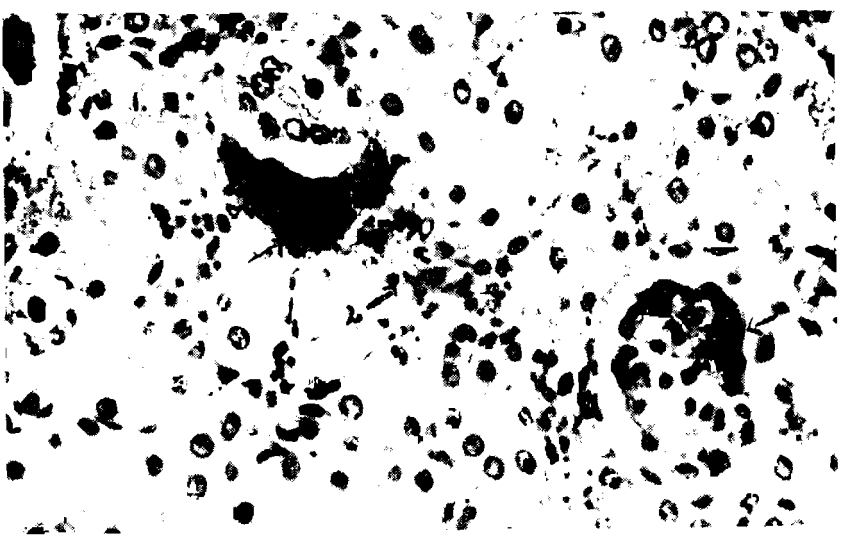

Fig. 2. Kidney. Tubule with pygnotic nuclei, (1), small group of neutrofiles, constituting focus of developing micro-abscess, (2), and bacterial accumulations, (arrows) in glomerular tuft and intertubularly. H and E staining. X 480.

The macroscopic picture of the acute cases presents, in addition to septicaemic changes, typical pinhead to pea-sized abscesses in the cortex, which become visible when the capsule of the kindey is stripped; adherence of cortical tissue to the capsule is observed. On section the abscesses are surrounded by a hyperaemic red area. Microscopically the abscesses are much larger than those seen in the per-acute case. The colonies of bacteria are more numerous and extend along the medullary rays into the medulla.

Adrenal.—The adrenal, in the majority of per-acute cases, appears enlarged and dark-red in colour and on section the cortex, intensely reddened, contrasts sharply with the yellowish-grey medulla. Microscopically, extensive haemorrhages occur throughout the entire cortex, changing the normal architecture of the adrenal cortical cells to a disorganised mass of redblood cells, scattered individual parenchymal cells in an advanced state of degeneration, and neutrofiles. The latter appear in small aggregations and irregular strings throughout the cortex.

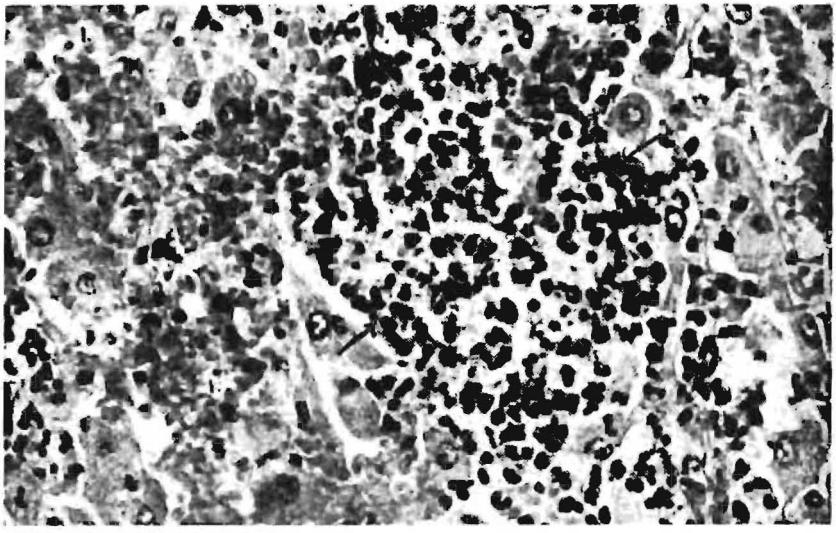

Fig. 3. Adrenal cortex with micro-abscess (arrows) and haemorrhage (I) in an acute case. H and E staining. X 480.

In the acute subject the adrenal may also appear haemorrhagic and minute abscesses are seen as pin-point dull-grey foci. Microscopically these, in addition to numerous bacterial colonies, are confirmed. The haemorrhages are not as pronounced as in the per-acute case and are confined to the immediate vicinity of the micro-abscesses. A large number of cortical parenchymal cells show degenerative or necrotic changes.

Lung.—Macroscopically reddish-grey areas of grey hepatisation, one to two cm. in diameter, sunken below the surface and sharply demarcated from the surrounding lung tissue, are occasionally seen in the per-acute case, With the exception of the adrenal changes they are very often the only macro- and microscopic lesions observed. Sub-pleural haemorrhages

commonly occur. Upon microscopical examination, micro-abscesses, occupying whole lobuli and studded by numerous colonies of bacteria, are seen. There is interlobular oedema and emphysema immediately around the abscesses. Smaller bronchioli are filled by neutrofiles. Larger bronchioli and bronchi are seldom involved in the inflammatory process.

The acute case shows more pronounced abscessation.

Fig. 4. Adrenal cortex with micro-abscesses (1), and bacterial colonies (arrows). H and E staining. X 75.

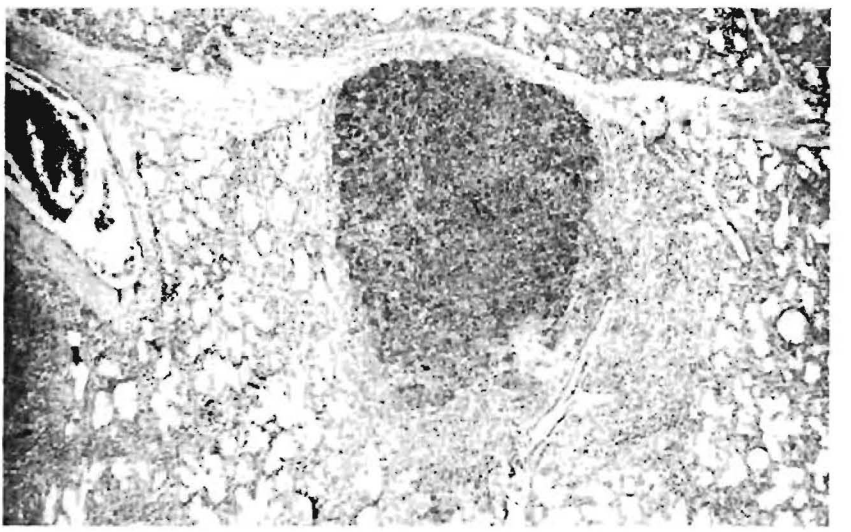

Fig. 5. Lung. Micro-abscess, studded by bacterial colonies, surrounded by hyperaemic zone and emphysema; interlobular oedema. H and E staining. X30.

Spleen.—At autopsy splenomegaly and sub-capsular haemorrhages are to be seen. Microscopically a typical and reasonably constant picture is presented. Necrosis of the germinal centres of the Malpighian corpuscles, manifested by extensive karyorrhexis, is seen. Scattered foci of coagulative necrosis of the red pulp reticulum, and an increase in the number of neutrofiles may also be present. Bacterial colonies have not been observed in the spleen.

Intestine.—The macroscopic appearance of the small intestine may vary from slight reddening to a dark-red swollen mucosa affecting parts or the whole of the small intestines. In some per-acute and acute cases there is extravasation of blood into the lumen of the gut. Microscopically partial desquamation of the peripheral epithelium, diffuse infiltration of neutrofiles, hyperaemia and haemorrhages in the propria are seen. Minute colonies of bacteria, slightly larger than the nuclei of the epithelial cells, are seen between the latter.

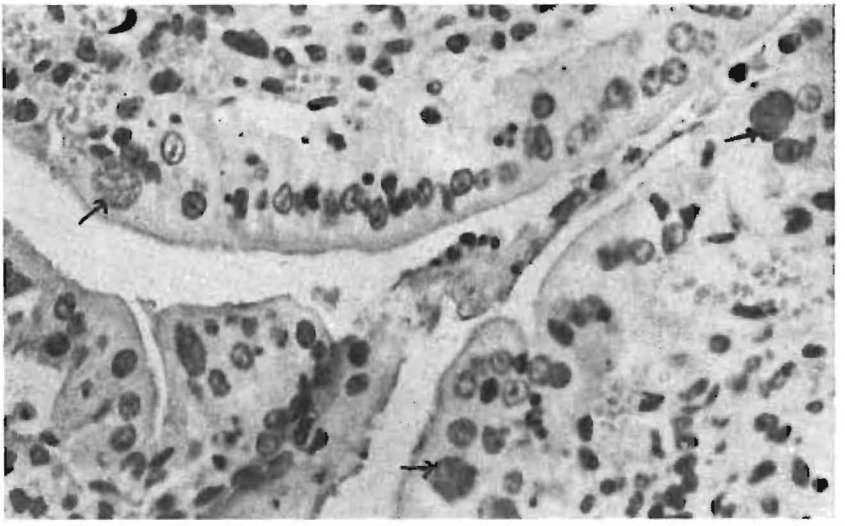

Fig. 6. Small intestine. Neutrofiles and red-blood cells in propria. Groups of bacteria, (arrows). H and E staining. X480.

Discussion

The microscopic picture of *S. viscosum* equi infection in the foals described, is characterised by a severely damaged adrenal cortex and pulmonary micro-abscessation in the per-acute disease, and in addition septicaemic manifestations in the liver, kidneys and spleen, in the acute cases. It is evident that there is a definite correlation between the distribution and extent of lesions and the rapid fatal course in the per-acute disease; the only pathological changes being confined to the adrenals and lungs. This phenomenon can possibly be explained by the fact that the animal dies from acute adrenal cortical deficiency, before any further lesions can develop.

In view of the probability that adrenal cortical deficiency may be the immediate cause of the rapid course and subsequent death in sleepy foal disease, it is suggested that cortico-steriods, in addition to appropriate antibiotic therepy, be administered in per-acute and acute cases.

The nature and appearance of lesions in the adrenals and lungs observed in certain of these cases, add support to the view of a pre-natal infection; as it is improbable that micro-abscesses and necrosis as seen in these cases, can develop in less than 24 hours. Intra-uterine infection would also account for the fact that foals are often born in a comatosed state.

Bacterial emboli, emphasized as of common and characteristic occurrence by Szeky[6] in older horses, were rarely seen in these cases of *S. viscosum* equi infection of foals. Numerous colonies of bacteria, though, were a consistent feature of the microscopic pathology. The pathologist normally regards with some hesitation any focal accumulation of bacteria in the absence of a cellular reaction, and is inclined to consider such a phenomenon as of post-mortal origin. Such colonies of bacteria have, however, been observed in cases of *S. viscosum* equi infection destroyed in extremis, where the lapse of time between death and fixation of histological material, most probably was insufficient to allow post-mortal development of such bacterial colonies.

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THE OCCURRENCE OF GOITRE IN ISRAEL AS RELATED TO IODINE CONTENT OF COW'S MILK AND DRINKING WATER

NAPHTALI BRAND, M.D. Workers Sick Fund, Dan, Upper Galilee, and
ITZHAK GEDALIA, Ph.D. Preventive Medicine Department of Hebrew University-Hadassah Medical School, Jerusalem.

Received for publication September 1962.

SUMMARY

A survey of the incidence of thyroid enlargement among children between the ages 8–18 years was conducted in Upper Galilee settlements and in coastal plain communities. Samples of drinking water and milk were analysed for iodine. The anlayses revealed a marked and consistent deficiency in the iodine content of Upper Galilee waters and cows milk as compared with those of the coastal plain.

The incidence of goitre was found to be higher in the Upper Galilee settlements.

The results are discussed and it is concluded that they demonstrate the recognised relationship of environmental iodine deficiency to the incidence of goitre. The possible role of the iodine content of water and the availability of iodine in the soil to the plants and animals is discussed.

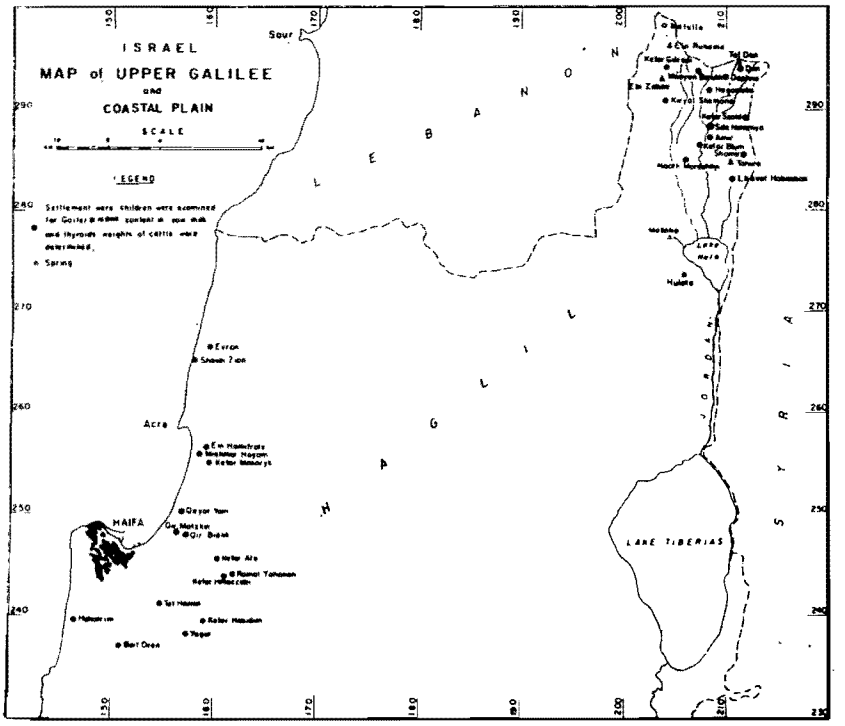

FIG. 1—Dr. N. Brand Kibbutz Dan Israel

Introduction

Israel appears to have been free from goitre in the past[7]. Recently, however, it has been shown that there is a high incidence of goitre among children and adolescents born in some of the settlements (Kibbutzim) of the Upper Galilee in the valley of Mount Hermon[3].

Upper Galilee is an iodine deficient area. The low iodine content of the water and the alkaline soil rich in $CaCO_3$ have been implicated in the etiology of the recently established endemic goitre[4].

This investigation was undertaken to find out if iodine deficiency in drinking water, rain water and milk, influence the incidence of thyroid enlargement in this northern part of Israel.

Material and Methods

In 12 settlements which were founded 25–30 years ago, 1,475 children and adolescents of both sexes, 8–18 years of age, were screened for the presence of goitre. In Kiryath Bialik and Kiryath Motzkin, two neighbouring coastal plain communities, 2,009 children and adolescents of both sexes and of similar ages were examined. These two communities were chosen in order to compare an endemic and a non-endemic area. The clinical examinations were performed by one of us (N.B.) and the results were classified according to the method of Expert Committee on Goitre of the World Health Organisation[6].

The iodine content of the drinking water and that of the rain water (air-borne iodine) in both regions was determined by an ultramicromethod[8]. This method, is based on the catalytic accelaration of the redox reaction between chloramine-T and N,N tetramethyldiaminophenylmethan. Samples of drinking water were collected from various sources such as rivers, springs, wells and taps in both areas. The milk samples were collected directly from cows. Milk from animals living under similar conditions was pooled. Since the cows in Israle's collective settlements receive artificial feed almost throughout the year, no seasonal variation in the iodine content of their milk was expected. The situation is rather different in other countries[17], [1], [2]. The total iodine content of the milk was determined by the method of Zak et al. for iodine in serum[16]. The samples were oxidised with chloric acid at 130–140°C and the catalytic action of the iodide on the reduction of the ceric to cerous ion by arsenious acid was determined.

Results

The results of the clinical examinations are presented in Table 1 and the analytical data in Table 2.

In the collective settlements, 120 out of a total of 692 girls (17%) and 68 out 783 boys (9%) had enlarged thyroid glands. In the coastal plain the results were as follows: In Kiryath Bialik) 16 out of 593 girls (2.6%) and 7 out of 553 boys (1.2%) and in Kiryath Motzkin) 21 out 444 girls (4.7%) and 12 boys out of 419 (2.9%) had enlarged thyroid glands. No cretins or deaf and dumb were found. The iodine content of drinking water in the endemic area of Upper Galilee was found to be

between 0.5 and 6 micrograms/l and that of the rain water 0.5 micrograms/l. Both of these values are quite low in comparison, for example, with values of 1.8–11.2 micrograms/l in endemic goitre regions of Holland[12], [13]. On the other hand, the iodine content of the drinking water in the coastal plain communities (K. Bialik and K. Motzkin) was 20-100 micrograms/l. This concentration range, may be compared with the values of 50.2—52.2 micrograms/l found in goitre free areas of England[11].

The results obtained with milk samples indicated an iodine deficiency in Upper Galilee as compared with the coastal plain area which was goitre free. Forty two milk samples from collective settlements in Upper Galilee had low iodine content of 2–10 micrograms/l. These values approximate the iodine cotnent of milk in endemic goitre areas in various other countries (3–35 micrograms/l)[10], [15]. In the coastal plain area, samples of cow's milk were found to contain from 60–100 micrograms/l of iodine.

TABLE I.
CORRELATION BETWEEN IODINE CONTENT IN WATER, MILK, FLUORINE IN WATER AND THYROID ENLARGEMENT IN UPPER GALILEE AND COASTAL PLAIN AREA: ISRAEL.

Area	No. of examined children		No. with enlarged thyroid		Percentage.		Iodine content in milk gamma/l	Iodine content in water gamma/l	Fluorine conc. ppm. in water
	m.	f.	m.	f.	m.	f.			
Upper Galilee...	783	692	68	120	9	17	2–10	2–6	0–1
Coastal plain K. Motzkin.-....	419	444	12	21	2.9	4.7	60–100	20–100	0.65-0.9
Coastal plain K. Bialik.-.....	553	593	8	16	1.2	2.6			0.3

DISCUSSION

The incidence of goitre in Upper Galilee was 17% among girls and 9% among boys in the population sampled. According to WHO criterion, a goitre incidence of over 10% is considered endemic[9]. Our results showed that the iodine concentration in the drinking water is low in those regions where goitre is endemic, These findings confirm reports in the literature indicating that less than 7 micrograms iodine per liter drinking water may result in a diatetic shortage of iodine[5], and that drinking water should contain about 50 micrograms of iodine per litre in order to satisfy man's physiological requirement for this trace element[11], [5], [12], [14]. There is no universal agreement regarding the relationship between environmental iodine deficiency and the frequency of incidence of goitre. It has been emphasized by work carried out in England[17], and in other countries, that a direct relationship between the iodine content of the soil and that of the plants grown on it does not necessarily exist. Thus, for example, although the pastures of Somerset and Suffolk contained similar amounts of iodine, the iodine content of the water of Somerset is much lower. Therefore the total iodine content of soil may be less important than the combination in which this element occurs, since this later may determine its availability to plants and animals. A factor which may reduce the availability of soil iodine in Upper Galilee is the alkalinity

TABLE II.

A SURVEY OF TYHROID EXAMINATION OF CHILDREN FROM 8—18 YEARS OF AGE IN UPPER GALILEE AND COASTAL PLAIN AREA—ISRAEL.

Age	Upper Galilee						Coastal plain area K. Motzkin						Coastal plain area K. Bialik.					
	No. of girls	enlarged thyroid	%	No. of boys	enlarged thyroid	%	No. of girls	enlarged thyroid	%	No. of boys	enlarged thyroid	%	No. of girls	enlarged thyroid	%	No. of boys	enlarged thyroid	%
8	77	9	12	100	7	7	33	—	—	54	2	3.7	83	2	2.4	122	—	—
9	77	13	17	71	8	11	57	4	7	61	1	1.6	88	2	2.2	99	2	2.2
10	66	7	11	93	10	11	54	2	3.7	47	2	4.2	103	3	2.8	95	1	1.0
11	82	20	24	86	6	7	49	3	6.1	66	2	3.3	89	2	2.2	90	2	2.2
12	78	15	19	95	12	13	44	2	4.5	51	2	3.5	101	3	2.8	96	2	2.0
13	64	9	14	72	7	10	62	4	6.4	55	1	1.8	79	3	3.9	7	—	—
14	64	13	20	70	7	10	45	2	4.4	42	2	4.7	23	1	4.3	12	—	—
15	68	12	18	69	6	9	27	—	—	20	—	—	7	—	—	12	—	—
16	44	4	9	47	2	4	44	2	4.5	14	—	—	13	—	—	14	—	—
17	35	8	23	45	2	4	26	2	7.5	8	—	—	6	—	—	3	1	33
18	37	10	27	35	1	3	3	—	—	1	—	—	1	—	—	3	—	—
total	692	120	17	783	68	9	444	21	4.7	419	12	2.82	593	16	2.6	553	8	1.4

FIG. 2—Tel-Dan near the settlement Dan—Israel.

of the soil and the presence of large quantities of limestone[4], which is known to decrease the absorption of iodine by plants. In this investigation we did not examine the iodine content of the soil. The low iodine content (2–10 micrograms/l) in milk of cows in the Upper Galilee and the much higher content (60–100 micrograms/l) in the coastal plain, despite identical artificial pastures, seems to reflect the iodine content of the drinking water of both regions. The low intake of iodine from milk, therefore, may represent an additional factor in the goitre incidence of the Upper Galilee.

FIG. 3—The Jordan river in the background Mr. Hermon.

ACKNOWLEDGEMENT.

We wish to thank to Dr. Mosberg, the Head of the District Health Center of Haifa for the permission to examine the schoolchildren of K. Motzkin and K. Bialik and the Chief Nurse and other nurses for their kindly collaboration.

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OUTBREAK OF LEPTOSPIROSIS AMONG MAN AND DOMESTIC ANIMALS IN UPPER GALILEE

N. BRAND, M.D. AND R. A. KATHEIN, D.V.M. — Kibbutz Dan Upper Galilee Israel.

Workers Sick Fund, Dan, Upper Galilee; "Haklait", Kiryat Shmona

REPRODUCED WITH THE KIND PERMISSION OF THE AUTHOR WITH GRACIOUS ACKNOWLEDGEMENT TO THE PUBLISHERS

LEPTOSPIROSIS is of Public Health significance and represents a serious economic problem. Leptospirosis became established in the cattle herds of the Jewish sector of this country only after the establishment of the State of Israel following a change of management practices involving utilisation of pastures surrounding the Jewish settlements, previously used by Arab cattle and goat flocks exclusively. These pastures apparently were heavily contaminated by the excreta of fieldmice and so caused the infection of cattle and man who treated them[1] About 1000 human cases were reported in the period prior to 1950 in Israel[2].

