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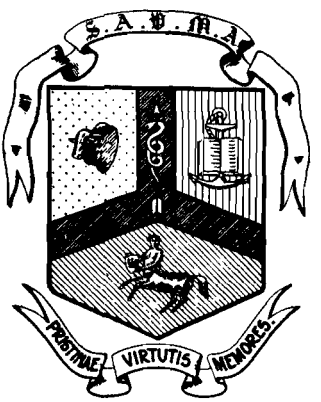

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EDITORIAL.

DR. P. J. DU TOIT RETIRES.

On the 16th of March, 1948, Dr. P. J. du Toit retired from his post of Director of Veterinary Services which he had held for 21 years.

Born at Somerset Strand in 1888, he was awarded the Queen Victoria scholarship for overseas study and gained his Ph.D. in Zoology in 1912. While on a vacation visit to South Africa in the same year he visited Onderstepoort and he was influenced by Sir Arnold Theiler to take up Veterinary Science. For this purpose he proceeded to Berlin and passed the Staatsexamen in 1915. Owing to hostilities he could not leave Germany and took his Doctorate in Veterinary Medicine with a thesis on "Leukaemia in Cattle" the following year. He was also co-author with Professor Knuth of the volume of Mense's "Tropenkrankheiten" dealing with diseases of animals. Since that time he has made many valuable contributions to our knowledge of veterinary tropical medicine.

In 1919 Dr. du Toit returned to South Africa joining Sir Arnold Theiler at Armoedsvlakte in his work on Lamsiekte. When Sir Arnold resumed his Directorship at Onderstepoort, Dr. du Toit accompanied him as second in command and became Director in 1927.

With the founding of the Faculty of Veterinary Science in 1920, Dr. du Toit was appointed Professor of Tropical Diseases and Protozoology, and every South African graduated veterinarian to date has had the privilege of studying these vital subjects under him. Dr. du Toit has been Dean of the Faculty of Veterinary Science since 1927 and has come to be recognised as an authority on University matters throughout South Africa.

He has attended numerous scientific conferences overseas where his broad knowledge and appealing personality have done much to enhance not only his own personal world-wide reputation but also that of the whole veterinary profession of South Africa.

During his service Dr. du Toit has also been called upon to serve on numerous official commissions, among which may be cited the East Coast Fever Commission, the commission of enquiry into the training of natives in veterinary matters and the Departmental Commission into the Veterinary Services. Although there may be considerable disappointment in the practical outcome of these enquiries, we all know that Dr. du Toit and his associates did the profession

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signal service in presenting their reports and only wish that they had received more consideration.

Dr. du Toit has been a member of the Veterinary Board and of the Council of the South African Veterinary Medical Association for many years and was our President from 1924 to 1930.

We understand that his knowledge and experience will not be lost as he is to remain in close association with the Department of Agriculture and the Council of Scientific and Industrial Research. In any case we can rest assured that he will continue his active interest in our Association and the Veterinary Profession in general.

We wish him and Mrs. du Toit many more years of useful and happy life.

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A REVIEW OF THE LITERATURE ON THE SO-CALLED SKIN-LESION REACTORS TO THE TUBERCULIN TEST

C. C. WESSELS
Durban

Introduction

Within the last few years, the widespread application of the tuberculin test, for the purpose of tuberculosis eradication in animals, has brought with it many new problems. The aetiology and exact nature of the so-called skin-lesions of cattle reacting to the tuberculin test, without any other manifestations of tuberculosis, have been the subject of study by many investigators. At present conflicting opinions and opposite view points are held by these workers.

Some authors maintain that the causative organism is a definite strain of the tubercle bacillus which shows a predilection for the skin, others are of opinion that these lesions are set up by the tubercle bacillus which has been lowered in virulence due to its location and residence in the skin. A third theory is that this condition is caused by an acid-fast organism other than the tubercle bacillus but capable of sensitising the host so as to cause a reaction to tuberculin injected intradermally.

Discussion

Traum([1]) was one of the first to report such a condition but called it lymphangitis caused by an acid-alcohol-fast bacillus. As he failed to produce lesions in small animals he did not believe the condition to be of true tuberculous origin. Similarly Carpenter and Goldberg([2]) reported that although this condition simulated tuberculosis they had failed to produce lesions in experimentally injected guinea pigs. Later Traum([3]) again demonstrated acid-fast bacteria in subcutaneous lesions obtained from tuberculin reactors but material inoculated into guinea pigs did not produce tuberculosis. He concluded that the organism did not belong to the mammalian type of the tubercle bacillus.