The epidemic proportion of leptospirosis declined considerably after 1950. In 1953 thirty cases were reported and in 1956 only fifteen patients suffered from the disease in the whole country[3]. The strains identified were *L. grippothyphosa*, L. *canicola* and *L. icterohaemorrhagica.* In 1959 Van der Hoeden *et al.* described a new strain for the first time in Israel among irrigation workers in Upper Galilee — *L. swajizak* and *L. hebdomadis*[4].

Whereas until now the Coastal Plain and the central part of the country were considered endemic areas of human leptospirosis[3], the present outbreak, in a small area of Upper Halilee, known as a sporadic area only, might point to an additional endemic area.

CASE REPORTS

Case 1. A 33 year old single man, from Kibbutz Hagoshrim, immigrated from Turkey 10 years ago. He is working in a plantation. A month before the beginning of the present disease, he visited Nathania. Excepting right herniotomy in the past, he had always been healthy.

The present disease began on July 14th, 1961. The patient complained of cough, headache and muscle pain; he had a temperature of 38.5°C. The physical examination did not show pathological findings and he received symptomatical treatment. After 3 days the temperature rose to 40°C, he got chills, vomited, complained of muscle and joint pains and was constipated. The physical examination showed conjunctivitis, subicterus of the sclerae, tenderness in the right upper quadrant of the abdomen, the liver was enlarged. Lung and heart were without pathological findings, blood pressure 110/60, pulse 110/min, regularly. He did not have neck stiffness, and had normal reflexes. Blood examination for

malaria was negative. There were traces of albumen in the urine as well as of urobilinogen; bilirubin was negative. Sedimentation rate in the first hour was 75mm Westergreen. The blood was sent for culture and agglutination test of typhoid, brucellosis, Weil-Felix and leptospirosis. The patient was treated by chloramphenicol, 1.5 gm per day. The next day he felt well and the temperature was normal. After a few days we received the results from the central Sick Fund laboratory, Haifa, that confirmed the diagnosis leptospirosis of *L. grippotyphosa* positive with a titer 1:200. On repeated blood examination for leptospirosis, the titer did not rise.

Case 2. A boy, 18 years old, born in Dan, working on irrigation of plantations, healthy until two months previously when he had been hospitalized because of nocotin intoxication. The present illness began on August 27, 1961 with 40°C fever, headache, cough, vomiting. Because of his uncertain condition he was admitted to Safed hospital. He was in a medicore condition; his temperature was 40°C, pulse 120/min, the tongue coated, submandibular and inguinal lymph nodes enlarged, rales in bases of both lungs, spleen palpable. Sedimentation rate 34 mm Westergreen in the first hour, hemoglobin 14.7 gm%, leucocytes 7000 with left shift. Urine: traces of albumen, urobilinogen positive, bilirubin negative. Blood urea 45 mg%, blood examination for malaria parasites negative. X-rays of the lungs negative. A blood speciment was sent for culture and agglutination tests. An agglutination titer for *L. swajizak* of 1:250 was found. This result was received after the boy had returned home (Central Laboratory of Workers Sick Fund, Haifa, Head Prof. Hirsh). The patient received antipyretic treatment.

Case 3. A boy, 15 years old, born in Dan, fell ill at the same time as the previous boy. He complained of headache, muscle and joint pains, nausea and cough. He had a fever of 40°C, 116/min pulse, rate regular, spleen and liver was enlarged, a lymph node of the neck enlarged and conjunctivitis. He did not show stiffness of the neck, reflexes were normal. Sedimentation rate 25 mm Westergreen in the first hour. He received symptomatic treatment at home. After seven days he was free from fever and felt well. Blood examination confirmed that the boy suffered from leptospirosis. The agglutination titer was: *leptospira grippotyphosa* 1:200. Subsequent examination showed an increased titer for two months, and then a decrease to 1:200.

Case 4. A married woman, 28 years old, born in Israel, for nine years at Kibbutz Hagoshrim, mother of four healthy children, worked as head of the Kibbutz kitchen. She had various children's diseases and an operation of varicose veins of the right leg. On September 12, 1961 she fell ill with high temperature up to 40°C, complained of pains in legs and back, of chills, perspiration, and passed a dark urine. After five days of symptomatic treatment in the settlement she was sent to the hospital with the diagnosis of pyrexia of unknown origin. When admitted to the department of internal medicine she was in a good condition, her temperature was 38°C, pulse rate 11/min; regular. Her thyroid, spleen and liver were found to be enlarged. Sedimentation rate 80 mm in the first hour (Wester-

green), hgb. 10,4gm %, leuc. 7200 with left shift. Urine: traces of albumen, urobilinogen normal, 8-12 leucocytes per field, few erythrocytes and epithelial cells. Blood urea 25mg%, sugar 110mg%. Total protein 7,6gm %, albumen 3,7gm %, globulin 3,3 gm %, Westmann 4, thymol turb. 3U, cephalincholesterol flocculation negative, cholesterol 245mg%, bilirubin 1,5mg%. The blood was sent for culture and agglutination test for typhoid, Weil-Felix, brucellosis, and leptospirosis. The patient received for two days achromycin, then antipyretics and when the temperature was normal she was sent home. The laboratory report received at home was *L. hebdomadis* 1:50.

The human infections appear to be related to a concurrent disease episode in the livestock population in this area. So, cows in the herd of Kibbutz D. suffered from bacteriologically negative mastitis accompanied by pyrexia and anorexia which subsided after 10 days with and without symptomatic treatment. Blood sera of three such cases were sent to the Institute of Biology in Ness Ziona for examination, resulting in agglutination titers with *L. swajzak* of 1:500 and 1:100 *and L. canicola* 1:100 respectively. The latter cause was accompanied by pronounced anemia and after she was slaughtered, the histological examination of the kidneys revealed interstitial nephritis and *L. canicola* was isolated. Spot check examinations of blood sera of another nine cattle in this herd did not reveal additional positive agglutination titers. At the same time cow 1/13893 in Kibbutz K. fell ill with pyrexia 41,8°C, anorexia and agalactia. Examination of the hemogram revealed a leucocytosis of 28.000 with a definitive left shift. Blood serum agllutinated 1:2000 with *L. grippotyphosa*. This titer dropped after 6 weeks to 1:250. The herd of Kibbutz K. was sampled and 30 sera were examined jointly by the Veterinary Institute in Beit Dagon and the Biological Institute in Ness Ziona. Five of the sera agglutinated 1:100, 1:250, and 1:500 with *L. sejroe. L. hebdomadis* and *L. swajizak* and *L. grippotyphosa*, with two of them, agglutinating simultaneously 3 strains in the same cow. *L. grippotyphosa* and *swajizak* were obtained in high amounts from kidneys of *musc. musculus* and *microtus guentheri* caught in the vicinity of Kibbutz D.

Discussion

This outbreak of leptospirosis in Upper Galilee showed a parallelism between man and livestock. The early diagnosis of this entity is problematic in many respects. The clinical picture in man resembles that of the common cold or infectious hepatitis. Only the agglutination test and culture can give the definitive diagnosis of the disease. The usefulness of the erythocyte sedimentation rate as a diagnostic tool, as claimed by many workers [5-10], is questioned. These workers concluded that the marked increase in ESR is a constant and characteristic finding and a normal ESR rules out a diagnosis of leptospirosis. In our two human patients we could see a moderate or slight rise of ESR 23-24 mm Westergreen in the first hour and in two other patients a marked increase of sedimendation rate, 75 mm and 80 mm in the first hour Westergreen (2nd and 3rd case).

An outbreak of bacteriologically sterile negative mastitis can be suspected as a sign of an outbreak of leptospirosis. Mitchel. *et al.*[13] described an outbreak of bacteriologically sterile mastitis with clinical symptoms similar to our cases. Serotypes of the hebdomadis group were identified in these cows as well as in guinea pigs, following inoculation with milk and urine from the clinical bovine cases. In our cases no animal inoculation were performed; however, the positive serological findings coupled with the clinical syndrome appear to be of interest.

The positive agglutination titers obtained in two Kibbutz herds from a number of cows accompanied by leucocytosis and a significant left shift together with highly significant findings in the animal reservoir population in this area[11] appear to be indicative of active infection. However, it must be admitted that none of the otherwise severe symptoms associated with *L. grippotyphosa* infection in cattle as well as abortions were noted. Also in the herd surveys conducted by the Veterinary Institute no low grade immunity or post infection titers, expected usually in at least 40% of the hermates, were found. It is worth mentioning that all the herds involved were vaccinated in 1958 with *L. grippotyphosa* Bacterin prepared by the Veterinary Institute and the present phenomenon might be an indication of the immunity conferred upon the vaccinated animals, yet heifers born and raised after 1958 should nevertheless have shown some agglutination titers. We can draw no further conclusion but that the reservoir-vector animals, livestock and man in the same general locality, at the same time revealed clinico-pathological symptoms of leptospirosis, agglutinated the same strains of leptospirosis at highly significant titers and that some of these strains were isolated from kidneys, blood and urine.

Leptospirosis has been incriminated in 10 human patients as a causative agent in Upper Galilee in the period July-October 1961, as compared with one case in 1958, four cases in 1959, one case in 1960 and fifteen cases in the whole country in 1956. In the cattle population of Upper Galilee the Government field station in Safed has recorded six cases in 1958, one case each in 1959 and 1960 and 13 cases in 1961.

The 1956–57 epidemic in cattle affected about 40 herds involving 10.000 head of cattle with losses running close to 1 million LI. A village herd of 127 head belonging to 16 farmers registered a loss due to abortion, dead and milk loss of about 25.000 LI. Another herd of 27 head in a communal settlement lost 25% in dead, 18% aborted, ammounting to an actual loss of 18.000 LI.

Summary

1. Four human cases of leptospirosis in a small part of Upper Galilee (two Kibbutzim) involving sero-types *L. grippotyphosa*, L. *swajizak* and *L. hebdomadis* are *described.*

2. A parallel leptospirosis episode affecting two herds involving positive agglutination titers to L. *grippotyphosa. L. hebdomadis*, *L. swajuzak* and *L. serjoe* is described.

3. An outbreak of bacteriologically sterile mastitis in a Kibbutz cattle herd is strongly suspected to be related to the leptospirosis episode.

4. A markedly increased erythrocyte sedimentation rate seems not to be a constant finding in leptospirosis.

5. It has been emphasized that leptospirosis may cause heavy losses to the livestock population.

6. The atypical course of the leptospirosis episode in cattle may represent an immunity response to earlier vaccination.*

ACKNOWLEDGEMENT

We are indebted to the Government Health Department and the Government Veterinary Station in Safed for the statistical information on leptospirosis in Upper Galilee and to Dr. Schick for permission to publish two cases hospitalized in his department.

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* One of the cases, three months after his first symptoms of leptospirosis, developed iridocyclitis.

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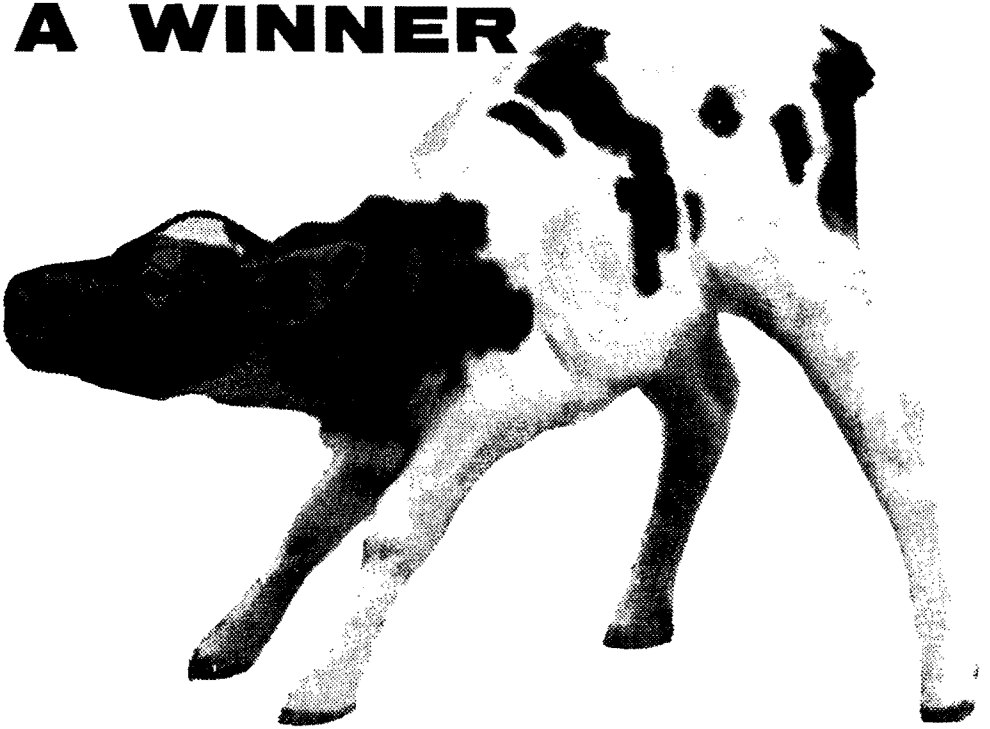

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BILIARY FEVER (NUTTALLIOSIS) IN THE CAT

E. M. ROBINSON — P.O. Box 244, Knysna, C.P.

Received for publication August 1962.

SUMMARY

A number of cases of biliary fever in cats in the Knysna area are described with some notes on the diagnosis and treatment of the disease. Terramycin, alone or combined with trypan blue has given satisfactory results in the treatment of the disease.

INTRODUCTION

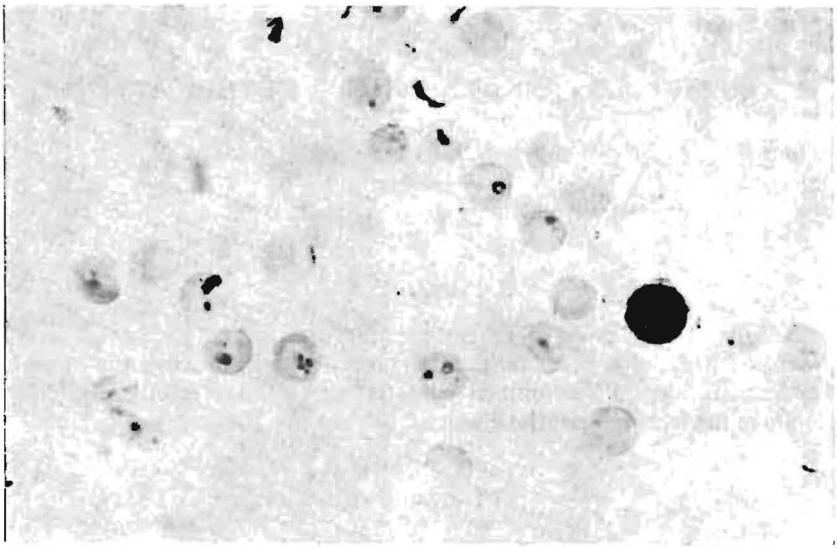
The purpose of this short article is to record a few observations on biliary fever in cats in the Knysna district. It appears to be fairly prevalent in the South Western area of the Cape Province and it is more than probable that many cases occur which are not brought to the notice of veterinarians. Since the author has been practising in Knysna for the last two years, he has had fifteen cases brought to him for treatment. Smears have been made from every case and some observations on the blood picture have been recorded, as well as some on the treatment of the disease.

HISTORICAL

There appear to be very few references to nuttalliosis in cats in the literature. Henning[1] refers to an article by Jackson and Dunning[2] on a case in the Stellenbosch district. Very little research has been done on the disease and none on the transmission. It is obviously tick transmitted but it is not known what the usual species is which transmits it. There is a great deal of scope for research work on the disease in all its aspects.

SYMPTOMS

In the cases seen by the author the history has been very similar. The animals go off their food and in consequence lose condition rapidly. Judging by the marked anaemic changes in the blood it seems likely that the infection had been present for a few days before the owners' attention was drawn to the animals. The paleness of the visible mucous membranes was rarely observed by them. In all cases these were found to be very pale, even almost white; in some they had a lemon-yellow colour from icterus. The temperature varied from 101°F to 104°F; in most cases being 102°F to 103°F. One would expect considerable variation as the cats were in different stages of the disease. One case in a kitten was very weak when brought in for examination and died a few hours later. The others all recovered after treatment but the subsequent anaemia was a real problem as will be mentioned under treatment.



Diagnosis

In most cases there was a very marked anaemia, shown by polychromasia, punctate basophilia and normoblasts. *Nuttalia felis* was usually present in large numbers. The parasites were small, very pleomorphic and in some cases appeared to have very little cytoplasm. Maltese chromasia, punctate basophilia and normoblasts. *Nuttalia felis* was usually present in large numbers. The parasites were small, very pleomorphic and in some cases appeared to have very little cytoplasm. Maltese cross forms were seen. As there seemed to be so much polymorphism the author considered the possibility of there being a haemobartonella or eperythrozoon present. Slides from several cases were submitted to Dr. R. Bigalke of the Protozoological Section, Veterinary Research Institute Onderstepoort. His report on the slides reads as follows:—

> "The parasites are most interesting structures, extremely pleomorphic and some looking more like theilerias than piroplasms. Large numbers of small piroplasms were present consisting chiefly of chromatin with very little cytoplasm. The basophilic rods were difficult to identify, but were not *Haemobartonella felis* or *Eperythrozoon felis*. A large number of the basophilic rods are, in my opinion, parasites that have been distorted in the process of making the blood smears. There is some stain deposit. Maltese cross forms are particularly plentiful in one of the smears. Polychromasia and anisocytosis are the most common anaemic changes. Normoblasts were present in all the smears. Punctate basophilia was rare. Jolly bodies were present in small numbers".

Treatment

There does not seem to be any response in the treatment of cases with drugs such as Phenamidine or Berenil. Trypan blue is useful and the antibiotic, Terramycin, has given good results in the author's hands.

It was tried at the suggestion of Dr. Allchurch of Port Elizabeth who finds it specific for the disease, using it in a dose of 5 mg per lb. body weight. One dose is often insufficient so two doses on successive days are recommended by him.

The writer has used Terramycin alone with success but now uses it combined with Trypan blue giving a dose of each on two successive days. Vitamin B 12 (Cytamen) is also given to combat the anaemia. The real problem in the disease is the severe anaemia which develops and which takes some time, even a few months, to disappear in some cases, particularly in kittens.

Research on the transmission, blood picture and treatment of the disease is very necessary, as the private practitioner can do little more than experiment, in an empirical way, with the treatment of the disease. The author is of the opinion that with drugs which are of use, such as Terramycin and Trypan blue one gets a suppression of the parasites which enables the animal to recover, but the organisms do not disappear from the blood, as shown by smears to the extent they do in billiary fever of dogs.

ACKNOWLEDGEMENT

The author wishes to thank Dr. Bigalke for his opinions on the semars and for the photomicrographs.

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SEVERE COCCIDIOSIS IN GUINEA-PIGS

H. H. KLEEBERG — Veterinary Research Institute Onderstepoort — Fellow of U.S. Public Health Service Fellowship Program.

W. STEENKEN, JR., — Director, Trudeau Laboratory, Trudeau Foundation, Inc., Saranac Lake, New York.

Received for publication August 1962.

SUMMARY

An outbreak of coccidiosis of epizootic proportions in a guinea pig colony is reported. The history, postmortem appearance, diagnosis, control by treatment, sanitary means, and prevention are described.

INTRODUCTION

Coccidiosis in guinea-pigs is of common occurrence in Britain[1], the United States[2], and South Africa. It is caused by *Eimeria caviae*, which is host specific[3]. It is usually mild in animals on an adequate diet and death from uncomplicated coccidiosis is rare. It is believed that it cannot gain epizootic proportions in the absence of other unfavourable factors[4]. The necrotic lesions produced in the liver may resemble those caused by tuberculosis. The confusion arising from such possibility is sufficient reason to take every precaution against the development of coccidiosis in experimental animals in laboratories engaged in the field of clinical and experimental tuberculosis.

HISTORY

At the end of 1961 the guinea-pig colony at the Trudeau Laboratory consisted of 650 animals. There had been no introduction of new stock for many years and no problem of disease, except for one outbreak of Salmonellosis fifteen years previously. The animals were given a balanced (commercial) diet, including vitamins, and additional hay. Water containing freshly added vitamin C was provided in bottles ad lib. In the breeding, as well as in the experimental section, the animals were kept together in groups of 7 to 15 in one cage, but for certain purposes small cages for 2 to 4 animals were used. The feed was placed once a day in a small pile on the bottom of the cage without the use of feed containers. Once every fortnight the bedding was removed and the pans scraped clean and filled with fresh wood shavings.

CLINICAL OBSERVATIONS

At first appearance the disease caused mortality among the older animals with few prior symptoms of illness. The attendants noted weakness and bad condition only a few days before death. No changes in

feeding or cleaning procedures had been instituted which could be related to the onset of mortality. The great majority of cases occurred among the guinea-pigs in long-term experiments. These animals had reached an age of four to five years and had been in the same cages for three to four years, although the cages were sterilized occasionally. Experimental tuberculosis or the use of antituberculous drugs could not have contributed to the condition as the tuberculosis had been cured or arrested and the drugs had been discontinued one to two years before the onset of clinical coccidiosis. A number of female breeders, who had never come in contact with tuberculosis nor been given drugs, also succumbed to the disease. Diarrhoea was not observed but there was loss of appetite, which was confirmed by the lack of intestinal contents seen at autopsy. When control measures were first instituted the mortality rate was 5 per cent per month.

Postmortem Changes

A total of 30 adult guinea-pigs were examined. A few of these, showing advanced symptoms, were killed in order to obtain fresh material for bacteriologic examination. The prevailing features were emaciation, enteritis, haemorrhages in the stomach, enlargement of the liver with local areas of necrosis. In one animal the lung showed three transparent nodules in which the parasites could be demonstrated. The hemorrhagic patches in the stomach wall and the involvement of the liver were particularly striking. Sometimes the necrotic yellowish areas in the liver extended over half a lobe and were filled with parasites. The bile usually contained oöcysts. The gallbladder of one animal was completely filled with debris and coccidia resembling thick mucoid pus, and the common bile duct was blocked.

Diagnosis

In order to prove that coccidia was the causative organism it was necessary not only to demonstrate the oöcysts in the diseased tissues but also to rule out the possibility of bacterial conditions. Aerobic as well as anaerobic cultures were prepared from the liver, spleen, intestines, heart, and blood of several guinea-pigs which were either sacrificed or not yet contaminated by postmortem changes. No disease producing organism could be isolated. For microscopic observations of the oöcysts of *E. caviae* a drop of weak solution of brilliant green mixed with the flattened out material was found useful in distinguishing oöcysts from other bodies with the same size and shape. It was noted that in preparations of diseased liver tissue a number of oöcysts were filled with granular material which, in rare instances, occurred in two or four round masses, indicating the beginning of sporulation. Complete sporulation of *E. caviae* requires at least 6 days and this was demonstrated in material kept in Petri dishes at room temperature. In some cases oöcysts were observed in all samples of mucosa taken from different parts of the intestines. The outer shells of the droppings of 30 healthy guinea pigs which lived in the groups where deaths occurred, were examined and 50 per cent were found positive for coccidia.

Control Measures and Treatment

Because of labour shortage, a complete change of cages for sterilization, or meticulous cleaning with soap and water twice a week, could not be considered. To prevent continuous infection it was decided that separation of the animals from their faeces and the use of feed containers were sufficient measures of control. After an initial sterilization, all large cages were equipped with wire screen floors which permitted faecal droppings to fall through into the removable pans. Simple wire nets were attached to the doors as racks for hay and the dry mash was given in earthen bowls. Succinylsulfathiazole was added to the drinking water to give a 0.05 per cent solution and the whole colony was treated for one month. This chematherapy was intended to serve several purposes: to save as many of the valuable guinea-pigs in long-term experiments as possible: to suppress and possibly prevent the further infestation of the bedding in those small cages where wire mesh floors could not be installed, and cleaning could be done only once a week: and to protect young animals in the breeding section from infection through their mothers' droppings, since guinea pigs are coprophagous. At the dosage used no toxic side effects were noted.

Results and Conclusions

Only three animals (0.5 per cent) showing conditions similar to those described above died within the succeeding 30 days, and thereafter none. The observation period then was 9 months. Forty-three non-tuberculous guinea pigs were sacrificed and autopsied during this time and no pathologic changes of the described nature were found except necrotic spots or scars in the liver. Oöcysts could not be demonstrated in this material. The animals still alive, were in good condition.

A relapse of clinical coccidiosis occurred in the colony in October, 1962. Twenty animals, mainly young breeders, died showing generally severe liver damage. The probable cause of the recrudescence may have been an inferior diet (solely commercial rabbit chow was fed at that time) resulting in lowered immunity and the inability of the drug to sterilise the host. The drinking water was replaced by a 0.1 per cent solution of Succinylsulfathiazole (double dose) for a period of 14 days and balanced "Purina guinea-pig feed" fed. This resulted in an almost immediate cessation of mortality.

In the colony described, several factors contributed to the epizootic. The mixture of damp bedding, faeces and feed provided a suitable condition for sporulation of the oöcysts. There was continuous contact with faeces and the fortnightly cleaning did not interrupt the life cycle. The duration of the experiments resulted in a continuous and increasing reinfection which led to a final breakdown of immunity. Chematherapy for a month appeared to have curative effect. Not only did the mortality cease almost immediately and before the wire screen floors had been installed in the cages, but all symptoms of the disease disappeared in animals kept in small cages, where separation from the faeces was not feasible.

The recurrence of the disease shows that the 0.05 per cent drug solution did not sterilize the animals from coccidiae. The double dose however, damaged the bacterial flora of the intestines.

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SALMONELLA TYPHI-MURIUM INFECTION IN BLUE WILDEBEEST CALVES, (*CONNOCHAETES TAURINUS*) (BURCHELL).

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SUMMARY

A short report on an outbreak of *Salmonella typhi-murium* in young Blue Wildebeest calves is given.

The disease is possibly endemic in Blue Wildebeest in the Kruger National Park, occasionally becoming epizootic and seriously affecting young calves.

S. typhi-murium was isolated from the lungs, liver, spleen and intestine. These isolates correspond to the histo-pathological findings which showed the disease to be of a septicaemic nature.

INTRODUCTION

The Blue Wildebeest in the southern portion of the Kruger National Park usually calve down during December. For a number of seasons it had been noticed by various game wardens that during the first three months of calfhood about 50 per cent of the calves were lost. This loss was initially attributed to predation by carnivora.

During January 1960 it was noticed that the loss of calves in a certain herd in the Malelane district had increased appreciably. On investigation two sick calves were found, and it became clear that the losses were also due to disease.

SYMPTOMS

Of the two diseased calves examined by ante-mortem inspection one was in extremis and unable to stand or move. There were no signs of diarrhoea.

The other was still able to stand but very weak. It often fell and showed continuous muscle trembling and spasm of the limbs. There were also no signs of diarrhoea and it died shortly afterwards. Both calves were about 3-6 days old.

Post Mortem

Both animals showed essentially the same lesions on post mortem examination.

The brain, spleen and umbilicus were apparently normal. The liver showed tumor hepatis and slight yellow pigmentation. The lungs and kidneys were hyperaemic and subendocardial petechiae were visible. The mesenteric lymph nodes were enlarged and oedematous. A haemorrhagic enteritis was present in the one calf and intestinal catarrh in the other.

Blood and spleen smears were made and appropriate specimens were taken for pathological, bacteriological and virological examination.

Laboratory Examination

The epizootiology, symptoms and post mortem lesions indicated an infectious disease. The following examinations were therefore carried out on the specimens submitted in 50% glycerine saline and 10% formalin.

(1) *Bacteriology.*

Approximately 10 grams of the lung material was minced up with 10 ml. saline. The suspension was filtered through gauze and six white mice were each injected intraperitoneally with the filtrate in doses ranging from 0.5 ml. to 0.1 ml.

After eight days none of the mice showed any signs of illness.

Direct cultures of the lungs were made on blood tryptose agar plates in air and under 20% CO_2 at 37°C. *S. typhi-murium* was isolated in pure culture. It was identified by standard biochemical, agglutination and agglutination absorbtion tests.

Cultures were made of the intestinal contents and mucous membrane on MacConkey agar, selenite broth and minced meat broth. After incubation of the selenite for 24 hours at 37°C, sub cultures were made on MacConkey agar. By further sub-culturing, selection of single colonies and employing standard biochemical and serological techniques, *S. typhi-murium*, *Escherichia intermedium* and *Streptococcus faecalis* were isolated and identified.

By means of toxin anti-toxin tests in mice the minced meat broth was shown to contain *Clostridium welchii type A* toxin.

By using the same methods as described for the intestine *S. typhi-murium* was also isolated from the liver and spleen.

(2) *Histo-Pathology*:—

The following histo-pathological lesions were seen in sections made from specimens submitted in 10% Formalin.

Calf No. 1.

UMBILICUS: A few petechiae otherwise nothing unusual.
INTESTINE: Pronounced hyperaemia. No cellular infiltration. Majority of epithelium cells desquamated.
BRAIN, LUNG, LYMPH NODE, and KIDNEY: Hyperaemia.
MYOCARDIUM: Nothing abnormal.
LIVER: Slight congestion and degenerative changes.
DIAGNOSIS: Acute septicaemia.

Calf No. 2.

LYMPG NODE: Oedema and hyperaemia.
KIDNEY: Severe hyperaemia.
MYOCARDIUM: Nothing abnormal.
LIVER: Occasional cells and groups of cells showed necrobiotic changes. Many liver cells showed granular pigmentation.
SPLEEN: Pronounced congestion.
LUNG, BRAIN AND ABOMASUM: Hyperaemia.
DIAGNOSIS: Septicaemia.

(3) *Smears*:—

Blood smears and spleen impression smears were all negative for protozoan parasites.

(4) *Virology*:—

Routine methods used for virus isolation were employed but with negative results.

ACKNOWLEDGEMENTS.

We are indebted to the Chief: Veterinary Research Institute for permission to publish this article and to Prof. W. O. Neitz who examined the smears. We also wish to thank Mr. Espag of the National Parks Department who assisted with the field observations and Mr. L. Bester and Mr. F. Visser of Onderstepoort for their assistance.

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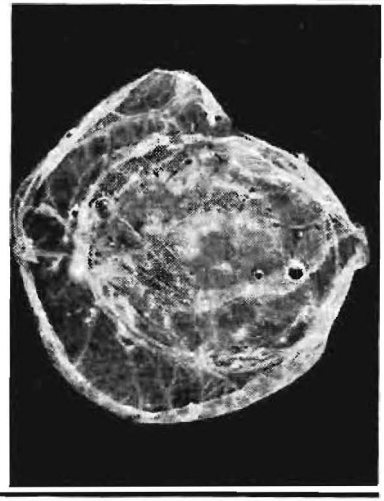
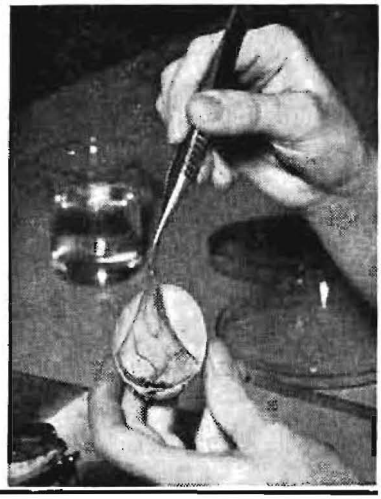


Chorio allantoic membrane showing effect of virus growth



Harvesting of infected chorio allantoic membrane after virus growth

Grant 30-2883

OBSERVATIONS ON THE CONTROL OF ANGORA GOAT LICE, *LINOGNATHUS AFRICANUS* AND *DAMALINIA CAPRAE*

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SUMMARY

The effects on the mohair of two species of lice infesting Angora goats are described, also a number of field trials carried out to investigate the developed resistance and/or tolerance of these lice to insecticides in use. The susceptibility of both species of lice to two organic-phosphates was determined and also the survival time of the lice away from the host.

INTRODUCTION

Angora goats were first introduced into South Africa in 1838[1] by the importation of some rams (which had been sterilised before they left Turkey), a ewe, and its ram kid, born on the voyage. There were further importations, about 3,000 in all, up to the end of the century. Initially there was some cross-breeding with Boer goats, but, as can be imagined, cross-bred hair is nothing like good mohair and it would take many generations of careful breeding and selection to produce good mohair again, so that naturally enough the present flocks have been derived mainly from the original importations, which has necessitated inbreeding.

During the war (1939–45) mohair, because of its resiliency, was used as cushioning to replace rubber in tanks, armoured cars and aircraft. Mohair is used for fine suiting with a high degree of lustre and wear, facings on men's evening suits and liners, used with wool or synthetic fibres for tweeds and worsted materials, womens jerseys, jumpers, shawls, etc.; carpets, (Turkey and Persian carpets are renowned for their colour and longevity) upholstery, blankets and rugs and, for a special type of shawl and headdress woven with gold thread for the Sheiks of Araby and Persia. For all these different uses a fibre is required with length, strength, resiliency, fineness and lustre, all qualities of good class mohair, in fact there is no more versatile natural fibre.

Production of mohair is limited, the main producers being in Texas, Turkey, South Africa and Basutoland — the best quality coming from South Africa and Texas. South Africa accounts for about 12% of world production and since the war the demand for mohair for use alone or mixed with wool or synthetic fibres has exceeded supply, so accordingly prices have risen.

In South Africa and Texas through selective breeding there has been considerable increase in production, i.e. more hair per goat, and a marked improvement in the quality of fineness of the mohair. In Turkey the

country of origin of the Angora, very little or no improvement has taken place, the goats being run as they were in Biblical times with no selection nor controlled breeding[2]. Basutoland is following a policy of improving the Native goat of the country by introducing pure-bred buck-rams* from South Africa to run with the flocks but controlled breeding is not practised[3].

The rise in price of mohair has naturally focussed more attention on the general wellbeing of flocks and their production. One of the most important factors acting to the detriment of mohair production is lice infestation.

It has been the practice amongst goat farmers to clip twice a year; at the end of January or February and again in July-August. The reason behind these two arbitrary fixed dates is that the buck-rams apparently will work only in March-April, so the buck-ewes are cleaned then for tupping. Kidding takes place in July-August so the ewes must be cleaned up again. The best quality and finest mohair comes from the kids; first clipping, super-summer hair, which is clipped in February. Under good conditions mohair should grow 1 inch per month so that at each clipping, hair 6 inches should be clipped. With very long hair there is the danger of goats being caught up in bushes, and dying a lingering death.

Mohair in its natural state on good grazing tends to be greasy, and under South African conditions collects a fair amount of dust, particulate matter from leaves, grass and bark, dung from kraals, besides the normal epithelial sloughs. If lice are present this skin debris is considerable. The "handle" for fineness, quality, and lustre; factors important to the buyer, are thus masked by the amount of dirt present.

To prepare the "fleece" and present it in the best possible form, it has been customary to dip the animals, 4 to 6 weeks before clipping, in a soapy wash containing an insecticide, to remove the dirt and excess grease and to kill the lice. The period 4–6 weeks is allowed for the "yolk" (natural grease) to rise. This gives weight, improves the lustre, and imports a slight golden tinge to the mohair. The commecial dips of choice were specific proprietary brands, such as one containing soft vegetable-oil soaps and rotenone (which was taken off the market in the 1930's) and one containing soft soaps, cresylic acid, arsenic and rotenone (which is still on the market). This second dip, because of its arsenical content, often caused "dipburn" to animals with tender skins and is frequently used at only $\frac{3}{4}$ or $\frac{1}{2}$ strength. It was directly as a result of the apparent failure of this dip to control the Blue sucking louse, that these investigations and trials were initiated.

As far as the author is aware no dip has ever been specifically developed in South Africa—

(*a*) for the control of goat lice,

(*b*) to promote and safeguard the natural qualities of mohair.

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*In South Africa Angora goat rams and ewes are known as buck-rams and buck ewes.

All dips that have been used were initially developed for combatting ecto-parasites of sheep or cattle and it was simply accepted that they would be suitable for the control of goat lice and not damage the mohair. Both these suppositions have, in certain instances, been found to be wishful thinking.

Species of lice and their effects

In all examinations carried out, two species of lice have been identified:—

(*a*) *Linognathus africanus* the Blue sucking louse.

(*b*) *Damalinia caprae* the Red biting louse.

The louse causing the most harm to the animal and damage to the mohair is the Blue louse.

Infestations of these two species of lice are, to a certain extent, seasonal in incidence. Blue lice appear mainly during the summer months and Red lice mainly during winter. However, infestations of both species may be encountered throughout the year.

Massive infestations of Blue lice may cause severe anaemia with oedema of the legs and underline and, if not controlled, death of the animal, particularly kids. In kids and young goats just after weaning medium to heavy infestations may cause stunting.

Considerable damage to the "fleece" is caused by lice and again the effects of the Blue louse are more severe. Due to skin irritation and reaction there is continual scratching and rubbing. The large amount of cellular debris from the skin, dirt, lice and their excreta, causing the mohair to become matted, stained and lustreless, besides weakening and breaking the fibres. A comparable severe infestation of Red lice does not cause nearly as much irritation, scurf or matting. Quite a severe Red louse infestation may sometimes be missed by the farmer.

Towards the end of 1959 a report was received from the President of the Angora Ram Breeder's Association at Jansenville, that a certain proprietary dip, containing arsenic and rotenone, was no longer controlling the Blue louse in some areas, notably the Jansenville district. A month or two later reports from farmers in other districts as well as Jansenville were received that the chlorinated hydrocarbon insecticides, gamma B.H.C., Toxaphene and Dieldrin were similarly failing to control the Blue louse.

These reports were investigated and the following trials carried out:—

Trial 1.

TOTAL IMMERSION DIPPING TRAILS AT:—

(i) Two farms (*a*) and (*b*) in the Jansenville district where resistance was suspected against rotenone.

(ii) Two farms (*c*) and (*d*) in the Somerset East district where resistance or tolerance to Toxaphene was suspected.

(iii) One farm (*e*) in the Baroe district where tolerance to chlorinated hydrocarbons was suspected.

(iv) One farm (*f*) in the Bedford district where no known resistance had appeared.

The goats were examined and tagged before treatment, then examined 24 hours post treatment for kill of lice, and again at 15 days post treatment for any insecticidal effect on hatching larvae. During the period of observation the goats were isolated to prevent reinfestation.

The assessment of kill in this and other trials was made by examining at least five areas over the skin of the animal; flank, inner aspect of the thigh, belly, just behind the shoulder, neck region just under the jaw, and counting a minimum of 10 lice in each area (alive or dead), usually 30 or 40, and then averaging the percentage kill. The method could doubtless be improved upon, however for a field assessment carried out by the same operator, results are reasonable and comparable.

Various insecticidal washes marketed to-day were used in these trials according to their label instructions for the control of ticks and lice. In all cases samples of the freshly made up wash were submitted for analysis and found to be correct. Analysis for rotenone, however, for these initial trials, was not undertaken . The final concentrations of insecticide required in the dipwashes, diluted according to instructions, were:—

(i) Arsenic	0.13%
Rotenone	0.006%
(ii) Dieldrin	0.05%
(iii) Toxaphene	0.25%
(iv) gamma B.H.C.	0.03%
(v) p.p. D.D.T.	0.3%

For the purpose of these trials the effect of arsenic was disregarded as a concentration of less than 0.2% arsenic in the wash is generally considered to be ineffective in controlling lice.

TABLE 1.

District.	*Farm.*	*Dipwash.*	*Blue Lice.* 24 *hr. examination*	*Blue Lice.* 15 *day examination.*
Jansenville.	(*a*)	Arsenic/Rotenone.	80% kill.	Immatures and adults present.
		Dieldrin.	90% kill.	do.
Jansenville.	(*b*)	Arsenic/Rotenone.	80% kill.	do.
		Dieldrin.	90% kill.	do.
Somerset East.....	(*c*)	Toxaphene.	90% kill.	do.
Somerset East.....	(*d*)	Toxaphene	90% kill.	do.
Baroe.	(*e*)	gamma B.H.C.	80% kill.	do.
		p.p. D.D.T.	50% kill.	do.
		Rotenone.	100% kill.	Immatures only present.
Bedford.	(*f*)	Arsenic/Rotenone.	100% kill.	do.

RESULTS

A definite rotenone resistant strain would appear to have developed on farms (*a*) and (*b*), whereas rotenone is still giving 100% kill on farms

(*e*) and (*f*), but does not have sufficient residual effect to kill emergent larvae, evident from the appearance of immatures only at the 15 day examination.

On all farms where chlorinated hydrocarbons were used there was not a complete kill of viable lice indicating either a developed resistance or inherent tolerance to the insecticide used at the stated concentration. Resistance towards gamma B.H.C. and D.D.T. by the Blue lice is unlikely to be the explanation because on farm (*e*) gamma B.H.C. had only been used once before and D.D.T. never, so these wash concentrations are inadequate for this parasite.

Trial II.

WORLD HEALTH ORGANISATION FIELD TEST.

Observations were carried out on farms (*a*) and (*b*) in Jansenville and (*f*) in Bedford (Table I) using Blue lice only.

METHOD.

A kit is supplied by the World Health Organisation, for determining insecticidal resistance of the human body louse, containing packages of different concentrations of powdered insecticide with squares of cloth and full directions for conducting the test which briefly is as follows:

An assayed amount of powdered insecticide is worked into the nap of a square of cloth. The cloth is then fastened by means of tacks or tape to a stiff board. Lice are collected and for each square a minimum of 20 active adult recently fed lice are selected. These are then placed on the cloth square and confined under half of a petri dish or similar container. Observations are carried out for 24 hours. The test should be conducted in the dark and at a controlled temperature of 25°C.

A large board for a number of tests requires space so the following method was used on the farms in adapting the test for use with the Blue louse of goats.

Table II.

Test Insecticide.	*No. of Lice*	12 *hr. examination*	24 *hr. examination.*
Jansenville—Farm (a) First Test			
gamma B.H.C. (0.02%)....	60	90% viable.	75% viable.
Controls.....	60	75% viable.	60% viable.
Jansenville—Farm (a)—Second Test.			
gamma B.H.C. (0.02%)....	80	80% viable.	80% viable.
p.p. D.D.T. (0.04%).....	80	80% viable.	75% viable.
Rotenone (0.006%).....	80	80% viable.	80% viable.
Controls.....	80	90% viable.	90% viable.
Jansenville—Farm (b).			
gamma B.H.C. (0.02%)...	70	no examination.	60% viable.
p.p. D.D.T. (0.04%).....	70	no examination.	70% viable.
Rotenone (0.006%).....	70	no examination.	20% viable.
Controls.....	70	no examination.	80% viable.
Bedford—Farm (f).			
gamma B.H.C. (0.02%)...	60	no examination.	10% viable.
Rotenone.....	60	no examination.	100% kill.
Controls.....	60	no examination.	80% viable.

Fully engorged adult lice were placed in a 2-oz. glass jar. The square of insecticide impregnated cloth was placed over the top of the jar and secured with a rubber band. The jar was then inverted. The jars could then be packed in a box or cupboard and kept in the dark at the required temperature.

RESULTS.

Results of this *in vitro* test tended to confirm the findings of the field trial (Table I). Of interest is that D.D.T. had not been used for goat dipping and at both farms (*a*) and (*b*) mortalities of lice treated at the concentrations recorded was very low.

TRIAL III.

SURVIVAL OF LICE AWAY FROM HOST.

The length of time lice will survive away from the host was observed by placing:—

(1) 50 adult lice alone.
(2) 50 adult lice plus 2 or 3 locks of mohair with numerous nits.

} in glass jars with gauze tops and standing the jars on the laboratory bench—(18°–25°C).

TABLE III.

Survival time of Goat Lice kept off goats.

	Blue Lice.	*Red Lice.*
(1)	Adults survived 5 days.	Adults survived 7 days.
(2)	Adults survived 4 days, hatching larvae 4 days.	Adults survived 9 days, hatching larvae 6 days.

The adults had all died at the end of the periods stated. The larvae, however, emerged over the whole period, i.e. 8 days for Blue lice and 15 days for Red lice, but did not survive for longer than 5–6 hours. No more nits hatched after the 8th and 15th days respectively although observations were continued over 30 days.

RESULTS.

Under the conditions of the experiment Blue lice did not live longer than 5 days and Red lice 9 days, away from their host.

TRIAL IV

DIPPING TRIALS WITH ORGANO PHOSPHATE INSECTICIDES.

Flocks of goats infested with Blue lice or Red lice, or both, and where Blue lice populations were "resistant" to several insecticides, were dipped in Delnav (Dioxane bis (diethyldithiophosphate) and VC 1-13 (Diethyl dichlorophenyl thiophosphate) washes of different concentrations. Heavily infested individual goats were marked and examined 24 hours, 15, 30 and 42 days post treatment. The results of these trials, summarised in Tables IV (Delnav) and V (VC 1–13) record the dipping of over 12,000 goats on 25 different farms.

TABLE IV.

Using a special Delnav Miscible Oil Goat Dip producing washes with mild cleansing action on hair.

Delnav Concentration	*Blue Lice.*	*Red Lice.*
0.006%	70% kill.	5% kill.
0.0125%.....	100% kill but nits survived	30% kill.
0.025%.....	100% Kill, nits as well.	50% kill.
0.05%.....	100% kill, nits as well.	100% kill but nits survived
0.075%.....	100% kill, nits as well.	100% kill but nits survived.
0.1%.....	100% kill, nits as well.	100% kill, nits as well.

TABLE V.

The same type of M'scible Oil dip as above but replacing the insecticide Delnav with VC 1–13.

VC 1–13 *Concentration*	*Blue Lice.*	*Red Lice.*
0.01%.....	20% kill.	80–90% kill.
0.02%.....	50% kill.	90–100% kill.
0.03%.....	90% kill.	100% kill, nits survived
0.04%.....	100% kill, nits as well.	100% kill, nits as well.