Hastings, Beach and Weber([4]) also had negative results with cultures from skin-lesions. Hastings, Beach and Thompson([5]) state that " from the evidence available it seems safe to conclude that all or nearly all skin-lesions are due to other than tubercle bacilli," and that " some other of the mycobacteria than tubercle bacilli may invade the tissue and sensitise to tuberculin."

Day([6]) reported that out of 85 tuberculin reacting cattle, 47

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showed skin-lesions, either alone or in combination with other lesions. Later, in the study of skin-lesions in tuberculin reacting cattle, Day(7) expressed the opinion that the skin is irritated by accumulations of manure causing the formation of fissures through which tubercle bacilli enter from infected manure. A calf inoculated by him with skin-lesion material reacted to tuberculin. Day's opinion is that " all of the skin-lesions found in cattle that give a positive reaction to the tuberculin test and in which acid-test bacilli are found, are tuberculosis lesions caused by mycobacterium tuberculosis which has gained entrance into the skin through abrasion, because we know of no other acid-fast organism capable of producing such skin-lesions, and at the same time giving a positive reaction to tuberculin."

Crawford(8) endeavoured to produce skin-lesions with the following cultures : B. phlei, mist bacillus, " hog skin " bacillus, avian, human and bovine tubercle bacilli. He failed to produce any skin-lesions. In spite of the fact that he injected bovine tubercle bacilli underneath the skin, he could not produce any skin-lesions and only internal lesions were set up. With a number of skin-lesions after subinoculation he failed to produce lesions in guinea pigs, rabbits, mice, rats, chickens or cattle. He mentions that microscopical examination of over 20 subcutaneous lesions acid-fast organisms could be demonstrated in the majority of them.

Mitchell(9) maintained that the view that the so-called skin-lesions are not caused by the tubercle bacillus is unsound when based on the fact that it has not been possible to infect laboratory animals or to isolate the organisms. He laid down the following hypotheses assuming the acid-fast bacteria were the cause of the lesions : (a) a strain of tubercle bacilli that had become altered in pathogenicity through its residence in the skin, (b) a strain of tubercle bacilli not conforming to any known type, (c) an organism separate and distinct from tubercle bacilli but capable of exciting sensitiveness to tuberculin. He further mentions that factors such as symbiosis, individual immunity and varying reactions of an animal to infection may play a role, but even so it would not cancel the three above mentioned possibilities. Mitchell further states " I am not prepared to accept this interpretation now, but look upon the lesions as truly tuberculous, although possibly caused by a strain somewhat atypical in its selection of unusual tissue for colonization." He infected laboratory animals from only two out of 33 natural clinical cases of subcutaneous tuberculosis and mentions that it is interesting to note that both these were from young animals. He is therefore of opinion that the age factor plays an important role in that the animals were young and so the organisms present in the lesions had not been there long enough to become attenuated. Further he is of opinion that in older lesions the organisms are dead.

Elder, Lee and Phelps(10) in an article published in 1929 made some very interesting observations on the work done by them with 35 tubercular lesions of which 32 were skin-lesions, two were teat

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lesions, and one was a cervical lymph gland. Twenty-one per cent. of the skin-lesions including one teat lesion produced tuberculosis when injected into laboratory animals. It is however pointed out by them that the incubation period averaged 192 days, showing that the organisms in the skin-lesions were of low virulence as compared with the usual bovine tubercle bacilli. In 91 per cent. of lesions studied acid-fast bacilli were found. Further all the experimental animals reported tuberculous died. Many experimental animals injected with skin-lesions lived. Tuberculin tests had been run upon the experimental animals but none had reacted, both avian and bovine tuberculins being used.

Calmette([11]) stated that skin tuberculosis in cattle is regarded as very rare, and suggested that in as much as the skin and subcutis are unfavourable locations for the tubercle bacillus to develop, the virulence is markedly decreased. He further stated that while it is possible to produce tuberculous lesions in guinea pigs, by the inoculation of material from lupus tissue, the lesions so produced are local and progress very slowly. He also stated that " no one has ever been able to inoculate lupus from one human being to another."