Where no larvae were found 15–42 days post dipping it suggests that either the nits were killed *in situ* and did not hatch or that there was sufficient residual insecticide to kill any larvae that hatched. Furthermore, at 15 and 30 or 42 days post treatment examinations neither immature nor adult stages could be found after an extensive search of the whole animal.

RESULTS.

(*a*) DELNAV.

From the results tabulated here it is evident that a considerable difference in concentration of Delnav washes is required to kill the two species of goat lice; the concentration required to kill Blue lice on goats being in the region of 0.0125% and for Caprine Red lice four times greater — 0.05%. Similarly eradication of infestations required 0.025% and 0.1% Delnav respectively. Examinations were carried out at 24 hours, 15 days and 30 days post treatment. Where in the table it is remarked that "nits survived", immature forms were found at 15 days and 30 days; whereas "100% kill, nits as well" means that at 15 and 30 days post treatment no viable lice, neither immature nor adult, could be found after a careful search.

(*b*) VC 1–13.

VC 1–13 was used at dilutions given in Table V and examinations carried out at 24 hours and 6 weeks post treatment. These total immersion trials were carried out on minimum groups of 4 and more of heavily infested goats. Complete kill of Blue lice was achieved at a concentration of 0.04% and Red lice at 0.03%; very much less difference than was noted for Delnav. A concentration of 0.04% VC 1–13 gives 100% kill of both species of lice and their larvae as judged by finding no parasites on examination at 6 weeks post treatment.

DISCUSSION.

The selection pressure for the development of resistant strains on the two farms, (*a*) and (*b*), Table I, has been comparatively high over the last 10 years as they are stud farms where the stock have been regularly and frequently dipped primarily with arsenic/rotenone alone and then for the last 3–4 years with chlorinated hydrocarbons as well.

The goats would be dipped 4–5 times a year to control the lice and if lice were still troublesome or the state of the mohair was not satisfactory, the stock would get another one or two treatments.

A concentration of rotenone at 0.006 per cent has given apparent complete control of viable lice of both types for many years and still gives 100 per cent kill of viable lice in commercial flocks that are only dipped twice annually, such as at farms (*e*) and (*f*), Table I, at Baroe and Bedford. It must be remembered that it is only since 1952 that mohair prices have warranted the focussing of close attention on the flocks and their well-being. For many years prior to that the flocks were considerably smaller than they are now and run exclusively in the arid areas where internal and external parasites are not severe problems unless overstocking occurs and artificial pastures are established. In the old days the flocks would only be gathered twice yearly at clipping time when, if lice were noted, the goats would be dipped and returned to the veld till the next clipping, six months later. Under these circumstances it was easy for farmers to delude themselves that the one treatment controlled lice. It is quite possible that the state of tolerance to certain ineffectual wash levels of insecticides, e.g. the chlorinated hydrocarbons, has been in existence from the time they were first used. Evidence for this assumption is clearly shown at farm (e), Table I, where gamma B.H.C. has been used only once before, and p.p. D.D.T. never.

Resistance to rotenone, as far as these examinations have gone, appears to be focussed on 2-3 stud farms in the Jansenville district where total immersion dipping trials did not give 100 per cent kill of viable Blue lice, which was confirmed by the W.H.O. *in vitro* test.

It is very evident from these trials that there is a vast difference in the concentrations of the organo-phosphate Delnav tolerated by the two species of lice (vide Tables IV and V). Excellent control of Blue lice infestations was obtained with one treatment (total immersion) in Delnav at 0.03 per cent. Red lice on the other hand require two treatments at 10-14 days and a wash of 0.05 per cent concentration or one treatment at a concentration of 0.1 per cent.

For the control of parasites in small stock any double dipping procedure recommended under South African conditions certainly loses a great deal of its efficiency because difficult mustering over large distances of rough bush country makes farmers and their labour loath to collect at a short interval of 10-14 days. Frequently a few head are missed.

The ideal to be aimed at is 100 per cent kill of viable lice and nits (or larvae hatched from them), of both species in a single dip treatment. This has been achieved with the other organo-phosphate VC 1-13. On Table V, it will be noted that concentrations of 0.04 per cent gave 100 per cent kill of viable lice of both species and an examination 6 weeks post treatment failed to find a single louse, mature or immature.

Conclusions

(*a*) In a localised area the Blue goat louse appears to have developed resistance to rotenone.

(*b*) Over a much wider area this louse appears to be tolerant of insecticidal levels of the chlorinated hydrocarbon insecticides reported to be effective against the sheep louse.

(*c*) Organo-phosphates such as Delnav and VC 1-13 give excellent control of both species of goat lice.

(*d*) Survival away from the host and possible reinfestation may occur for up to 9 and 15 days for Blue and Red lice respectively.

Acknowledgement

My thanks to Dr. H. S. Purchase, Technical Director, Cooper & Nephews, S.Af. (Pty.) Limited, for his interest and assistance in the preparation of this paper and to the Directors of Cooper & Newphews, S.Af. (Pty.) Limited for permission to publish.

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BILHARZIASIS IN SHEEP AND CATTLE IN THE PIET RETIEF DISTRICT

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SUMMARY

A severe infestation of bilharzia in sheep and cattle was encountered on the farm "Harloo" (Jackson) in the Piet Retief district.

As bilharziasis is unusual in sheep it can easily be overlooked.

A short resumé is given of the condition as well as therapeutic and prophylactic measures applied to combat it and how these measures were effected on this specific farm with excellent results.

INTRODUCTION

Severe infestation of sheep and cattle with bilharzia was encountered on the farm "Harloo" situated in the Piet Retief district between Pongola and Golel, bordering on Swaziland.

The farm is hilly in the north and for the rest consists of plains with bushveld grazing. Several spruits originating in Swaziland run through the farm. These spruits have running water only in summer. The rest of the year pools of stagnant water are formed all along their courses. The spruits are heavily infested with different species of small water snails. At the time of investigation, these spruits constituted the only available drinking points for stock on the farm.

Furthermore, the area has a very hot climate and the existing conditions on the farm are therefore ideal for bilharzia infestation of stock.

Although the sheep on the farm had been dosed with anthelmintics every month for a period of two years, no improvement in condition was noted.

The problem was investigated and Ortlepp[2], diagnosed the species as *Schistosoma mattheei.* All the sheep examined were found to be heavily infested with bilharzia. The mortality rate was so high that the farmer had decided to cease sheep farming if matters did not improve.

A thorough investigation was carried out in attempts to arrive at the best means of control. Unfortunately the farm is situated 120 miles from the author's headquarters.

PROCEDURE

On the spot observations were carried out when the following information was obtained.

Animals affected

Although bilharzia was diagnosed both in sheep and cattle, sheep were more severely affected.

It can be mentioned that 28 Bantu on the same farm were tested for bilharzia and were all found to be positive. They were dependent on the same infested spruits for their water supply.

Morbidity and mortality

The sheep which were all cross-breds showed severe symptoms and lingered on for a considerable period before they eventually died. The mortality rate was very high, not only due to bilharzia, but to secondary conditions such as pneumonia.

Although the young cattle exhibited marked symptoms of schistosomiasis, the condition was masked to a considerable extent by the excellent grazing conditions in the area. However, the resistance of the stock was lowered and they often succumbed to such diseases as piroplasmosis.

Symptomatology

Sheep: On being driven affected animals tired quickly, the breathing was laboured and accelerated and progressive emaciation was noted. Anaemia with occasional oedema of the submandibular space; lack of lustre of the hair, diarrhoea and even pneumonic symptoms were frequent.

Cattle: Although only mildly affected their condition was poorer than could be expected on the good grazing at that time.

The diagnosis was confirmed by faecal examination.

Pathology

Macroscopic: Emaciation, cachexia, severe anaemia, hydrothorax and ascites was common. The greyish discolouration of lungs, liver and greyish spots on the intestinal serosa were pathognomonic. The lungs frequently had pneumonic lesions; the surface of the liver was uneven with marked degeneration and cirrhosis. Calcified lesions of the intestinal serosa were common and although the mesenteric vessels contained many parasites, none were found in the blood vessels of the bladder.

Microscopic: The following were observed:

Large numbers of parasites in the lungs, liver and intestines; calcification of the mesenteric blood vessels; extensive granulomatous focal pneumonia and marked pigmentation of the lungs and liver.

Aetiology

Schistosoma mattheei, a parasite that infests both animals and humans was the aetiological agent. This fact could have been responsible for a vicious cycle on the farm as both animals and the Bantu labourers made use of the same spruits for their water supply.

The spruits harboured many water snails which were examined and found to be *Physopsis africana*, *Lymnaea natalensis* and *Biomphalaria pfeifferi*. *Physopsis africana* is the intermediate host of *S. mattheei*.

Collection of Snails

Snails were collected from the spruits and air dried in the shade. Then they were packed in moist grass in a small carton for dispatch to the laboratory. Snails were also preserved in 10 per cent formalin before being sent off. Some of the live *Physopsis* snails were found to shed cercariae at Onderstepoort and the preserved snails were also found infected with bilharzia on dissection.

Therapy

Sheep: The classical treatment is repeated intravenous injections of 6 per cent sterile tartar emetic solution, giving a total of ten injections; starting with 2 cc. then 3 cc. and thereafter 4 cc. on alternate days.

Cattle: A 6 per cent solution of antimosan giving ten injections of 25 cc. each on alternate days, is advocated.

This is rather a laborious and expensive treatment. The animals were at the advanced chronic stage of the disease, with marked liver and intestinal involvement. They repeatedly reinfested themselves at the drinking places.

Treatment in these cases would therefore have been of no avail, and was consequently not tried.

However, methyridine was injected intraperitoneally at 200 mg./Kg. after all spruits had been fenced off and the sheep had been given access to treated water in drinking troughs only. A control group kept under similar conditions was not treated.

Later on, test slaughter was undertaken of both treated and untreated sheep. There was no difference whatsoever as far as infestation with bilharzia was concerned.

Prophylaxis

As mentioned earlier the stock drank at infested spruits. These streams did not lend themselves to treatment with molluscicides as they were filled with plant growth and there was no known means of assessing the flow of water. Under these circumstances chemical control measures are valueless[3].

To prevent stock from becoming continually reinfested, the spruits and any other dangerous water supplies such as vleis, dams etc. were fenced off.

To supply a safe source of drinking water both for the labourers and livestock on the farm the following steps were taken:

A concrete reservoir was constructed on a hill on the farm and water pumped from the nearby Pongola River into this reservoir. This water was treated with copper sulphate in the porportion of 5 parts $CuSO_4$ to 1 million parts of water, to destroy snails that may have been pumped up from the river. Molluscicidal treatment was frequently repeated.

Treated water flowed from the reservoir through iron pipes to taps for the use of Bantu labourers and through iron and plastic pipes to concrete drinking troughs for livestock. Circular drinking troughs with barbed wire across them to prevent soiling were used. In addition troughs were regularly cleaned.

Careful attention was paid to any leaks from the reservoir, troughs pipes etc. which would form ideal breeding places for snails.

Results

As mentioned earlier, only methyridine was used for the treatment of affected sheep and no difference was found at test slaughter between treated sheep and untreated controls. The old bilharzia cases on the farm are still badly affected, but as a result of the precautionary measures applied, further reinfestation was prevented.

In contrast, the young stock present a completely different picture. They have been allowed access to treated water supplies only, and have been kept completely free of infestation. Of the young wethers, many have since been slaughtered and carefully scrutinised for the presence of bilharzia, but they were all found completely negative.

The young cattle, as well as sheep are in excellent condition and t here is no comparison between them and stock from previous seasons.

Conclusions

When the diagnosis of bilharziasis in stock is made, the animals are usually in the chronic states of infestation with secondary complications already present. Treatment of these cases is therefore of no value and with the drugs mentioned it amounts to a very laborious and expensive procedure. Re-infestation also keeps on taking place.

The application of prophylactic measures as set out in this report was completely successful and prevented the infestation from spreading.

Schistosoma mattheet infests both man and animals. While there is such a high infestation rate of bilharziasis in humans in different parts of the country, one should always be on the lookout for this condition in our domestic stock.

ACKNOWLEDGEMENTS

I would like to thank Drs. R. Reinecke, R. J. Ortlepp and J. D. Smit for their help and co-operation. Also a word of thanks to Messrs. I.C.I. for supplying the methyridine for the experiment.

Acknowledgement is due to the Chief of Veterinary Field Services for permission to publish this article.

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THE LATERAL APPROACH TO PUDENDAL NERVEBLOCK IN THE BOVINE AND OVINE

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Received for publication, December, 1962

SUMMARY

The lateral approach to pudendal nerve block is described in the bovine and ovine.

The advantages of the technique are summarized.

INTRODUCTION

The classic approach to this nerve-block as described by Larsen[1] in 1953 has been through the ischio-rectal fossa. Habel[2] in 1956 pointed out a possible source of error in the technique. The author has found the technique fairly cumbersome and an investigation into alternative approaches was instituted.

Larsen mentions that the lateral approach though the gluteal region was tried but he did not persist with it as he felt the ischio-rectal approach to be easier.

Dissections carried out by Dr. J. M. W. le Roux of the Department of Anatomy, Faculty of Veterinary Science of Pretoria University supported the author's contention that the gluteal approach could be developed.

No major differences in the anatomy as described by Larsen and Habel were found, and the 4 sites of injection as suggested by Habel seemed obvious but would militate against the gluteal route.

The object of this investigation was therefore to develop the lateral approach with a view to minimizing the sites of injection and the manipulations required.

It was decided that 2 sites for injection would be sufficient for complete anaesthesia of the penis and relaxation of the sigmoid flexure, namely over the pundendal nerve just as it passes medial to the lesser sciatic foramen in it's dorso-anterior quadrant, and a second injection at a site lying between the posterior haemorrhoidal and the pudendal nerves. The latter site necessitates penetrating the sacro-sciatic ligament but no difficulty was found in effecting this and no untoward effects have been noted.

Forty two subjects were used in these investigations. They varied in age from mature to 16 month Friesland, Bonsmara, Afrikaner, South Devon and Hereford bulls. Relaxation and anaesthesia were obtained in 38; the remaining animals showing various aberrations which could be attributed to faulty technique at the commencement of the investigation.

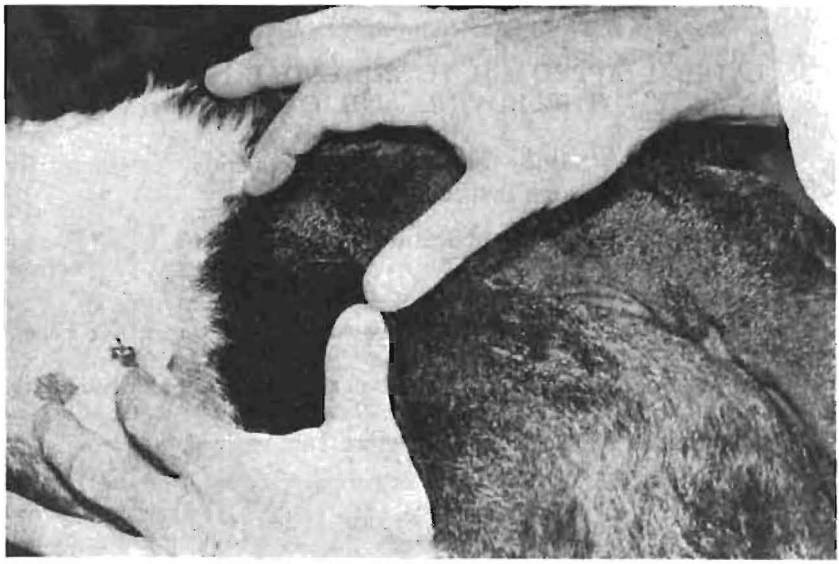

FIG. 1

Showing the site of injection and the relationship to the length of the sacrotuberous ligament. The two thumbs are placed on the anterior dorsal tuberosity of the tuber ischia

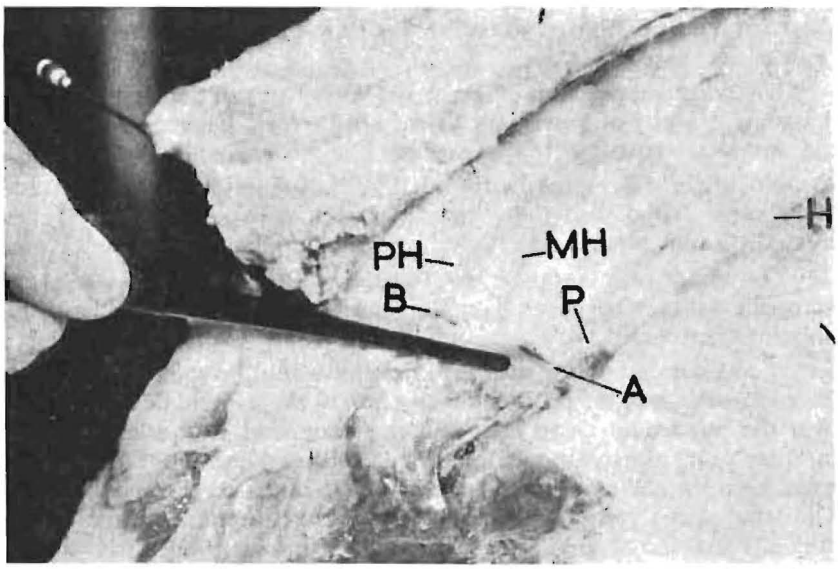

FIG. 2

H = Internal *Iliac Artery*
P = Pudendal Nerve
MH = Middle Haemorrhoidal Nerve
A = First Position of Needle
B = Second Position of Needle

The pointer is on the anterior border of the lesser sciatic foramen.

Technique

Bovine

(1) The subject is brought under full control preferably in a crush with full restraint of the head.

(2) The sites for injection are clipped, thoroughly washed and swabbed with the antiseptic of choice.

The site of injection is determined by using the anterior tuberosity of the tuber ischii as a fixed point and the length of the sacro-tuberous ligament as a radius. This distance is used to establish the site on a line parallel to the midline, anterior to the fixed site (refer to photograph No. 1).

(3) 2 cc procaine hydrochloride is injected subcutaneously at the sites as this makes subsequent manipulations less painful and renders the subject more amenable to handling.

(4) Either hand is then introduced per rectum and the lesser sciatic foramen located. The internal iliac artery can be used as a guide as it enters the foramen and disappears. (Refer to photograph No. 2).

(5) A $4\frac{1}{2}''$ 15 or 16 gauge needle is then inserted through the skin weal and directed towards the middle finger held in the sacro-siatic foramen until the point can be felt lying alongside the nerve which can easily be palpated. 10 cc of 2 per cent procaine hydrochloride is injected at this site.

(6) The needle is then withdrawn about $1\frac{1}{2}$ to $2''$ and redirected caudally and dorsally so that it penetrates the sacro-sciatic ligament at a point about an inch posterior and about an inch dorsal to the first site as is shown on the second photograph. Five cc of a 2 per cent procaine hydrochloride solution is injected at this site. It is sometimes possible to feel the posterior haemorrhoidal nerve running ventro-caudally in which case the needle is directed towards it.

(7) The needle is withdrawn and the sites are then massaged.

(8) At this stage it is advisable for the inexperienced operator to change hands after washing up before proceeding to anaesthetize the other side. When the technique has been carried out a few times it will be found that both sides can be anaesthethized using only one hand rectally for both.

Ovine

The technique is simply to place a finger into the rectum and locate the slit-like lesser sciatic foramen, usually about at finger depth. The corresponding skin site is then cleansed and swabbed with antiseptic after the wool has been opened. It is sufficient to inject 7 ml of a 2 per cent or 5 cc of a 5 per cent procaine hydrochloride solution at the foramen and to massage per rectum. The other side can be completed, keeping the same finger in the rectum.

Complete anaesthesia and relaxation follow within about 5 minutes and is of sufficient degree to allow for any surgical interference including amputation of the penis.

Conclusions

The technique as described is quicker than the classic method and because less anaesthetic is used due to the accuracy, fewer side effects are noted. It is also possible to carry it out with good results in the ovine, with less manipulation. There is also reduced danger of local damage, as manoevering of the needle is limited to an area relatively free from delicate structures

ACKNOWLEDGEMENTS

Thanks are due to the Chief of the Veterinary Research Institute Onderstepoort for permission to publish this monograph.

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VETERINARY PRACTICE IN WESTERN CANADA

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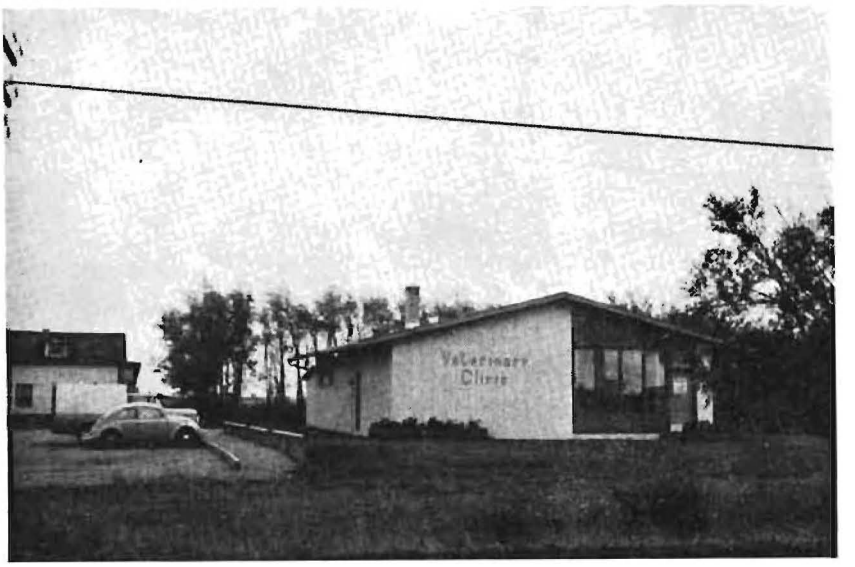
Received for publication August 1962.

Introduction

The practice in question is based on the town of Lloydminster, which is situated on the boundary between the provinces of Alberta and Saskatchewan, in a flourishing mixed farming area of Canada's "west". It has a population of some 5,400 souls and is served by two trans-continental railways. Situated midway between the two large cities of Edmonton and Saskatoon, it is the main supply and shipping centre for a large area.

Canada's "west", includes 95% of the country's total acreage planted to wheat (22,800,000 acres), 75% of the total acreage planted to feeding grains (22,400,000 acres), and produces 82% of its beef in the form of approximately 2,300,000 slaughter cattle per year.

The "west" was surveyed in square miles or "sections", with east-west roads one mile apart and north-south roads two miles apart. The farms are all rectangular in shape and average about 1½ "sections" or 970 acres. The average gross income is 7,000 to 8,000 dollars or R4,700 to R5,400 (at 1.48 dollars per Rand). The annual precipitation amounts to about 14 inches of which at least 10 inches fall during the summer months. from April to September.