Van Es([12]) in 1931 published an article in which he reported that he had fed a considerable amount of bovine skin-lesions to tuberculous-free hogs. These failed to react to either avian or mammalian tuberculin and no tuberculous lesions could be found at post mortem.

Van Es, with a number of different sets of skin-lesions shown to contain acid-fast bacilli, attempted typing experiments ; the results however were negative. He concluded that " apparently no living tubercle bacilli were present."

Daines and Austin([13]), ([14]) reported in articles published in 1931 and 1932, that they had endeavoured by means of animal inoculations to obtain some information as to the place of these skin-lesion acid-fast organisms in the bacterial groups. Their results had been obtained in the study of skin-lesions from several hundred animals with subcutaneous lesions, most of which had given positive tuberculin reactions. They stated that the available evidence pointed to the probability of wound infection as the usual mode of entry of whatever organism or organisms producing the usual skin-lesions of tuberculin reacting cattle. The lesions mostly occur on the legs, shoulders and teats, where skin wounds are most frequent. These workers believed that they had a considerable amount of evidence which indicated some organism other than M. tuberculosis as the cause of these lesions. From cultures made on a modified Petroff's medium they obtained various organisms which fell into four main groups :

(1) Atypical virulent bovine strain of M. tuberculosis obtained in one case only. (This animal had visceral lesions of tuberculosis as well.)

(2) A partially acid-fast, gram-positive, pleomorphic, diphtheroid

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organism, producing in 12 to 24 hours, colonies which were usually chromogenic.

(3) A slow growing, acid-fast, gram-positive, diptheroid rod-shaped organism with occasional coccoid forms, producing deep orange colonies in about seven weeks.

(4) A non acid-fast, gram-positive, pleomorphic organism occurring as long or short rods or coccoid forms. This produced non chromogenic, spreading colonies in 24 hours.

The majority of their cultures belonged to group (2). Morphologically and culturally their organism is similar to the Preisz-Nocard bacillus except for its inability to haemolyse blood, although strains of the Preisz-Nocard organism isolated by them also failed in this haemolysis. The lesions produced by cultures in guinea pigs approach more nearly those produced by the Preisz-Nocard bacillus of suppurative lymphedenitis. The Preisz-Nocard bacillus in their cultures had developed definite acid-fast properties, thus making resemblance to their skin-lesion cultures more striking. These authors stated : " If the Preisz-Nocard bacillus is the organism we recover from the skin-lesions, it is usually though not always attenuated for guinea pigs. We already have evidence that its virulence may be increased for these animals by repeated transfer and allowing it to take on typical reactions for the Coryne-bacterium ovis. Bacterium pyogenes and even Johne's bacillus must be considered as possible factors in the causation of the disease."

Subcutaneous injection of cattle with the group (3) organism evoked the formation of nodules in the subcutaneous tissues which remained up to about four months and one animal developed a transient sensitisation to tuberculin.

Marsh([15]) reports data on sixty cases of teat lesions in cows which reacted to the tuberculin test and the following statement is made. " It is our opinion that these teat lesions are primary lesions due to infection through abrasions on the teat; that they are of the same nature as the skin-lesions described by several authors; and that they are caused by the mycobacterium tuberculosis, modified to some extent by its habitat in the subcutaneous tissue, rather than by another acid-fast organism giving group reaction with tuberculin."

Feldman([16]) using emulsions prepared from fourteen typical subcutaneous nodules, tried to produce lesions in laboratory animals by intracerebral injection. There were no macroscopical lesions, but definite collections of epithelioid cells somewhat similar to tubercles were observed in the brains of the rabbits used.

Feldman([17]) reported work with two strains of acid-fast organisms obtained from Daines and Austin, representing their groups (2) and (3) respectively. Tubercle-free fowls were inoculated by various routes, but although they were tested over a period of six months

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none reacted to avian or mammalian tuberculin. No post-mortem changes were described. Later ([18]) the same author inoculated these organisms intraperitoneally into white mice but with negative results, being in marked contrast to avian, bovine and human strains which were also used. He concluded that these skin-lesion strains are more allied to the saprophytic than to the pathogenic acid-fasts.