The Practice

The practice under discussion is staffed by three veterinarians and serves an area of some 3,390 square miles, including 7 municipalities. Most of the calls are into the country up to a distance of about 35 miles from the clinic, but visits up to 60 miles away are not infrequent.

The area served has a livestock population of approximately 100,000 head of cattle, 3,500 horses, an equal number of sheep and about 25,000 pigs. Their value on the Lloydminster auction market, averages about R108 for a "range" beef cow; R150 to R160 for a "blue (supergrade) beefsteer; R200, for a 5 gallon Holstein cow; R145 for a good "cutting" (stock) horse; and from R20 to R30 for a 190 lbs. liveweight pig.

The centre of the practice is a recently built clinic which cost R17,000. It comprises a large-animal hall (24 x 24 feet), with a large roll-back door which allows trucks, with sides, to be driven right into the hall, where the patients are, if at all possible, treated without off-loading. The hall also has two steel "combination pens" which can be erected when large animal patients have to be hospitalised. A large waiting room covering 220 square feet is combined with a dispensing counter of 150 square feet. The clinic also includes an office, a small animal surgery, a kennel room, run room, store room and a basement "flat" for the house veterinarian.

Overhead expenses are extremely high because of very expensive labour. Most of the chores are therefore done by the practitioners themselves. The stocks of biologicals, antibiotics etc., carried, vary in value from R2,400 to R4,800 during the year.

Of the working time, approximately 50% is occupaied by clls into the country, another 40% is spent in giving professional advice over the counter and over the phone, and in dispensing drugs. The remaining 20% is taken up by "regulatory" work, that is, by government subsidised brucellosis vaccination, blood testing, and tuberculin testing. By estimation, the nett profit of the practice is derived from the above activities, approximately in the following proportions;

(i) from calls, about 10%,
(ii) from cases treated in the clinic, about 25%,
(iii) from regulatory work, about 25%, and
(iv) from the sale of drugs, about 40%.

Of all the cases treated, about 75% are cattle, 12% small animals, 10% pigs and horses and sheep make up the balance of about 3%.

The Cattle Practice

Because of the fixed breeding season, the cattle practice is mainly seasonal. After the spring calving season from February to May, the cattle go out to pasture for the summer. The bulls are put into the herds, usually about the middle of June and remain there until the cattle are brought home in the fall. This date depends upon the first frost, the snow and the available pasture. It may be as early as September the 15th, or as late as mid-December.

During the winter the pregnant cows are sheltered, and fed at the homestead on straw, hay and "chop" (course grains such as oats, barley and wheat), the amount depending upon the severity of the winter, the condition of the cattle and on the pocket of the farmer. Most farmers keep a family milkcow on the homestead and a small number milk from 5 to 15 cows the year round, shipping the cream and feeding the skim to pigs.

Parturient Conditions.

During the late winter and spring practically the entire practice consists of calving cases and calf conditions. During the 1962 season so far, 340 calving cases have been dealt with; 210 on calls in the country and the rest on cows brought to the clinic on lorries from as far as 50 miles away. In the majority of these cases too, the calves have been delivered alive, without off-loading the cows. During the rest of the year another 30 calving cases may be expected.

Apart from direct obstetrical cases, the following types of gynaecological conditions are met with:

Prolapsed vaginas.

Mostly preparturient, but a number have to be corrected after calving. Of the approximately 250 cases this season, 30% were attended to on country calls and the rest in the clinic. Another 50 cases may be expected during the year. No specific cause can be suggested for this large number of prolapsed vaginas, mostly encountered in Hereford cattle. There appears to be a genetic predisposition.

Prolapsed uteri.

Some 60 cases have been dealt with so far this year and a possible further 15 cases can be expected. About 85% are dealt with in the clinic.

Retained placentas.—

In terms of afterbirths actually removed, the practice deals with only about 35 cases per year, mostly on calls, but calculated on the number of pessaries sold over the counter, the number of cases amounts to about 1,000. Farmers are advised to commence using pessaries 24 hours after "freshening" (parturition) and to continue until the placenta comes away.

"*Downers*".

Notwithstanding the large number of parturition cases attended to by the practitioners, many difficult births are dealt with by the farmers themselves. This often results in socalled "downers", probably because of unnecessary traction and the indiscriminate use of foetal extractors (obtainbale from the local drugstore). Heifers and cows in poor condition are especially prone to go down and remain down for as long as 4 to 6 weeks. As long as they "stay bright and keep eating", the chances of recovery are good. Except in a few individual cases, the use of slings is not advised; the Bradshaw hoist being preferred. Advice is given annually on about 70 "downers" and some 15 are attended to by the practice.

Calf Conditions

Calf diarrhoea.

Estimated from the amount of preparations sold for diarrhoea treatments, about 1,250 cases are dealt with per year. Five to ten herds will be inspected and treated, and of the approximately 200 calves brought to the clinic each year, roughly 30% suffer from enteritis, often associated with lung conditions.

Calf Diphtheria.

Some 50 cases are treated annually. This year (1962) there has been a marked increase in cases affecting the arch of the cricoid cartilege, causing a pronounced laryngeal stridor. On 12 such cases so far, in addition to treatment with antibiotics, tracheotomy has been performed and all the calves have made uneventful recoveries. A few yearling- and adult cattle have been affected in a similar way.

Navel ill.

Thirty to fifty cases are treated every year.

Other calf conditions.

These include cases of cleft palate, hydrocephalus, atresia cerebellum, atresia ani, cardiac in-sufficiences, dwarfism, anopthalmus, joint ankylosis, chronic luxation of the patella, vitimin A deficiency, etc.

General Conditions

Milk fever and acetonaemia are prevalent throughout the year. Some 100 cases of the former and 70 of the latter are dealt with annually. All the milk fever cases are treated on the farms, but about 50% of the acetonaemia patients are brought to the clinic.

Footrot.—With minor fluctuations during the rainy and thawing periods, the clinic deals with some 250 cases throughout the year. In most of them advice only is given. Good results are obtained with penicillin and sulphas given parentally and organic iodides (H."Hiamine", — Pitman-Moore) as a mineral additive.

Bloat.—The practice treats about 150 cases per year, of which about 80 are frothy bloat. In addition some 30 to 50 cases of chronic bloat in calves and yearlings are dealt with. On possibly 15 of the latter cases rumenotomy is performed, leaving permanent fistulae; of these animals again about four or five will gain sufficient in weight to make them fit for slaughter.

Urolithiasis.—Up to 50 cases are treated annually, mostly calves and yearling steers. Urethrostomy is performed on about half the cases and another 25% will be slaughtered before the bladder ruptures. It is of interest to mention that bovines often live as long as 7 to 10 days after the bladder has ruptured.

Infectious keratitis—(Moraxella bovis), is very prevalent, especially during the summer when the cattle are out on pasture. The condition often reaches epizootic proportions. Treatment is difficult because it means rounding up the cattle every day. With labour at a premium, only those

cases are treated in which blindness threatens. Vaccines have been tried but with disappointing results.

Poisoning.—During the winter on farms and throughout the year in feedlots, large quantities of straw are fed and this causes sporadic outbreaks of nitrate poisoning. Cases of lead, algae, salt, mercury and hemlock poisoning are also encountered.

Actinobacillosis and actinomycosis.—The practitioners deal with some 15 to 20 cases per year, and drugs will be prescribed and dispensed for about another 20 cases of each condition.

Abscesses in the intermandibular space, and in the parotid and cervical regions, are very common. Some 200 cases are treated each year.

Primary pulmonary emphysema.—Usually in late summer about 25 animals in possibly 25 herds are affected and treated.

THE PIG PRACTICE

Pigs are reared in barns. The population fluctuates according to market prices and is not, as a rule, affected by season. During years of high prices, as many as 200 inguinal hernia- and 60 cryptorchid operations will be performed, while during years of low prices these operations will drop to about 75 and 25 respectively. Castrations on full grown boars vary from 12 to 30 yearly and some 25 farrowing cases are dealt with annually. All the above cases except the farrowings, are treated in the clinic.

Some 400 sucking- or weaner pigs are annually brought to the clinic for treatment or for autopsy. In order of prevalence, the conditions from which they suffer are: excessive fibre in the diet (as a rule oat hulls), gut

oedema, pneumonias. erisypelas, non-specific enteritis, iron deficiency, helminth infestation and chronic enteritis. Virus pneumonia and atrophic rhinitis are well known and farmers are advised to depopulate for at least a year. Hypoglycaemia in piglets is encountered quite often. Mastitis is common but agalactia and metritis less so. Posterior paralysis is very prevalent in sows that have just weaned their litters and lately the condition has also been seen in a few "feeders" of 100 to 130 lb. liveweight. These cases seem to respond fairly well to supplementation with vitamin D.

Glassers disease (fibrinous poli-serositis and arthritis) and peribronchitis are occasionally diagnosed in young pigs, and a few cases of suspected clostridiosis and mulberry-heart disease have been encountered.

Dog and Cat Practice

Canine and feline distemper are particularly prevalent during the summer months. "*Globulan*", (Pitman-Moore), gives excellent results in cases of canine distemper. One gets the impression that nervous complications are less frequent in Canada than in South Africa, and also less severe. Many dogs are brought to the clinic for the removal of porcupin-quills under anaesthesia. For the rest the small -animal practice is no different to such a practice anywhere else.

The Practice during the Summer Months

In the practice under discussion the slack summer months are tl.e vacation time. Only one practitioner is on duty at a time and he can cope with all the work. The two South African graduates in the practice make good use of their leave to see as much as possible of Canada and the States.

In neighbouring practices this slack period is used to do additional "regulatory" work under the Federal "brucellosis control programme"; to check on the prevalence of the disease in controlled areas. Where enforced vaccination has been systematically carried out for 6 to 7 years, only about 0.5% reactors are usually found. This testing work is done almost entirely by private practitioners under the supervision of the Federal veterinarian for the area concerned. The remuneration of 30 dollars or R20.00 per day is paid by the Federal government. The practitioner is allowed one technical assistant who must be trained by him, and approved by the Federal veterinarian. The collected blood-samples are sent to special Federal laboratories.

THE PRACTICE DURING THE FALL

In the "fall", that is, towards the end of September or the beginning of October, the farmers have finished harvesting, haying and "putting up" their green feed. They will then round up their cattle and see to the necessary castrations, dehorning and vaccination. Some of this work is done by the practice, but the bulk is still done by the farmers themselves. The practice may examine a few herds for pregnancy, but due to the very high fertility, a 100% calf-crop is nothing unusual. It is only in dairy herds and in beef herds where vibriosis is suspected, that the veterinarian is called in.

After rounding up the cattle, the steers are put into the feedlot or sent to the local stockyards for auctioning and shipment to the different centres for fattening. In anticipation of shipping fever an the associated secondary infections, a tremendous volume of drugs is sold over the dispensing counter. During the last year about 10,500 doses of "*Triplogen*" vaccine (Pitman-Moore) which includes *Cl. chauvoei*, *Cl. oedematiens*, and *Past. haemorrhagica* and about 5,000 doses of "*Derapen*" (Ayerst and McKenna), which contains prophylactic long acting penicillin, were sold.

The movement of store cattle has hardly ceased, when the first cases of "grain overload" are reported and these cases will continue to occur in sporadic bursts for the next five months. The majority of fattening cattle are placed on self-feed hoppers called "chopbins" and on hay racks; often right from the start.

Drugs for as many as 1,000 cases of grain overload are annually sold by the practice. They consist of

(*a*) 12 ounces of "*Emblo powder*", (Haver-Lockhart), containing magnesium hydroxide, dibasic sodium phosphate, magnesium citrate and silicone:

One to 1½ ounces of "Terramycin" (Pfizer), i.e. oxy-tetracycline mixed with one quart of water is given as a drench.

(*b*) "*Pyrahistine*" (Pitman-Moore). An anti-histamine compound.

(*c*) "*Parcal*" (Pitman-Moore), i.e. calcium borogluconate, given parenterally in cases that show rapid intoxication and depression. Water is withheld for at least 48 hours and thereafter the intake is controlled.

With the onset of the cold weather the number of non-specific infections increase, and in particular, pneumonias, which seem to flare up with changes in the weahter, rather than with very low temperatures. Cases of frozen limbs, tails and ears usually occur in new-born calves that get wet, and also in old and ailing animals due to insufficient exercise and poor circulation. Milk cows and nursing cows often get the teat extremities frozen. It is impossible to save the teat tips where necrosis has set in and treatment is directed at limiting the spread of any secondary infection.

The practice during the winter

During November and December, possibly also during January, depending upon the temperature and the snowfall, at least two of the practitioners are fully occupied with the vaccination of all the heifers in the seven municipal areas comprising the practice, as part of the provincial "brucellosis vaccination programme", subsidised by the Federal government.

On the average each veterinarian injects some 135 heifers on 17 different farms each day, and "heaven forbid" if no "chutes" are available and all the animals have to be "roped". The practitioner is accompanied by a local farmer who acts as organiser and notifies owners of the time and place where vaccination will be done; he also assists in catching and handling the calves. Roping is still generally practised. One cowhand roped 70 out of 85 calves and missed only 5 times.

It is not unusual for vaccination to be carried out in the open, under conditions of minus 45 degrees Fahrenheit, two to three feet of snow, with a wind of 10 to 15 m.p.h., and with the sun shining brightly.

The vaccination campaign is handled solely by veterinarians. They do the injections, eartag the heifers and write out (in quintuplicate) the certificates supplied by the authoritories. Remuneration comes partly from the farmer, a fee paid at the time of the vaccination, and partly from the government, on submission of the completed certificates. The eartags too, are supplied by the government.

This "brucellosis vaccination programme", has been the start of many of the present practices in the Alberta province.

The steers in the farm feedlots and fattening yards are finished off towards the end of December and large numbers are exported to the United States during the following months in batches of 40, 80 or 120 head. They are all T.B. — and C.A. tested, vaccinated against Bang's disease, and inspected clinically. This "regulatory" work too is done entirely by private veterinarians but the export certificates have to be countersigned by the local Federal veterinarian. In the southern part of the province where there is a greater concentration of feedlots and fattening yards, this work continues throughout the year. The practice under discussion handles some 3,000 export steers per year.

Practice "over the Counter" and the Sale of Drugs

The practice answers queries and gives advice over the counter on nutrition and deficiency diseases in some 2,500 cases annually. Mineral, vitamin and calf supplements are sold. These include stabilised vitamin A (for about 25,000 head), cobalt, phosphates and organic iodides for mixing in salt licks, and "calf starter tablets", containing vitamins A and D, low levels of neomycin and streptomycin, and traces of selenium.

Other matters discussed over the counter and over the telephone are breeding, fertility and infertility, calf rearing, mastitis control, vaccination and vaccines, lice and grub (warble) control, hormone implants, secondary infections, traumatic injuries etc. A limited range of disinfectants, insecticides and topical dressings and ointments are kept on hand.

A very important service rendered by "counter conversation" and even the phone, is to suggest diagnosis and direct treatment of cases on farms outside the economic range of the practice. Free advice is also given to farmers within the economic range of the practice, who are of the "do it yourself" type. This is on the principle that if he is set on treating the case himself, he may as well be told how to do so and not make recovery impossible if and when the case becomes really serious and he finally does call in the veterinarian.

This attitude not only fosters a harmonious relationship between the practitioner and the farmer, but it also keeps the former *au fait* with what is happening, from a veterinary point of view in his area. It also stimulates the sales of vaccines, drugs, injectable vitamins, and to a lesser extent of potentially harmful drugs such as hormones, stimulants, sedatives and traquillisers.

Emasculators, dehorners, automatic- and ordinary metal syringes, implant guns, balling guns etc., are loaned free of charge to farmers by the practice and disposable plastic gloves for removing retained placentas, milk testing equipment and disposable syringes are supplied at low cost. Milk sample-bottles and vibrio tampons are supplied free on request.

This liberal approach to free veterinary advice is dependent on a correct and co-operative relationship between ethical drug firms and practising veterinarians. Such ethical firms sell only to the recognised professions. Their travellers keep the practitioners in touch with improved and new drugs and medicines, with research and new techniques, and advise them with regard to correct business methods.

From their contact with the profession, the travellers report back to their firms and research departments, the needs of the profession, that is, of the farmers. In its entirety, this overall approach constitutes an important and highly commendable integral part of the livestock industry.

Diagnostic Laboratories

The provincial authorities of Alberta and Saskatchewan each operate a veterinary diagnostic laboratory. The Alberta laboratory in Edmonton, serves 106 general practitioners and has a professional staff of 5 pathologists and 3 bacteriologists. Reports on specimens submitted for diagnosis or confirmation are dispatched, as a rule, not later than 10 days after receipt. In areas served by veterinarians, farmers who wish to have specimens examined, forward them to the laboratory through the local practitioner.

The practice under discussion operates in both Alberta and Saskatchewan and annually sends in for diagnosis or confirmation, some 300 specimens to the two laboratories and some 500 blood samples for C.A. agglutination tests; the latter over and above those collected as part of "regulatory" programmes.

Working in close co-operation with the Edmonton Laboratory staff, are three provincial veterinarians who deal with cases of suspected outbreaks of epizootics in areas not served by private practitioners. They keep the nearest practitioners informed of such outbreaks, and together with the staff of the laboratory, circularise all the practitioners in the province with regard to outbreaks of notifiable diseases, provincial veterinary regulations, and developments in provincial veterinary policy.

Because of the facilities for tests available through the diagnostic laboratories and because of the "regulatory" programmes against brucellosis and tuberculosis, the authorities have been able to introduce veterinary certificates and also a compulsory veterinary inspection, at all livestock sales and auction markets. Such sales and auctions take place under the supervision of the local veterinary practitioner, who is paid by the Provincial authorities out of funds made available by the Federal government.

Government Support to Private Practice

The financial vote for veterinary services in the province of Alberta for 1962, amounted to 586,000 dollars or R391,000. Of this sum, it is

estimated that the following amounts were paid to veterinary practitioners:

R120,000 for brucellosis calfhood vaccinations;
R80,000 for inspection of livestock sales and auctions; and
R335 for herd inspection under the swine health programme.

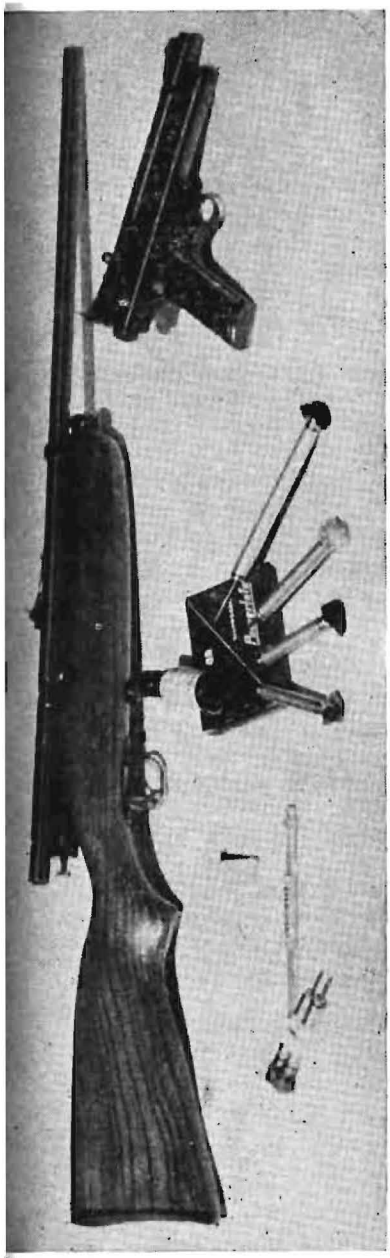
Conclusions

The most noticeable and impressive aspects of veterinary practice in Canada are:—

1. The tremendous encouragement of Provincial and Federal authorities, and their financial support, to private practitioners.
2. The close and healthy co-operation between ethical drug firms and veterinary practitioners.
3. The important role of the veterinarian in "canalising" vaccines, antibiotics and drugs to the farmers.
4. The wide field of advice given by practitioners to their clients. The private practitioner is the "animal consultant" to the area he serves in contra-distinction to an "animal doctor".
5. The relatively limited number of infectious diseases.
6. The large number of obstetrical cases.
7. The volume and variety of clinical cases.

ACKNOWLEDGEMENTS

Thanks go to Dr. G. K. Weir and Dr. J. W. E. Adams of the practice for their assistance and advice.



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OBSTETRICS IN A GENERAL PRACTICE IN WESTERN CANADA

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INTRODUCTION

Western Canada is primarily a grain producing area. It includes 95 per cent (22.8 million acres) of the country's total acreage planted to wheat, and 75 per cent (22.4 million acres) of its total acreage sown to feeding grains.

Farmers may plant as many acres to grain as they wish, but each year the Government sets a quota for the number of bushels per acre of wheat and feeding grains, which may be sold off the farm, through the strictly controlled marketing channels.

Since this quota system was introduced, after the First World War, livestock, and in particular beef cattle, have become an essential factor in farming practice, to utilise the surplus grains. Today, Western Canada produces 82 per cent of the Canadian beef in the form of 2.3 million slaughter cattle per year.

THE 1962 CALVING SEASON

From the middle of December, 1961, to the end of June, 1962, the three veterinarians in the practice, dealt with 345 bovine dystocias; 212 on farms and the other 133 cases in the clinic of the practice. Table 1, gives the breed distribution of these cases.

TABLE I
The cases of dystocia, classified according to breed

Breed	Number of dystocias	Percentage of total	Approximate Percentage of the breed to total bovine population
1. Hereford	274	79.0	±90
2. Hereford crosses	16	4.5	—
3. Shorthorns	27	7.7	± 5
4. Aberdeen Angus	14	4.1	± 2
5. Holstein Friesian	11	3.3	± 2
6. Ayrshires, Jerseys etc.	3	0.9	± 1

No less than 282 or 81 per cent of the cases were heifers, and of the 105 caeserian sections performed, 98 or 93 per cent were on heifers, many of which were not more than 16 months old and weighed approximately 600 to 650 lb.

Beef heifers, and particularly Hereford heifers in Western Canada, are sexually very precocious. Some will take the bull and conceive at as early an age as four months. Fencing in general is poor, so that it is difficult to keep bulls away from heifers on heat. During the summer months, when many farmers turn their cattle on to the communal grazing, the calves accompany the cows. Early spring heifers will start bulling in the fall, and will conceive before they are weaned.

Most of the bulls used are Herefords. They are usually heavy boned. They tend to produce calves which are very wide through the head and between the shoulders. In addition, during the latter and most severe part of the winter, which coincides with the last three months of pregnancy, the cattle are fed a great deal of grain, which results in optimum foetal development in relation to the size of the dam.

Description and Discussion of the Ceasarean Section Operation

Whenever the case history suggested the necessity of a Caesarian section, the owner was advised to bring the animal to the clinic. This happened in 86 of the 105 cases. At the clinic, by preference, the lorry was driven into the large clinical hall and the operation performed on the lorry.

In all, 84 live calves were delivered and another 8 could have been saved if the owners had asked for veterinary advice sooner.

Beef cows are worth on the average from R100 to R110, and three-day old beef calves from R25 to R30. At the clinic, R17.50 was charged for the operation, and on farms a minimum of R30. After-treatment, on the average, cost R3.50 to R5.00.

Indications for operation

Maternal

The age and the overall size and weight of the heifer is not a reliable indication. The internal size of the pelvis in relation to the dimensions of the foetus is of prime importance, as is also the internal shape of the pelvis. Per-vagina delivery is very difficult and Caesarian section is advisable, in cases where—

(1) the ilia are pinched in the region of the psoas tubercles, resulting in a figure of eight shape of the anterior inlet to the pelvis, with the lower half usually smaller than the upper half, and not large enough to accommodate both the fore limbs;

(2) the pubic tuberosities are very prominent; and

(3) the pinbones are very close together.

Foetal

Anterior presentation. — If the head and fore limbs cannot be completely introduced into the pelvic canal, and if, on palpation of the joints and the bony prominences of the head, the calf is found to be coarse boned, Caesarean section is preferred.

Posterior presentation. — If the foetal hindquarters are too large in relation to the anterior pelvic aperture of the dam, Caesarean section is preferred.

Table II, gives an analysis of the main causes of dystocia, and reasons for performing the Caesarian operation.

TABLE II

Causes of dystocias in heifers, which necessitated Caesarean Section

Cause of dystocia	Obstetrician			Total	Percentage
	A	B	C		
1. Excessive size of calf	34	30	13	77	66
2. Unusually small maternal pelvis	4	2	11	17	15
3. Combination of the above two..	10	2	10	22	19
	48	34	34	116	100

Note: The three obstetricians of course varied in their interpretation of too big a calf and too small a maternal pelvis.

RESTRAINT

The animal is cast, using a simple belly-hitch, and the free end of the rope is then passed once round the hocks and either held or tied. The animal is cast in the sternal or right lateral recumbant position. The head is tied about six inches above the ground level, and an assistant (usually the owner) assigned to sit on the patient's withers.

PRE-SURGICAL PREPARATION

The operation site is approximately 2 feet deep and 1 foot wide. It is clipped, thoroughly cleansed and de-fatted with an aromatic chlorine soap ("Sapolube"), and finally dressed with a poly-alkaline-glycol iodine compound ("Welladol").

ANAESTHETIC

Epidurally. — 20 m.ls of a 2.5 per cent procaine hydrochloride solution, using a one inch long 16 or 18 gauge needle, *plus*

Local infiltration — 80 to 100 m.ls of a 2.5 per cent procaine hydrochloride solution, 3 to 4 inches anterior and dorsal to the line of incision, using an 18 gauge, two inch long needle.

OPERATION

A vertical incision of approximately 10 to 12 inches long is made in the left flank and enlarged only if found too small to deliver the calf. By grasping an intra-uterine limb, preferably a hind limb, and applying traction, the uterus is streched sufficiently to indicate a line of incision, which will avoid cotyledons and prevent excessive haemorrhage. It is not always easy to find an intra-uterine limb, and a 75 degree rotation of the uterus is sometimes necessary. This may cause a tear in the serosa, but this appears to be of little consequence.

It is convenient to have an assistant (usually the owner), to pull the foetus out of the uterus with the aid of an obstetrical chain looped around the exposed limbs, thus leaving the operator free to cope with the uterus, which tends to adhere to the foetus.

Unless there is evidence of macroscopic uterine infection or of putrifaction, little concern is felt for the entry of uterine fluids into the peritoneal cavity.

After the calf has been removed, four uterine pessaries (containing sulphanilamide, sulphathiazole and urea) are inserted into the uterus, which is closed by one layer of continuous Lembert sutures. The peritoneum and muscle layers are closed by means of a continuous suture, supported by two large mattress sutures.

Tetracycline powder ("Polyotic"), is liberally dusted onto the exposed muscle and fascia, and the hide wound is closed with one layer of continuous sturues to within two inches of the ventral commissure, which is closed with a separate continuous suture, because of possible suppuration.

The average time for the operation, from start to finish, is 35 to 40 minutes.

No evidence of uterine or muscle layer breakdowns have been encountered, and in the approximately 8 per cent of cases, which developed suppuration, no real deleterious effects resulted.

Post Operative Treatment

Two uterine pessaries per day, until the placenta has been discharged, and 15 m.ls pen/strep, (200,000 I.U. penicillin and 25 mg/ml streptomycin) intramuscularly, per day, for 5 days are administered.

Where patients in the clinic, were operated, not on the lorries that brought them, but on the floor, they were all able to walk up the ramp and back into the lorries, without any difficulty.

Discussion

From the experience gained, Caesarians appear to be preferable to protracted foetotomies, except—

(i) in cases of grossly infected uteri. Even under such circumstances a few Caesareans have been performed with good results;

(ii) where, in an anterior presentation, the hips of the calf have been "locked" in the dam's pelvic canal. Repulsion is usually impossible and pelvic foetotomy is easily accomplished; and

(iii) where, also in an anterior presentation, the head and one limb have already traversed the pelvic canal, but the other front limb is flexed and has not entered the canal. In most cases the exposed parts have become so oedematous, that repulsion is impossible. Amputation of the head allows of easy correction of the position of the flexed limb.

Because of the success obtained with Caesarean sections, the operation is usually performed in borderline cases, where the lives of the calf and dam can be endangered by a per-vagina removal, and where, in heifers with small pelvic dimensions, birth per vagina would result in extensive bruizing and possible tearing of the soft pelvic tissues.

With regard to the latter cases, a common syndrome encountered, where too large a calf has been forcibly extracted, (the chief danger of foetal extractors in the hands of inexperienced laymen), is die "downer cow". This syndrome is attributed to over expansion of the bony pelvis and/or obturator paralysis. The prognosis in such cases is good, as long as inappetance does not set in. Approximately 70 per cent of the cases recover in periods from four days to five weeks and even longer.

Analysis of the 345 cases of Dystocia dealt with

Table III, gives particulars of the 345 cases of dystockia.

Two of the post-partum deaths occurred shortly after the cows left the clinic; they were due to excessive haemorrhage from uteri torn before admission.

Of the two cows on which uterotomy was performed during euthanasia (with chloral hydrate and magnesium sulphate), one was about 15 years old and had been recumbant for some time with generalised arthritis. The other was very emaciated, had been off its feed for several days, and was in a state of extreme dehydration.

Two heifers died from infection of the vagina, lacerated during delivery by traction. Neither had discharged the placenta. Caesarian sections could probably have saved them.

In three cases, in which there were extensive tears of 6 inches and more in the uterus at its dorsal attachments to the pelvic aperture, the heifers made uneventful recoveries, although the tears were left unsutured. It is near impossible to suture such wounds because of their inaccessibility. It is suggested that their successful healing was primarily due to early discharge of the placenta and rapid involution of the uterus.

Complete foetotomy consists of removing the front limbs by skinning them to the distal end of the humerus and applying chain and traction. Next the foetal body is sawn through at the last lumbar vertebra and the pelvis is then devided, either with a Thygessens embryotome or with a jointed handle foetatome.

In cases where only the front legs have to be removed, the foetus is extracted by means of a head chain connected to the foetal extractor.

The "Frank's" type of foetal extractor (see sketch 1), was used in all 121 cases mentioned in table III. These included in particular—

(i) cases in which there was little space to spare between the foetus and the maternal pelvis, and in which manual traction (2 men), had failed;

(ii) cases of "locked hips", in which the calf is pulled taut, parallel and directly posterior to the cow, and then the necessary pelvic flextion of the foetus is induced, by swinging the traction bar (and foetal fore limbs) snappily in a semicircle, down towards the cow's hocks; and

TABLE III

Analysis of bovine dystocias

Classification	No. of cases	%	Obstetrician A	B	C
Total number of dystocias	345	100	111	120	114
Attended on farms	212	65	50	77	85
Attended in clinic	133	35	61	43	29
Dystokias in multiparous cows	63	18.3	13	26	24
Dystokias in heifers	282	81.7	98	94	90
Calves delivered alive	201	59	80	67	54
Cases in which calf was dead when presented	131	38	29	47	55
Cases in which calf died in course of delivery	13	4	2	6	5
Post-partum maternal deaths	21	6	4	13	4
Euthanasia of dam — calf not delivered	4	1	1	3	—
Euthanasia of dam — calf delivered by uterotomy	2	—	1	1	—
Caesareans	105	30	52	30	23
On multiparous cows	7	2	2	4	1
On heifers	98	28.5	50	26	22
Live claves	84	24.5	43	24	17
Dead calves (could have been saved, if help called in sooner)	8	2	3	3	2
Torn uteri	12	3.5	3	3	6
Emphasematous dystocias	20	6	8	4	8
Removed by complete foetotomy	5	1.5	2	2	1
Front limb amputation and removed with foetal extractions	5	1.5	3	—	2
Cases in which foetal extractor was employed	121	35	29	57	37
Cases of "locked hips", corrected by foetotomy of lumbar vertebrae and pelvis	19	5.5	7	9	3
Amputation of head, because of retroflection of fore-limb	7	2	2	1	4
Presentations:					
Anterior	227	66	64	78	85
Posterior	54	16	9	23	21
Retroflection of head	33	9.5	7	9	17
Flection of forelimb(s)	20	6	4	7	9
Torsions	5	1.5	4	1	—
Twins	8	2	1	3	4
Triplets	1	—	—	—	1
Undilated services	6	2	—	2	4
Anomalies:					
Schistosomia reflexa	1				
Achondroplasia ("bulldog" calf)	3				
Congenital goitre	1				
General anclylosis	1				
Anchylosis of hind-limbs and lumbar verbrae absent	2				
Episiotomies	2				
Cerviotomies	2				

(iii) extractions of emphysematous foetuses and severed limbs. In cases of emphysema, liberal amounts of "Lubrivet" (Pitman-Moore), is used and found useful to keep the uterus and vagina from becoming dry.

When exposed swollen foetal heads have to be amputated, in cases of retroflextion of the fore limb(s), good care must be taken to incise the hide well in front of the cervical vertebrae to be exposed, because on retropulsion and subsequent traction, it is important to have them covered, to prevent injury to the pelvic wall.

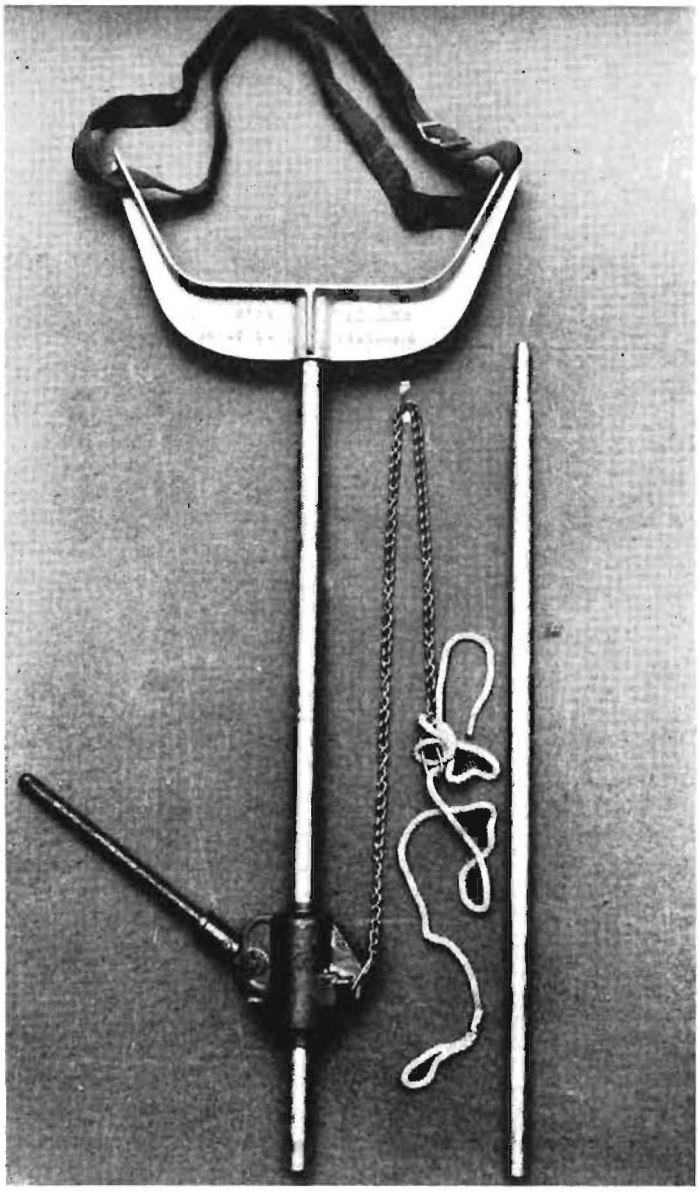

FIG. 1—Frank's typee of foetal extractor.

In most cases obstretical chains are used; the exception is in calves with soft cartilagenous bones and joints. This is usually discovered after the first traction with chains, which are then replaced with sash-cord.

Deviations of the head are never corrected with eye-hooks; a head-chain, like an applied Benesch snare, is as good and much safer. The usual fractured mandibles were encountered where lay-men tried to loop chains or ropes around the lower jaws.

A high percentage of prolapsed uteri seem to follow deliveries of calves in the posterior presentation. In one case, the obstretician was drying the calf delivered from such a presentation, when its dam obliged by expelling her complete uterus with a couple of well timed strains.

Of the 63 dystocias in multiparous cows, 19 were posterior presentations and only one was not a breech presentation. While in adult cows posterior presentations are common and may be the most frequent single cause of dystocia, it is not common in heifers.

Depending on whether they are partial or complete, and on whether a hand can be introduced through the cervix or not, torsions are corrected—

(i) with a headchain;

(ii) by rolling the animal, and if these two methods fail;

(iii) by Caesarean section.

Undilated services, are treated with calcium borogluconate intravenously, together with massage and physical dilatation, usually with satisfactory results.

The one case of shistosomia reflexa and the three cases of achondroplasia, were removed by Caesarean section.

Conclusions

The obstretical side of the practice in question, is of interest because of—

(i) the large number of bovine cases, especially in heifers. It must, however, be mentioned that the practice covers an area in which about 25,000 calves are born unnually;

(ii) the great variety of cases dealt with;

(iii) the large number of Caesarean sections performed and the measure of success obtained; and

(iv) the satisfactory percentage of live calves delivered. In this connection, the role of the owner who calls in veterinary aid in time, cannot be over-emphasized.

Acknowledgement

The authors wish to thank Dr. G. K. Weir, for allowing them to make use of the clinical records of the practice and for his help and advice in writing this article.

THE TREATMENT OF EIGHT SQUARE-LIPPED RHINOCEROS (*CERATOTHERIUM SIMUM*) WITH AN ANTHELMINTIC

J. B. CONDY, J. I. M. MCCULLOCH, J. O. K. RODGER, J. W. THOMSON
Department of Veterinary Services, Federation of Rhodesia and Nyasaland

Received for publication, December, 1962

SUMMARY

The treatment of eight square-lipped rhinoceros (*Ceratotherium simum*) with dimethyl-hydroxy-trichloroethyl phosphonate is described Bots of the genus *Gyrostigma*, and nematodes were passed by mos animals.

INTRODUCTION

There has been considerable activity in Southern Rhodesia during the last two years, in stocking game parks with a wide variety of species. Most of these movements have been from one park to another within the country, to stock new game parks which have hitherto not supported much animal life, and to introducing species to localities where they have become extinct.

Eight square-lipped rhinoceros (*Ceratotherium simum*) were imported from the Umfolosi Game Reserve, Natal, during September 1962, four being released in the Matopos National Park and four in the Kyle Dam Game Reserve. In both these areas the white rhinoceros had occurred in the last century, but from 1880 onwards the decline in their numbers was rapid, and by 1900 only a few stragglers remained[4].

Internal parasitism on a fairly high level in antelope in their natural environment, has been noted to occur at Wankie National Park[1]. Among game introduced from Wankie to Lake McIllwaine and the Matopos Park during the last two years, at least three ostriches, two eland and a giraffe have died of internal parasitism.

Bot fly larvae of the genus *Gyrostigma* commonly occur in white rhinoceros at Umfolosi, and as nematode egg counts on the faeces of the eight animals imported to Rhodesia showed a fairly high level of infestation, it appeared highly desirable to reduce their parasitic burdens to a minimum, in the hope that it might fall below the critical level necessary for their survival in their new environment.

As dipterous fly larvae and nematodes were the main parasites concerned (no evidence of trematodes or cestodes were found) the drug of choice to be used was an organophosphate Neguvon P, containing 75 per cent dimethyl-hydroxytrichlorethyl phosphonate.

METHOD

The eight white rhinoceros were weighed on arrival in Southern Rhodesia, at vehicle inspection depots; the actual weights of the animals being determined by difference.

The Neguvon P. was mixed with maize and meal gruel, and despite the fact that the rhinoceros were deprived of water for forty eight hours previously, they took several hours to consume the gruel, and in some cases not all of the gruel was consumed.

At the Kyle Dam Game Reserve, one rhinoceros, "Nyoni", was test dosed at a rate of 44 mg/lb. Eighteen hours after dosing he was lying on his side, apparently off his food. No antidote was administered, and the next day he appeared to have recovered completely.

In view of the apparent toxicity, the remaining three were dosed at a level of 44 mg/Kg.

All four animals at the Matopos National Park received a dose of 44 mg/lb body weight.

Faecal worn egg counts were carried out once before and twice after treatment, the technique used being that described by Gordon and Whitlock[2]. The results recorded are a mean of three counts made on each specimen. Attempts were made to recover all dead parasites passed in the faeces, but this was difficult due to the habit of the white rhinoceros to disturb its faeces immediately after defaecation.

TABLE I

Pre- and post dosing Nematode Egg Counts

Rhinoceros	Weight Kg	Dose gm	*e.p.g. day before treatment	e.p.g. 5 days post treatment	e.p.g. 14 days post treatment	No. of Bots recovered
Chianne.....	786	68	430	130	130	—
Mabaleni.....	848	72	130	100	Nil	—
Umfaan.....	916	80	1,500	100	32	—
Mashayazonke.	841	72	65	Nil	Nil	—
Nyoni.....	1,002	88	310	100	66	21
Ngazana.....	695	30.5	900	180	133	11
Nqoloti.....	785	34.5	1,430	300	266	10
Babs.....	1,000	44	550	133	66	6
Mean.....			664	130	86	

*e.p.g. = Nematode eggs per gramme.

Dose Rates refer to Neguvon P.

RESULTS

Only one animal out of five, dosed at a rate of 44 mg/lb exhibited transient toxic symptoms. None of the three dosed with the lower dose rate of mg/Kg showed any signs of toxicity.

Bot larvae were first noticed in the faeces forty eight hours following dosing, and were still being passed seven days later. The maximum number recovered from one animal was 21. More might have been passed, and either eaten by birds or disintegrated, when the animal desturbed its faeces.

Pre-and post-dosing nematode egg counts are shown in Table I. The counts of "Umfaan" and "Nqoloti" of 1,500 and 1,450 eggs per gramme (e.p.g.) respectively are very high. The mean egg counts of the eight rhinoceros concerned were reduced from 664 to 86 e.p.g.

Discussion

The method of administration appeared to be satisfactory. In most cases not all of the gruel was consumed, but as the dosage was high and effective results obtained, this did not matter.

From experience on Lake Kariba, black rhinoceros (*Diceros bicornis*) settle down to pen feeding after capture far more quickly than white rhinoceros. The black rhinoceros is very fond of ripe paw paws (*Carica papaya*) and will readily accept a half paw paw containing a dose of Neguvon P. The latter is now routine practice with all rhinoceros caught on the Lake Kariba during "Operation Noah".

The results of the pre-dosing faecal egg counts would appear to indicate that parasitism in white rhinoceros at Umfolosi exists at a relatively high level. This might be expected, due to the high concentration of the species in this area.

ACKNOWLEDGEMENT

The authors are grateful to the staff of the Federal Department of National Parks, and Mr. T. Orford for their assistance in this exercise and to Agro-Chem (Pty) Ltd., for supplies of Neguvon "P".

This paper is published with the permission of the Director of Veterinary Services.

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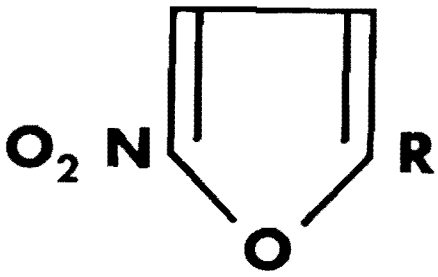

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CASE REPORT

SPIROCHAETOSIS (BORRELIASIS) IN A HORSE

R. W. BRYSON; G. E. WELLS — Department of Veterinary Services
Fort Victoria, South Rhodesia

INTRODUCTION

This case is recorded as of interest in the differential diagnosis of febrile conditions of equines, which in this area often cause some difficulty, especially during the horse sickness season.

The importance of recording temperatures of horses regularly has been emphasised to all owners in this district. It is now standard practice in the stables to do this early in the morning and at dusk.

Literature on equine spirochaetosis is scanty although it is mentioned in Knuth and du Toit (1921)[1], Gaiger and Davies (1938) (2nd Edition)[2], and Hager and Brunner, 1951 (2nd Edition)[3].

The organism, described as *Borrelia theileri* (Laveran, 1903), 20 to 30 u long, was found by Theiler in 1903.

It is said to be of no pathogenic significance and often to be associated with *babesia* infection.

SUBJECT

Thoroughbred Filly, "Soldier Girl", Age 1 year 10½ months.

PREVIOUS HISTORY

Inoculated with Onderstepoort horse sickness vaccine on 24.9.62. Confirmed babesiasis 11.9.62; successfully treated babesan (I.C.I.)

CASE HISTORY

On 16th October, 1962, at 6.30 a.m. temperature was normal at 100°F.

By 4.00 p.m. the temperature had risen to 105.6°F, but the filly was not visibly ill in any way, although interest in food was not displayed.

An hour later, 150 cc of sulphadimidine was given by intravenous injection pending smear examination. The horse showed no sign of illness apart from the rise in temperature.

On examination of smears at the laboratory relatively numerous *borreliae* were observed during the search for *babesiae* which were absent.

A diagnosis of spirochaetosis was made, and treatment with acetylarsan (M. & B.) 10 cc of 23.6 per cent solution subcutaneously was carried out on the 17th October.

The temperature at the time of treatment had now risen to 107.8°F, with the horse looking visibly ill; all interest in food being lost.

The treatment was administered at 11.30 a.m. By 7.30 p.m., the temperature had fallen to 105.6°F. At 6.00 a.m. on the 18th the temperature was down to 101.2°F; at 6.00 p.m. it was normal and has remained so since.

Discussion

Tick borne diseases are common in horses in this area where *Rhipicephalus evertsi* ticks are frequent.

Babesiae are not easily found in equine blood smears, and if other diagnostic symptoms are not present, diagnosis can be unsatisfactory. Especially is this so if other febrile conditions are possible such as strangles, horse sickness, etc., in the early stages.

It is suggested that the administration of arsenical compounds pending smear and other examination might be more profitable than antibiotics or sulphadimidine, as there is a tonic effect with this drug in addition to its effect on *borrelia*.