Feldman and Schluhauer([19]) examined eleven reacting cattle obtained at various tests from a " tubercle-free " herd. Three of these were cases of so-called " skin tuberculosis." In two of these cases they claimed to have isolated strains of the avian tubercle bacillus from the mesenteric glands, while in the third case the findings were negative.

According to Pendergast([20]) 95 per cent. of several hundred skin-lesion reactors examined failed to show internal lesions of tuberculosis on post-mortem examination. Many of these cases were from herds which had passed several tests with no reactors.

In reports ([21]) and ([22]) of the Chief of the Bureau of Animal Industry, U.S.A., for 1932 and 1933 mention was made of two strains of acid-fast organisms from skin-lesions, which caused transient tuberculin sensitisation in cattle. No details of these cultures were given. In 1934 it was reported ([23]) that four cattle inoculated with these organisms developed swellings at the site of inoculation which in the case of two animals gradually subsided, but in the other two became very pronounced and were still visible eight months after inoculation. None of the cattle showed a sensitisation to mammalian tuberculin up to the seventh month, but all reacted positively to avian tuberculin at the end of the third month. From one of these cattle, killed at the end of the eighth month, a skin-lesion was removed from which an acid-fast organism, apparently identical with that injected was obtained in pure culture.

Crawford([24]) recorded the isolation of two apparently identical acid-fast organisms recovered from skin-lesions from widely separated districts. These organisms, after inoculation into guinea pigs from skin-lesion material, were isolated by culture from the apparently normal spleens. Attempts to isolate similar organisms from normal guinea pigs were unsuccessful. Cultures of these organisms proved non-pathogenic for guinea pigs, rabbits and fowls, but when injected subcutaneously into cattle they produced lesions " somewhat similar " to skin-lesions.

A " tuberculin " was prepared from these organisms and used in field tests of herds in the hope that it might prove useful in differentiating " skin tuberculosis " from cases of true tuberculosis. It was found, however, that standard tuberculin was a better agent for producing reactions, both in animals which were definitely affected with tuberculosis and in those only harbouring skin-lesions. Crawford hesitated to incriminate these organisms as being the casual agent of the bovine skin-lesions, but concluded that the most logical explanation

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of the latter is that they are the result of infection with soil acid-fast organisms and lead to a " group " rather than a specific sensitisation to tuberculin.

Robertson and Hole([25]) described several cases of skin-tuberculosis in cattle which showed inconsistent or inconclusive reactions to the tuberculin test. Out of forty-eight such animals twelve had shown skin-lesions and acid-fast organisms were seen in eleven of them. They concluded that the skin-lesions were the most probable cause of the sensitisation to tuberculin. They also maintained that the sensitisation is not consistently greater for avian than for bovine tuberculin, or vice versa ; neither did the subcutaneous test appear to afford a means of differentiating the " skin-lesions " from true tuberculosis. They did, however, admit the possibility of the lesions having been due to an atypical form of M. tuberculosis. However, in view of the microscopical appearance of the organisms, certain histological features of the lesions, failure to infect laboratory animals, and failure to cultivate the organisms, they were of the opinion that the acid-fast organisms seen probably did not belong to the recognised pathogenic types, although they might be associated in a group sensitisation. The acid-fast organisms might not necessarily be the primary cause of the lesion, but be secondary invaders of a wound or abscess.

Hole and Hulse([26]) in their report on eighteen cases of " skin-lesions " admitted failure to transmit the condition by experimental animal inoculation. With each of the eighteen animals after post mortem, all the lymph glands which could be found were removed, thinly sliced, and examined for macroscopic lesions and gland material injected into guinea pigs and fowls. Only in one case, where the material from an affected prescapular lymph gland was inoculated on Löwenstein's medium did they obtain a pure growth of an acid-fast organism after four months incubation. The growth was in the form of pin point moist looking colonies on the surface which on smear examination proved to be short acid-fast rods. Subcultures showed no evidence of growth after one month's incubation.

At the time the authors did not associate these skin-lesions with the tuberculin reactions and stated that there was no proof either that the skin-lesions were able to provoke a response to tuberculin, or that the acid-fast organisms described were the cause of the sensitisation or even of the development of the skin lesions.

THE CHARACTER OF THE SO-CALLED SKIN-LESION.

Various authors have described the character of the so-called skin-lesion, the nature of their contents and the organisms generally found therein.