B. decoloratus and *Rh. evertsi* are known vectors of *B. theileri*.

ACKNOWLEDGEMENT

Permission of the Director of Veterinary Services, Federal Veterinary Department, to publish this article is recorded.

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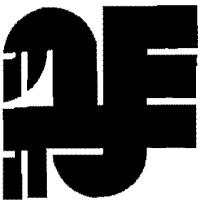

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K. v. d. Walt

Dit is met genoë dat die Trustees bekendmaak dat die eerste skenkings aan die Fakulteitsfonds gedoen is deur S. K. F. Laboratoria (Eiend.) Bpk., Pk. Bus 38, Isando, Transvaal. Hierdie skenking is so ruim dat die Trustees onmiddellik instaat gestel word om die doel van die Fonds soos in die konstitusie neergelê, uit te voer. Graag spreek ons namens die Veterinêre Professie in Suid-Afrika ons hartelike dank uit aan S.K.F. vir die gulhartige bydrae.

VETERINARY FACULTY FUND

The Council of the Pretoria University has sanctioned the creation of a Fund for the promotion of Veterinary Education in the Republic of South Africa.

The money deposited in the Fund will consist of amounts collected by the Veterinary Faculty and whatever other money is received by the University for this purpose. Acceptance of any donations will be at the discretion of the University Council.

The Fund will be controlled by the University Council which body will act as permanent Trustees, and will be administered by them in consultation with an advisory Committee consisting of the Chief (Veterinary Research), the Dean of the Faculty and three members of the Faculty of Veterinary Science, elected by that Faculty.

The University Council on recommendation of the Advisory Committee will at its discretion, utilize the money in the fund for:

(1) defraying expenses for prizes, donations, and grants. Such payments will not be repayable to the University;

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(4) awarding monetary prizes for work done in Veterinary Science in South Africa, to be known as the THEILER MEMORIAL PRIZE;

(5) granting money to any member of the Veterinary Profession in South Africa or a person closely associated with the Profession, provided that the funds are used for travel and/or subsistence overseas, in order to obtain further professional experience;

(6) and for any other purpose which the Council, in consultation with the Committee may decide.

It has been decided that the fund shall not be used for:

(*a*) the provision of loans to any person, institute or organization;

(*b*) the erection of buildings;

(*c*) the provision of equipment, facilities and services normally provided by any well equiped laboratory or institute;

(*d*) defraying administration expenses.

The members of the Advisory Committee are Prof. B. C. Jansen, (Chief of Veterinary Research, Department of Agricultural Technical Services), Prof. R. M. du Toit (Dean of the Veterinary Faculty), Prof. R. A. Alexander (Head of the Department of Infectious Diseases), Prof. H. P. A. de Boom (Head of the Department of Anatomy) and Prof. K. van der Walt (Head of the Department of Medicine).

K. v.d. Walt

The Trustees have pleasure in announcing that S. K. F. Laboratories (Pty) Ltd., P.O. Box 38, Isando, Transvaal made the first donation to the Faculty Fund. The donation is so generous that the Trustees are able to proceed immediately with implementation of the objects as embodied in the constitution. On behalf of the Veterinary Profession in South Africa we would like to thank S.K.F. most sincerely for the handsome contribution.

PRESS RELEASE

From 14*th to* 21*st August*, 1963 — 100 years after the first international veterinary meeting — the

XVIIth WORLD VETERINARY CONGRESS 1963

will be held in Hannover.

As this event celebrates the centenary of Veterinary Congresses, the World Veterinary Association has proclaimed the year 1963 *World Animal Health Year* in support of the F.A.O.'s "Freedom from Hunger" campaign.

Special topics have been selected to commemorate the historical event. The scientific programme, which includes general topics of current interest, colour television demonstrations and a varied programme of sectional meetings (for which more than 500 papers have been submitted), provides a survey of the present position of veterinary science and practice all over the world.

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The Congress fee for ordinary members has been fixed by the Permanent Committee of the World Veterinary Association at 15 $ = 60, — DM. Half this fee will be charged for accompanying persons.

The preliminary programme and "Application for Enrolment" forms will be ready for dispatch in the near future.

Interested persons, other than those who have submitted suggestions for titles of papers, are invited to request the "Application for Enrolment" form on the enclosed reply card or in writing from the

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Welcome to the XVIIth World Veterinary Congress in Hannover.

Signed: Dr. Merkt
Secretary General of the Organizing Committee of the XVIIth World Veterinary Congress

Signed: Dr. Schulz
President of the German Veterinary Association and Chairman of the Organizing Committee of the XVIIth World Veterinary Congress

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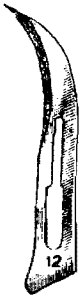

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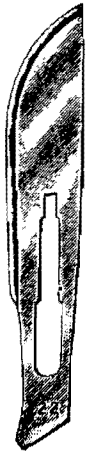

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REPORTS ON BRANCHES

CAPE WESTERN BRANCH ANNUAL GENERAL MEETING

The 13th Annual General Meeting of the Branch was held in the Offices of the Meat Control Board at Maitland Abattoirs on Friday, 30th November, 1962. The meeting was opened by Professor R. Clark, who gave a most interesting address on the future of the veterinary profession. Thirty members attended the meeting.

The following office bearers were elected for 1963:

Chairman: Dr. A. A. L. Albertyn; Vice-Chairman: Dr. C. H. Basson; Secretary: Dr. J. K. Thomson; Committee members: Drs. Müller, Stephan, Dorrington, Masters, Brownlie, Morkel and Horwitz.

After the business session, Professor Clark gave his paper on "Fluid Balance and Shock", which was received with the greatest interest and appreciation by those present. It was unanimously decided that the Branch recommends the publication of this paper in the Journal of the S.A.V.M.A.

After a braaivleis during the lunch hour, the meeting opened for the afternoon session at Electricity House, where a symposium on Rabies was attended by 84 members of the Branch, the staffs of the State Health Services, the Medical Faculty of the University of Cape Town, the Municipal Health Services and the Health Services of the Provincial Administration.

The Symposium was introduced by Dr. Müller. The Onderstepoort film on Rabies was then shown followed by a talk by Dr. R. Belonje on the Field Control of Rabies and the Collection of Specimens. Dr. R. Turner, Senior Government Pathologist, State Health Services then gave a paper on the modern treatment of Rabies. A lively discussion followed during which Dr. M. C. Lambrechts, Chief, Veterinary Field Services answered many questions by members of the various Health Services.

The Onderstepoort film "Inyamazane" on the control of game in the Kruger National Park was shown at the conclusion of the afternoon session.

On the evening preceeding the meeting, a most enjoyable dinner was held at Kelvingrove which was attended by 33 members and guests. Professor Clark was the Guest of Honour, and Dr. Stephan acted as Master of Ceremonies.

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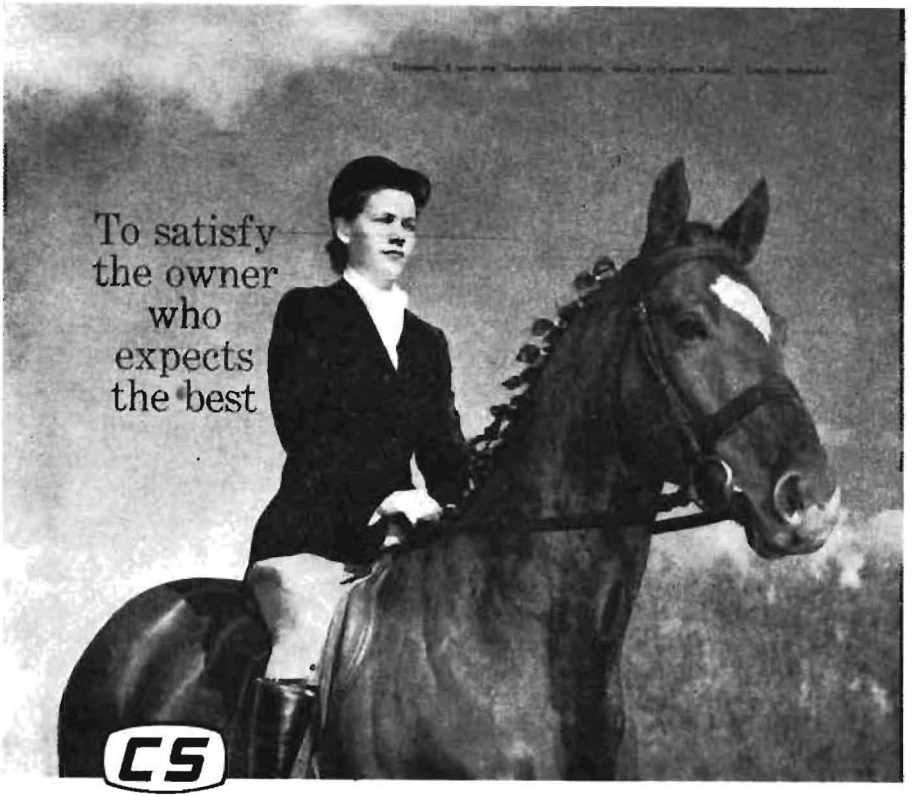

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REPORT OF THE CHAIRMAN

DR. A. A. L. ALBERTYN

A prominent Veterinarian told me recently that in his opinion there was no such thing as a bad Veterinary Surgeon. I am inclined to agree with him for the following reasons:—

They are idealistsis because finance was not their main objective when they chose their profession.

They are also honourable learned and practical men.

They are men who contribute to the welfare of the community more than they receive from the community and this gives them — even if subconsciously, a feeling of well being, independence and a high morale.

In the light of what I have just said, let us examine ourselves and our value to society and last but not least our value to our families and ourselves.

Here one of the first thoughts is that we should not allow ourselves to be exploited by being too unselfish and undemanding. Only by placing a high value on ourselves and on our services, can we command the respect of other people. In addition it is essential that we should have a feeling of security and independence, if we are to play our full and rightful part in the development of our country.

I maintain that we do have a measure, even if not a great deal, of security and independence, for the following reasons:—

(1) We know our job.

(2) No one else can do our job.

(3) Individually we are useful to the community.

(4) As a profession we are indispensible.

(5) There are more than one avenues of employment open to us.

(6) If conditions arise which make a job either unpleasant or unprofitable then we can enter those other avenues of employment within the profession.

Of these avenues of employment there are some which can be classified as being in the nature of sheltered employment. Then there are those veterinarians who are self employed and here I refer specially to the private practitioner. This man has in the past two decades pioneered and opened up avenues of employment which we had not thought of when I was a student. We are grateful to him for his efforts and we owe him our full support, for as long as he prospers — so will the rest of the profession prosper. Anything that undermines him undermines the profession. He is also the most vulnerable and deserves special consideration.

It is due to him to a great extent that the man in the street and the farmer has developed such a high regard for our profession, although I

shall be the first to admit that his is not the only branch of our profession which has enhanced our name.

However, they are and always should be the good ambassadors for our profession with the public.

On the other hand we have the scientists, professional men and administrators, the so called backroom boys, who make a tremendous contribution to the planning, progress and organisation of the country. In the past there has been a tendency for the authorities to under estimate the value of these men, and our country has been the poorer for it.

It is unfortunately true that scientific men in general, for instance engineers, chemists, physicists and not only veterinarians, do not get their due reward especially when their intrinsic value is compared with positions in commerce.

Although we as a profession have never gone on strike, the slow process which took place when veterinarians left the various services and entered the field of private practise and private enterprise, eventually made the situation so serious and so obvious that persuasion from our side brought about some improvement in the remuneration of veterinary officials.

I still do not think that we are being over paid but without the competition offered by private practise and private enterprise for our services our situation would have been worse.

On the other hand those colleagues in the various services are making their contribution to our common good by proving to the country the value of veterinary services. Let us hope that these efforts are appreciated and that they succeed in obtaining adequate remuneration for these services.

We live in an age where finance plays a very important role and where devaluation of money is taking place all the time. We must therefore continuously strive to prevent ourselves from being left behind in this race. Few people admire the poor — they pity them, and we can not do our job while we are being embarrassed by other people's pity.

To sum up then — our progress and efficiency depends to a large extent on mutual support with special consideration for our vulnerable points. This mutual support is best co-ordinated through our own S.A.V.M.A.

LOWVELD VETERINARY CONVENTION

NELSPRUIT — August 11th, 1963

On August 11th, 1962, an all day conference was held at Hall & Sons, Nelspruit, Eastern Transvaal, and which was attended by 21 veterinarians, one member of the medical profession and some visitors. This conference included an inaugural meeting to establish a permanent branch of the South African Veterinary Medical Association. The programme was as follows:—

8.30 a.m. Opening by Dr. Ben Jansen, lecture on the "Veterinary Act".

9.15 a.m.	Man—and the Parasites of Animals", by Dr. Elsdon-Dew.
10.00 a.m.	Tea
10.30 a.m.	Demonstration Oophorectomy by Dr. Peter Davies (Heifer)
12.00 noon	Business meeting and discussion
1.00 p.m.	LUNCH
2.00 p.m.	Professor van der Walt's lecture on "Blood Transfusion"
2.45 p.m.	Films and discussion
4.00 p.m.	Tea
4.45 p.m.	Discussions. closing of conference by Chairman
7.00 p.m.	Dinner at Bushman Rock Hotel

Dr. Jansen opened the meeting and explained its purpose. At this point he drew attention to the fact that Onderstepoort facilities should be made use of by both Private and State Veterinarians, as much as possible, and pointed out that this is one of the reasons for its very existence. He wished the conference well and expressed his delight that a new branch of the S.A.V.M.A. was being formed. Dr. Jansen then asked Dr. Meeser to take the chair with the full agreement of those present.

The Veterinary Act. Dr. Jansen threw much enlightenment on the too little studied, much misunderstood Act. He explained the functions of the Veterinary Board and discussed the clauses of the Veterinary Act amendments and future alterations which will come into force. The ethics in South Africa are very high, he said, and are strictly enforced. He spoke on the type of unethical behaviour which warranted punishment and the sort of punishments meted out by the Veterinary Board when necessary.

Dr. Elsdon-Dew, Director of the Amoebiasis Research Unit, Durban, gave a brilliant address beginning with the simple host-parasite relationship and continuing with lesser known, most interesting life cycles of parasites which affect the veterinary practitioner in the course of his practice. He revealed some amazing facts which touch us very closely not only as veterinarians but as parasite co-inhabitants of this earth. He stressed the importance of co-ordination of the veterinary and medical professions. After tea break, the conference adjourned to another portion to the farm to watch the demonstration, oophorectomy on a heifer by Dr. Davies.

A discussion followed, and especially on the all important factor of whether or not this operation actually did cause a weight increase which would make it an economical venture in the long run. It was suggested that in any case grazing management of de-sexed heifers was very much simplified, quite apart from any weight increases to be hoped for. Dr. Davies is to be congratulated on the expert way in which he carried out his demonstration.

Next on the agenda was the business meeting. It was formally proposed that a branch of the S.A.V.M.A. should be formed, and that this section be known as the *North-Eastern Branch* since veterinarians from the Northern Transvaal were included. This point having been definitely established, a Committee was elected. This would meanwhile take the form of a Sub-committee which could co-opt other members and which would work out a constitution on the lines of other branches of the S.A.V.M.A., the help of Dr. Diesel being sought in this respect.

Drs. Lowe, Davies and Solomon were elected as an ad hoc Committee which would later elect a Chairman. Other points were discussed, such as the location of the next venue, the time of year best suited for such conferences and the duration. Dr. Davies was asked to act as convener of the Sub-committee. As the Annual General Meeting was near at hand it was decided to hold a meeting of members of the newly formed branch at this time, hoping that at least a quorum would be present. If not, the present ad hoc Committee would continue until the next general Annual Congress.

Other discussions took place, ably led and rounded off by the Chairman, Dr. Meeser. It was decided that the question raised, of whether the Government would sponsor the private practitioner, with particular reference to the diagnostic centres to be presently established throughout the country, be deferred until the Annual General Congress in September. It was suggested by Dr. Jansen that a memorandum be drawn up for discussion of this subject.

The conference was then adjourned for lunch.

Professor van der Walt spoke next on Blood Transfusion in practice. He included details of technique, effects of transfusion, selection of donors and storage both of blood and plasma and their different uses. A lively discussion followed. Professor van der Walt gave members of the profession a great deal of useful material, and this in spite of his illness and obvious laryngeal discomfort.

Three films were shown during the last part of the afternoon:

1. Sweating Sickness, Lumpy Skin disease and Foot and Mouth Disease.
2. Heartwater.
3. "Saving your Bacon", on pig management, included interesting shots also of other animals of the pig family, from the elephant to the warthog. This film was shown by kind permission of Smith Kline and French.

Tea was followed by the closing of the conference by Dr. Meeser. The day's proceedings were suitably rounded off by the dinner at Bushman Rock Hotel, and the opinion of those present was that they looked forward already to next year's conference.

Grateful thanks are extended to Messrs. Hall and Sons for their courtesy in allowing the conference to use their Board Room and other facilities. To Dr. Ben Jansen for opening the meeting and for his help

and encouragement in its organisation, and for his lecture. To Dr. Meeser whose able chairmanship helped to make a very successful conference. To the other speakers who made this conference so worth while, Dr. Elsdon-Dew and Professor van der Walt. Last of all, but not by any means least, to the 21 Veterinarians who attended the meeting, many of whom came long distances — five members actually came from Swaziland

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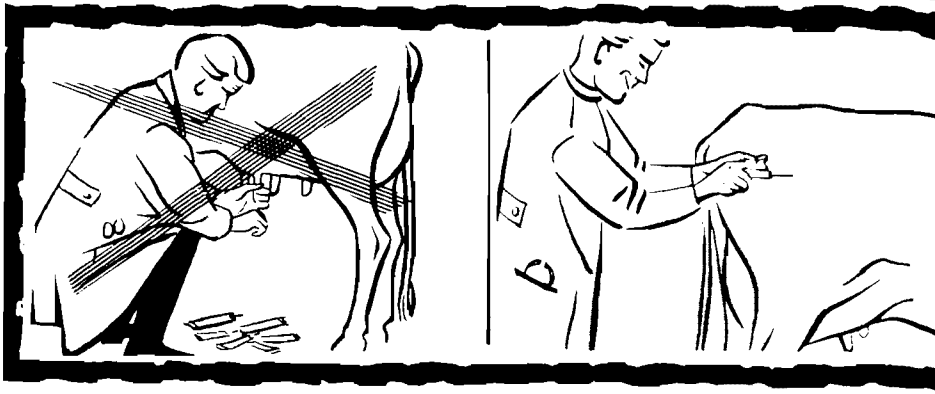

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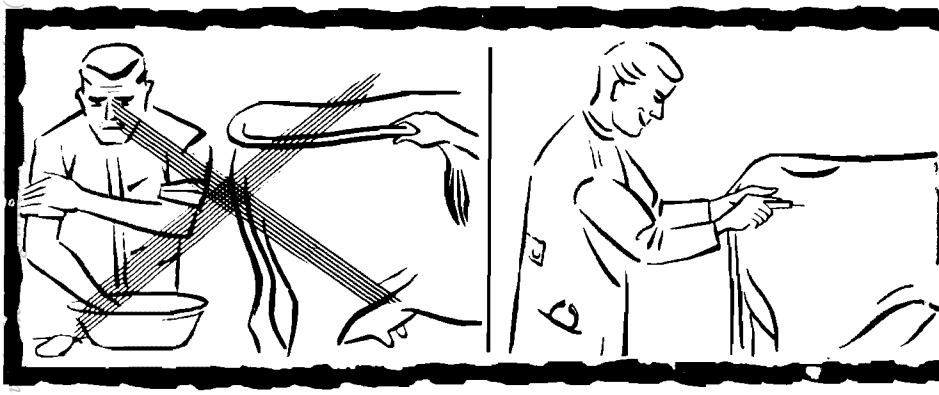

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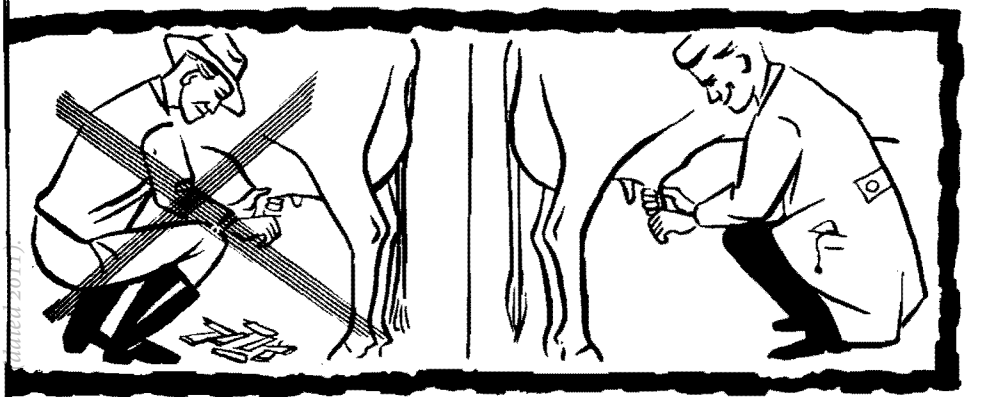

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WELCOME TO THE NEW GRADUATES OF 1962

The Dean of the Faculty of Veterinary Science, Professor R. M. du Toit officiated at the annual function, arranged by the Faculty on November 28th, 1962, to congratulate the new graduates and to award prizes to the successful competitors.

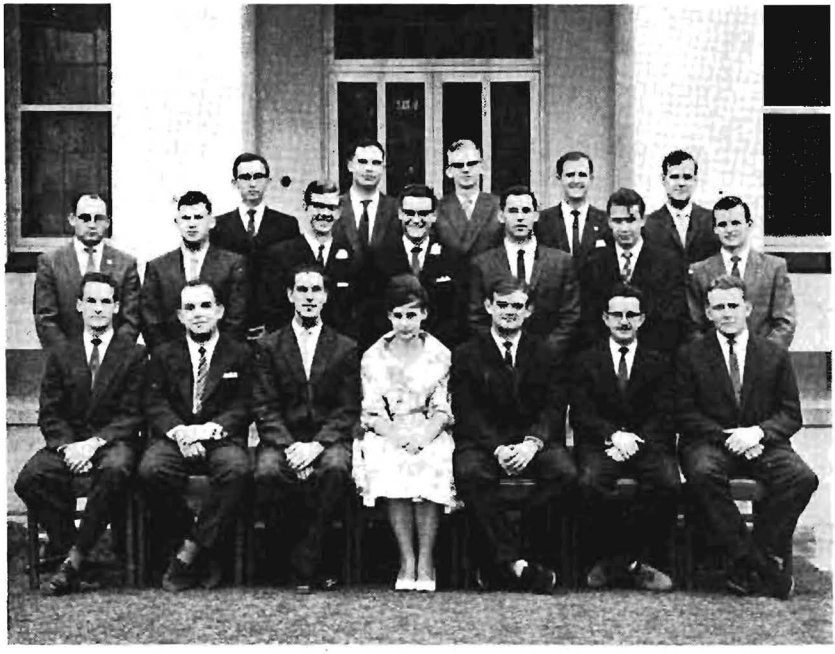
Professor du Toit presented the apologies of the Rector, Professor Rautenbach, who was unable to be present.