Daines and Austin([13]) have described the lesions as being mainly subcutaneous but that they often involved the skin, sometimes apparently

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being confined entirely to the skin. About one third gave gross evidence of external connections either closed or not. Possible evidence could be obtained of external connections at some period of development in every case if complete microscopic examinations could be made. Each specimen contained from one to several nodules, mainly subcutaneous, varying from pin-head size to as large as an ordinary hen's egg.

They described three general types of nodules :—

1. Those made up of granulation tissue with no apparent necrosis;
2. those with central necrosis without calcification; and
3. those having central necrosis with calcification.

In the last two types the centres usually contained a thick semi-fluid, odourless material which usually varied from a greenish-yellow to an orange colour. Often dense cords connected several nodules in chains and section of those cords showed them to contain this same necrotic material. Acid-fast organisms were found in every typical lesion from reacting cattle, varying in number from one in several fields to large numbers in a single field. These acid-fast organisms varied in morphology from coccoid to diplococcoid forms; short or long, straight and curved rods; solid or beaded and diptheroid forms of various sizes and shapes. The most constant acid-fast form was the solid medium size, straight rod about the size of a typical bovine tubercle bacillus. Further their cultures grew at room temperature and also at temperatures up to 37° C. They grew on various kinds of rich media. Petroff's medium was mainly used. This consists of 550 cc. of lean-beef infusion; 500 cc. of whole egg; and less than 1 : 100,000 gentian violet. No glycerin is added and it is desirable to have the medium soft. The advantage of the gentian violet is that it gives a good back ground for identification of the colonies. If cultures have to stand long the tubes must be sealed. Cultures were not obtained from necrotic material. Successful results were secured when scrapings were made from the wall of the abscess or when pieces of the wall were ground in a mortar.

In all the few cases observed by them, the complete removal of skin-lesions resulted in early negative tuberculin reactions.

It was pointed out by them that the Preisz-Nocard infection in sheep produces a lesion which consists of a central necrosis, surrounded by an exudate consisting of lymphocytes, plasma cells, leucocytes and a few new connective tissue cells. There is very little stimulation of endotheliocytes and no giant cells are present. Experimental lesions produced by them with their organisms in guinea pigs, rats and cows appeared identical with the Preisz-Nocard lesions. These consisted entirely of fairly early skin and testicular lesions in guinea pigs, skin-lesions in rats and systematic lesions in two cows.

According to these two workers the histological structure of the

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spontaneous skin-lesions of cows varies markedly with the age of the lesions. The earliest lesions that have been available from tuberculin-reacting cattle are apparently chronic, as idicated by the amount of connective tissue present; and still these give no evidence of changes which are usually considered to be characteristic of tuberculous tissue. The outstanding changes consist of a marked perivascular infiltration of plasma cells and lymphocytes, high vascularity and a marked sclerosis of the arterioles. There are no giant cells, and hyperplasia of endotheliocytes is not prominent. In studying these tissues one sees very little, if any, resemblance to ordinary tuberculous tissue. As the lesions become more chronic giant cells appear and endothelial hyperplasia becomes a prominent part of the picture. It should be remembered that these later changes are not absolutely specific for tuberculosis, but rather a reaction to stimulation which may be common to the acid-fast group.

Ray and Shipman([27]) showed that defatted tubercle bacilli and the lipins of tubercle, grass and colon bacilli may each induce tubercle formation. In the older skin-lesions of cattle, necrosis is very prominent, but this seems to be true also of some of the fairly early lesions, especially those which seem to be secondary to a primary focus. The authors concerned are impressed with the possibility that allergic changes have much to do in determining the character of the lesions. They have been able to obtain organisms from those skin-lesions which are either acid-fast from the beginning or which develop acid-fastness on certain culture media.

It is pointed out that Preisz-Nocard infection is very common in old ewes in Utah, U.S.A., occurring at times in the form of epizootics, and perhaps less common in horses, cattle and hogs. The organism has been recovered in large numbers from the droppings of apparently healthy sheep and it is therefore widely distributed in places where skin wounds of cattle can be readily contaminated. It seems possible that Preisz-Nocard or similar organisms entering in relatively small numbers in these wounds may in the presence of the fat of the subcutaneous tissue, develop acid-fast properties and produce the typical skin-lesions as well as stimulate a tuberculin hypersensitiveness. While sheep are susceptible to the organisms which enter with food, cattle apparently are not. However, if excessive doses are injected subcutaneously into cattle, it seems that generalised pseudo-tuberculosis may be produced in them. This seems to be true of the two instances in their series.