He extended a hearty welcome to all and particularly to Dr. H. P. Steyn, the President of the S.A.V.M.A., to Dr. B. C. Jansen, Chief of the Veterinary Research Institute, to Dr. M. C. Lambrechts, Chief of the Veterinary Field Services and to the parents of the new graduates.

The following students had successfully competed in the final year examinations and were now fully qualified veterinarians:

C. G. Cotton; A. S. de Beer; J. Engelbrecht; J. A. Erasmus; A. E. Fair; J. M. P. Fleming; (Miss) G. H. Gerdes; K. W. Katz; J. Krige; H. Kunnen; H. B. Lambrechts; J. C. Morgenthal; C. B. Rippon; J. G. Schürmann; J. J. van der Watt; J. A. van Wyk and C. A. Wilkins.

FINAL YEAR STUDENTS 1962



Front row: H. B. Lambrechts, K. W. Katz, C. G. Cotton, Miss G. H. Gerdes, C. B. Rippon, A. S. de Beer, J. M. P. Fleming
Middel row: R. de la Rey, J. Schürmann, S. G. Anema, J. J. van der Watt, J. Engelbrecht, J. Krige, J. A. van Wyk
Back row: C. A. Wilkins, J. A. Erasmus, H. Kunnen, A. E. Fair, J. C. Morgenthal

The following were the prize winners. (Except in the case of the Agricura Prize and the Pfizer Prize, where the donators could not attend, the awards were made by the organization who had offered them):

1. *The Theiler Medal.* No award.
2. *The Clinical Medal*, donated annually by the Witwatersrand Branch of the S.A.V.M.A. to the most successful candidate in clinical practice in the final examination. Awarded to J. J. van der Watt by Dr. Hempstead, Chairman of the Witwatersrand Branch.
3. *The Two I.C.I. Prizes* of R21.00 each granted by Messrs. I.C.I. (Pharmaceuticals) Ltd. to the best student in:
   (*a*) Surgery and Genesiology; and
   (*b*) Medicine and Infectious Diseases;
   these were presented by Mr. Buys respectively to Mr. J. J. van der Watt and Mr. H. Kunen.
4. *The Maybaker Clinical Prize* granted annually to the student showing the greatest improvement in the clinical subjects, the prize, an instrument case, was presented by Mr. Holmshaw to Mr. J. Engelbrecht.
5. *The Pfizer Prize for Clinical Medicine* 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. It was won by Mr. J. C. Morgenthal.
6. *The Agricura Prize of* R50.00 presented every year by Messrs. Agricura Laboratoria Bpk. of Silverton, Pretoria, to the most industrious student in pathology assessed over the last three years of the Veterinary Course, was awarded equally to Mr. J. A. Erasmus and Mr. J. G. Schürmann.

An Award to the Class Captain. In recognition of the regard in which he was held, and the assistance he gave, the Final Year Students requested Professor du Toit to present to Mr. C. G. Cotton on their behalf an award for his esteemed services.

AFSKEIDSBOODSKAPPE DEUR PROFESSORE J. H. R. BISSCHOP EN K. C. A. SCHULTZ

Die Dekaan, professor R. M. du Toit, stel luisteraars in kennis dat professore Bisschop en Schultz by die end van die jaar aftree en versoek hulle om 'n afskeidsboodskap aan die nuwe Veeartse te rig.

PROFESSOR BISSCHOP meld dat dit nou die 39ste keer in die lewe van die Fakulteit is dat hierdie funksie herhaal word.

Veeartse is vernaamlik opgelei om die dierenywerheid te beskerm en voort te sit. Die wat pas klaar gemaak het, is met 'n basiese kennis van veeartsenykunde gewapen. Deur ervaring moet hierop gebou en uitgebrei word. Diegene wat vir baie jare al die Fakulteit gedien

het, kan terug kyk en die groot vordering in die wetenskap besef. Leer planne word breër, en die owerhede het al begin wonder of die kursusse nie al reeds oorlaai is nie. Hulle het al gevra of, behalwe vir basiese kursusse, gespesialiseerde kennis in die verskillende fakke nie ingekort moet word nie. Die studente wat pas klaar gemaak het word nou aan die professie en aan die dierenywerheid oorhandig. Die Fakulteit vertrou dat die bevordering van die veebedryf nog altyd voortgesit sal word.

That we should take leave of students each year is inevitable. They are commencing their careers and we part from them in a feeling of gladness.

In the name of the Faculty and the University we wish them the very best of luck; happiness in their future homes and in their lives with their fellow townsmen.

In the years to come we trust they will look back on the days which they spent at Onderstepoort with great pride.

The Dean, Professor du Toit then called on Dr. Steyn, the President of the S.A.V.M.A. to address the new graduates.

DR. STEYN wished to disagree with Prof. Bisschop: the function now enjoyed by new graduates was a comparatively recent institution. In his day it was unknown.

The newly qualified veterinarians had now been launched on a new career. New careers during one's lifetime were not unusual — in his lifetime he had been launched on a number of new careers. Having acquired maturity, they become better men.

There are two organizations which play an important part in the lives of the new graduates viz.:—

(*a*) *The Veterinary Board.* This is a disciplinary organization and has no interest in the veterinarian who stays on the straight and narrow path.

(*b*) *The S.A.V.M.A.* and its Council which is a living growing organization. It is there to assist the veterinarian and stand by him as a brotherhood through which he can achieve an interest in a bigger brotherhood — the World Veterinary Association. Nearly every Veterinarian in South Africa was a member of the S.A.V.M.A.

The Association had played its part on a number of occasions in advancing the interest of the profession and of its members. It assisted in the improvement of salary scales and improved conditions of employment for all.

It is an Association worthy of support.

Dr. Steyn het die nuwe graduandes laat besef dat hy 'n privaat praktisyn al vir jare is. Hy was vroër 'n Staatsveearts, 'n navorser en 'n lid van die doseerstaf.

'n Privaatveearts het meer base as die wat salarisse ontvang, want die publiek is altyd baas.

As gevolg van jare in die praktyk is hy maar nog net 'n Kalahari-boer wat gedurig planne moet maak om die vonkproppe in sy kar langer effektief te hou.

Professor du Toit then paid tribute to the Committee which had organized the function and expressed the thanks of Faculty to the ladies who had assisted in its preparation.

A very pleasant cocktail party added to the success of the function.

AWARDS TO STUDENTS NOT IN THE FINAL YEAR OF STUDY

The following awards were made to students who were not in the final year of study:—

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 and veld management, this prize was awarded to E. Young and S. R. van Anstel.

2. *The A. S. Ruffel Prize of* R40.00. Granted 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, this prize was awarded to Mr. E. Young.

3. *The Two Prizes of* R50.00 *each donated by Messrs. Optical Instruments (Pty) Ltd. of Johannesburg.* These two prizes, offered each year for award to the most promising student in each of the Second and Third Years of study, were awarded respectively to Mr. P. H. le Roux (second year) and Mr. S. R. van Anstel (third year).

In appreciation of the decision by Council to request members of the S.A.V.M.A. not to charge fees for the treatment of dogs belonging to blind persons, this Scroll of Honorary Membership was bestowed by Mrs. Evans, founder of the S.A. Guide Dogs Association for the Blind, on the S.A.V.M.A. through its President Dr. H. P. Steyn.

The Scroll has been framed and hung in the Secretary's office.

PUBLIC RELATIONS SERVICE

Prof. S. J. van Heerden attended the meeting of the F.A.O. Expert Panel on Infertility in Domestic Animals at Rome during the week 14-19 January, 1963.

Expert Panels of F.A.O. comprise representatives of various countries, selected because of their expert knowledge on the disease under sideration. The recommendations of the Expert Panel are published and become available as information to member countries.

Included in the Agenda concerned with this meeting were items connected with infertility in Swine, viral infections in cattle, infertility in Sheep and certification of freedom of diseases of livestock affecting reproduction.

Dr. S. J. van Rensburg has been awarded a scholarship made available by the Imperial Cold Storage and Supply Company Limited for 12 months overseas study.

Dr. van Rensburg who qualified with honours in 1957 when he won both the Clinical and the Theiler medals has been in the Section of Reproduction at Onderstepoort for the past 4 years, where he has been doing basic research mainly into the physiological control of the oestrous cycle and pregnancy in domestic animals.

This scholarship will enable him to pursue a years study under leading authorities in this field, in both the United States and Great Britain.

He leaves at the end of March, 1963.

Dr. D. Coles has been overseas on a business tour of Europe, the United Kingdom and Israel.

The Veterinary Act Amendment Bill is due to be placed before Parliament during the present Session.

Professor H. P. A. de Boom, Hoof van die Departement Anatomie van die fakulteit van Veeartsenykunde op Onderstepoort, het so pas van die V.S.A. teruggekeer. Hy het vir 14 maande, van 1 Oktober 1961 af, as besoekende professor in die Fakulteit van Veeartsenykunde van die Universiteit van Cornell in die Staat New York opgetree. Die Departement Anatomie van daardie Universiteit het hom uitgenooi.

Prof. De Boom het onderrig gegee in embriologie en anatomie van groot huisdiere, samesprekings gelei oor die probleme van moderne onderrig en onderrigmetodes, en het ook aandag gegee aan Histogenie en Neuro-anatomie.

Dr. B. C. Jansen, Chief, Veterinary Research Institute, Onderstepoort, attended a F.A.O. Conference in Geneva during February, 1963, where the development of underdeveloped countries was the main item on the agenda.

The Association has submitted the name of Prof. Dr. W. O. Neitz together with the required documents, to the Secretary of the Permanent Committee of the World Veterinary Association, Utrecht, Holland, as a competitor for the *Gamgee Prize.*

John Gamgee initiated the first International Veterinary Congress at Hamburg (Germany) in 1863 and this prize is being awarded in remembrance of him, for outstanding contributions to Veterinary Sciecne.

The W.V.A. is donating the prize.

We wish Dr. Neitz the best of luck and hope he will succeed even in the strong competition which he is likely to meet.

The engagement is announced of Dr. H. Graham Purchase, B.Sc. (Wits)., B.V.Sc. (Onderstepoort) at present in East Lansing, Michigan, U.S.A., eldest son of Dr. & Mrs. H. S. Purchase of Johannesburg, and Nancy, only daughter of Mr. & Mrs. Wallace K. Schneider of Elmhurst, Illinois, U.S.A.

BACK NUMBERS OF J.S. AFR. VET. MED. ASS.

The Association has for sale back numbers containing articles on many veterinary subjects.

Volume XXXIII, Nos. (3) and (4) — (September and December, 1962) contain informative articles on Rabies and its control in animals.

Please advise us of your needs.

Secretary, S.A.V.M.A.,
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Pretoria.

VETERINARY HEALTH CERTIFICATES

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

Books of 50 Veterinary Health Certificates bearing the crest of the South African Veterinary Medical Association and printed in Afrikaans and English are available at the following prices.

Members desiring these books of certificates should remit the necessary amount to the Secretary, P.O. Box 2460, Pretoria.

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OBITUARY

DR. NOEL FRANCOIS VILJOEN

The death occurred in Johannesburg on 9th January, 1963, after a short illness, of Dr. N. F. Viljoen, Veterinarian to the P.D.S.A.

Noel Viljoen was born at Stellenbosch on 25 December, 1898 and was the son of the late Dr. W. J. Viljoen, Superintendent-General of Education for the O.F.S. and later for the Cape Province.

He received his education at Grey College, Bloemfontein; at the age of 17, enlisted with the South African Forces in World War I, serving in East Africa, where he was wounded. He had a very good war record.

On being discharged he proceeded to the Royal Veterinary College at Edinburgh, Scotland where he graduated in 1925.

On his return to South Africa he joined the State Service and was stationed at Mafeking. He served in Bechuanaland. He was stationed at Potchefstroom. He was employed as Abattoir Superintendent by the Bloemfontein Municipality where he served for some 15 years. While employed in this capacity he completed a thesis on Cysticercosis in Swine and Bovines and in 1937 obtained his D.V.Sc. from the University of South Africa. The thesis appeared in Vol. 9 — page 337–570 of the Onderstepoort Journal.

He served in the Second World War and held the rank of Captain. He set up private practice at Barkly East and at Queenstown. In 1955 he moved to Johannesburg where he served as veterinarian to the P.D.S.A.

He leaves a wife, Marjory, a stepson David and a son and daughter by a previous marriage. To them we extend our heartfelt sympathy in their sad loss.

BOOK REVIEWS

WHAT MAKES A GOOD MEDICAL BOOK REVIEW

By Dr. Irving J. Wolman
Editor Clinical Pediatrics (October, 1962)

(With acknowledgement and thanks to Messrs Lea and Febiger, Publishers, Philadelphia, Penn. U.S.A.)

MEDICAL BOOK REVIEWS

A. *General Remarks.* Book reviews are intended not only for subscribers who seek guidance in the buying of books, or are curious to read appraisals of books they already own. We seek to interest those busy practitioners who are kept from giving much time to books because of the pressure of other activities, but who nevertheless like to relax at the end of a busy day by browsing through a medical journal in search of intellectual stimulation and new professional ideas.

Most readers of reviews want solid information on the new books. They want to know what's in it; not what it's about. They are not interested in a rehash of a table of contents or a paraphrase of a dust jacket. They enjoy the personal reflections and interpretive comments of their colleagues who have pondered over the text.

A good review of a medical book should contain a few statements of objective summary of the central themes and these of the author. It should also transmit some judgments, appreciative or challenging, on the relation of this book to the broad frame of contemporary scientific thought. It should induce the reader to do some thinking on his own, and perhaps inspire him to buy in order to learn more about its subject matter.

A good review takes into consideration the purpose and intended audience of a book. It conveys a sense of the accuracy, quality and completeness of the presentations, and evaluates the writer's style as lively or pedestrian, terse or redundant, inspiring or dull. It may note the fundamental design and pattern of organization; the illustrations, bibliographies, index and other textual features if unusual. Is this a reference work, tabulating scientific information, or does it elucidate and tie together basic principles and a body of facts into a logically developed synthesis which is easy to understand and remember? How does this contribution compare with others in the same field? What is the professional status and competence of the author? Is the book needed?

The reviewer himself should be thoroughly familiar with the subject being presented, and express his opinions vigorously, straightforwardly and honestly. His style should be polished, lucid, attractive. Active tenses, strong verbs, and forceful arrangements of paragraphs are assets. Brief quotations convey the flavour and literary quality better than a

dozen descriptive sentences. A noncommittal or superficial discussion is usually taken by the reader to mean that a book is mediocre — "damned by faint praise".

B. *Practical Points* Length. There are no rules for the length of competent book reviews. Most medical textbooks and monographs can be surveyed adequately in 500 words or less. For the purely descriptive outline of a minor effort, less than 200 words may be adequate. In contrast, a major work may call for an extended scholarly commentary which spreads over several printed pages.

BIBLIOGRAPHIES AND INDEX

Are the bibliographies meant to substantiate statements, or to serve as guides to the literature? By either criterion, are they satisfactory?

The dates in a bibliography constitute valuable clues to the modernity of the text. If the author has gone back and revised his first-written chapters after completing the later ones, some of the references will not be more than one year older that the date of appearance of the book. As for the index, its thoroughness can be tested by noting random items in the text and checking to see whether these have been listed.

HANDBOOKS, MANUALS, ETC.

The best approach to evaluation is to use these in one's daily work, referring constantly to the pages to see how pertinent and helpful is the contained information. Superficial skimming will not suffice.

NEW EDITIONS

By and large, books and monographs in a rapidly advancing field of knowledge become outdated or even obsolete in a few years, and new editions of these should contain a good proportion of new material. Whenver feasible a new edition should be compared with its predecessor to see whether it truly is a rewriting or little more than a reprinting, since the owner of an earlier edition should know whether his copy is still dependale.

SIGNED OR UNSIGNED BOOK REVIEWS?

This subject has been controversial for years. A signature adds authority, particularly if the writer has public stature, and indicates that the judgements have not been rashly made. On the other hand an anonymous reviewer usually feels more frank in expressing unfavourable criticisms, and especially when he knows the author personally. *Clinical Pediatrics* leaves this delicate question to the option of the reviewers.

PROMPTNESS

Publishers mail out their review copies on the day a new book is published, and often earlier. A delay of a year or more in the printing of a review is a diservice to the author, the publisher, and the prospective readers. Thus, the journal will do its utmost to publish reviews no later than 90 days following publication of the book.

I.J.W.

BOOK REVIEW

DIE ENTWICKLUNG DES HUHNCHENS IM EI

E. KUNZEL

Pp. 30. Fig. 101. Paul Parey, Berlin and Hamburg 1962. R1.00

This little book is a bound reprint of an article which appeared in the "Zentralblatt für Veterinärmedizin" vol. IX no. 4, 1962. It presents in atlas form the macroscopic appearance of the developmental stages of the chicken from the first to the last day of incubation. For each day a series of photos are given, showing the embryo and its membrane after removal of:

(*a*) the egg shell and shell membranes (partially)
(*b*) the allantochorion
(*c*) the llantoamnion
(*d*) the egg shell (completely).

The isolated embryo is shown finally. Where necessary explanatory illustrations are added to the photos. Illustrations depicting the topographic relationship of the embryo, germ layers and foetal membranes during critical phases of the development viz. 2nd, 3rd, 5th and 9th day, are given. The photos and illustrations are described in detail.

This book is in the first place of value to the research worker in the laboratory where the chicken embryo plays an important role. In a few pages he has a broad outline of the macroscopic appearance of the developmental phases and topographical relationships which are of importance to him. It may also serve as a guide to determine the age of embryos. Secondly, from a didactic point of view, the book is most useful as a supplement to teaching especially in practical classes. Without optical aid the student has the events of a complete developmental cycle in front of him.

The photos are well reproduced and the book will be a welcome addition to any laboratory's and students' bookshelf.

J.M.W. LE R.

TIERARZTLICHE LEBENSMITTELUBERWACHUNG

G. WUNDRAM/F. SCHÖNBERG

7th Edition completely revised by F. Schönberg. Pp. VIII + 458, Fig. 259 + 1 colour plate. About R11.50 — Verlag Paul Parey, Berlin & Hamburg. 1962

The original purpose of providing a practical manual for students and practitioners of veterinary food control, within the concept of this term as generally understood in Western Europe, has been elegantly maintained in this revised edition of a book which is recognised as being

a standard work of considerable value and status. It is clearly set out, well printed and contains numerous excellent reproductions of photographs, drawings and charts.

The latest German legislation controlling the inspection, testing and standards of food of animal origin is quoted in full in an appendix. The book is designed to give practical assistance to the interpretation and application of this legislation during all the phases of production, preparation, processing, preservation, display, distribution and marketing of meat and other edible animal tissues, game, poultry, fish, whales and eggs.

The fish, wild birds and other game animals described in the book do of course not occur in or around South Africa. The standards and application of food control legislation are also considerably different to those of Western Germany — for one thing the veterinarians in South Africa is not considered the legal and expert guardian of foodstuffs of animal origin. For these reasons the book will inevitably have limited application here. Nevertheless it is strongly recommended to veterinarians engaged in food hygiene activities as a reference work. It should also find favour with other disciplines engaged in official food control word.

L.W. v.d. H.

LAMENESS IN HORSES

O. R. ADAMS

Adams, O. R. Lameness in Horses. Bailliere, Tindall & Cox, London and Lea and Febiger, Philadelphia 1962, pp. 311, illustrations 207. Price not stated

It is many years since a book, covering the field of equine lameness, has been published in English. The book under review embraces the following: The first chapter deals with the relationship between conformation and lameness. It is succeeded by the anatomy and physiology of the foot and examination for soundness i.e. the traditional and sound approach. Chapters 4 and 5 discuss diagnosis of lameness and inflammation of synovial structures. The succeeding chapter of 158 pages is devoted to the individual causes of lameness in the fore- and hind limbs. Chapters 7 and 8 cover horseshoes and shoeing, and chapter 9 surgical shoeing. The concluding chapter describes natural and artificial gaits.

This work is written in a lucid, crips style and the illustrations are excellent. The paper is of good quality and the book is typographically very well finished. These factors make for easy reference and pleasant reading. The subject matter bespeaks careful preparation and pains to present recent knowledge of lamenesses in compact form.

There is only one major criticism. The bibliography indicates that the author confined his reading to English veterinary literature. As many countries in Europe, as well as their neighbours further afield, publish their surgical contributions in German, it forms with English, the two most important vehicles of surgical knowledge. Adams does therefore not refer to work done e.g. on spavin in Denmark and on the cytology of arthritis in Germany etc.

The above does not detract from the essential merit of the book under review. It can be recommended to veterinary students and clinicians alike.

Besides filling a gap in modern veterinary literature, the book is a welcome addition in its own right.

C.F.B.H.

REPRODUCTION IN FARM ANIMALS

EDITED BY E. S. E. HAFEZ PL.D.

Balliere Tindall & Cox, London and Lea & Febiger, Philadelphia — 367 pages, 167 Illustrations on 85 Figures and 38 Plates: 48 Tables. Price $12.00 Published, July, 1962

The system of collating the writings of a number of authorities and presenting them, suitably arranged and edited, as a treatise on a particular subject is commendable.

Specialization in Veterinary Science continues to advance with an ever increasing tempo.

In a subject such as reproduction the presentation of combined views by persons who are authorities in their spheres of veterinary endeavour, should be of great assistance to all concerned and in particular to students.

Dr. Hafez is to be complimented on the part which he played as editor of this publication.

The volume comprises 367 pages and is presented as a concise text-book of comparative reproduction in animals.

Particular emphasis is laid on the physiological aspect.

Five major classes of farm animals including poultry, are dealt with. Canines are not included.

As is rightly emphasised by Sir John Hammond in the Foreword, the differences between the various species which have not been sufficiently appreciated in the past, have been generously dealt with, both as regards the maintainance of fertility and the prevention of sterility.

The book is presented in four parts. The First Part, on reproductive endocrinology, covers some 26 pages. The hormones are classified; their properties are described. Primary and secondary hormones are discussed.

The remaining three parts each consist of a number of chapters. Part II deals with reproductive physiology and covers 184 pages. It includes chapters on anatomy, both macroscopic as well as microscopic, of both the male and female.

The physiology of mammalian semen and ova, fertilazation, gestation sexual behaviour etc. are dealt with in detail.

Part III deals with reproduction in the four major species of farm animals as well as in poultry. It covers 68 pages. Sexual maturity, the breeding seasons, the oestrus cycles; fertility, its espects and methods of improvement, are explained.

Part IV deals with the effects of stress and disease on reproduction. It covers 40 pages.

The concise but complete manner in which the publication is presented will appeal to the busy practitioner.

The list of selected publications at the end of each chapter is adequate for usual reference.

For the veterinarian who has to deal with and advise on the efficiency of reproduction in farm stock, this book is a necessity and can be strongly recommended.

J.S.V.H.

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