Mitchell([9]) gives the following description. The lesions may be dissected away from the skin proper. Occasionally there is a sinus connected with the surface but this was rather the exception than the rule. Nodules were frequently found in groups and sometimes from two to six were present in an affected area. These nodules were definitely separated from one another or might be loosely attached by bands of fibrous tissue. They varied in size from a hazel nut to that

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of a large hen's egg. There seemed to be no tendency for the disease to migrate by way of the lymphatic system and the adjacent lymph-nodes were never diseased. Each lesion was made up of a distinct and thick yellow fibrous wall enclosing contents of varying character. Sometimes the contents were purulent, that is, they were made up of a thick tenacious odourless pus. Pus-forming organisms are invariably present in this type of lesion and usually the acid-fast organisms are easily found in scrapings from the fibrous wall.

In the second type of lesion, the fibrous wall encloses very coarse graular lime salts. The author believes these are the oldest type of lesion encountered, and it is usually very difficult to find acid-fast organisms in them.

The acid-fast organisms, even in the same lesion presented different forms, the most common being a cocco-bacillus usually occurring in pairs. Long forms were frequently present and in many instances had enlarged ends. Occasionally in the body of the bacillus an area would decolourise and take the counter stain. Round acid-fast bodies were often found, frequently in association with spherical bodies which took the blue stain but appeared much darker than other material in the smear. It was at first thought that these bodies were spores of different kinds but as many of the specimens were sterile this explanation did not seem to be satisfactory. The author states that it was only after reading Sweany's([28]) description of granules of the tubercle bacillus and studying his colour plates, that these bodies assumed significance. Non acid-fast organisms of innumerable kinds were found, although frequently lesions would contain no organism save the acid-fast bacillus.

Attempts by Mitchell to cultivate acid-fast organisms direct from tissues were done in several ways but no single colony of acid-fast organisms came up from the numerous plants made.

Some of the latest work on skin-lesions is that carried out so excellently by Hole and Hulse([26]) published in 1939. They described the most common site for lesions as the legs and more particularly the forelegs. Of 30 animals examined by them 25 had lesions on the fore limbs. There were seven lesions on the hind limbs, one on the flank, one on the back and one on the neck. Only three animals showed lesions on the hind limbs without the forelimbs being involved. The position of the lesions, especially on the forelimbs, was very uniform. They mainly followed a line,presumably of the superficial lymphatic vessels, descending from the prescapular lymph gland along the antero-lateral aspect of the upper leg as far as the elbow joint, it then passed obliquely round the lateral aspect of the radius to behind the carpus. Lesions in the regions of the metacarpus and lower fore leg joints were only seen once. When two or three lesions only were present, they generally lay in the carpal region, but might occur as isolated nodules higher up the leg. They were positive in one case at least

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that the first lesions to appear were in the carpal region, and subsequently nodules developed successively in the ascending direction. This " line " of distribution on the fore leg has also been recorded by Andersson([29]) and the centripetal direction of development is mentioned by Mohler([30]). In the hind limb the two favourite sites appeared to be about the lateral aspect of the hock, metatarsus and fetlock joint.

The lesions were described as non-painful, cold, and as a general rule, firm, rounded swellings, but they might, especially on the hind limbs, be thick walled abscesses that fluctuated on firm, digital pressure. They might be quite free from the overlying skin, or adherent to it with actual intradermal involvement, in which case superficial lesions were always to be found in the form of ulcers, haemorrhagic crusts, loss of hair, or healed scars. Lesions of the softer abscess type might be discharging.

In size the lesions varied from that of a small pea to a tangerine, the softer abscess types sometimes reaching even greater dimensions; confluent masses of nodules might also occur and form prominent areas of nodular thickening of considerable size.

These authors recognise macroscopically three types of the sectioned lesions. One or all types may be present in the same animal, but type (3) frequently occurs alone.

In type (1) the nodules are of a firm consistency and characteristic light brown colour, sometimes but not always showing small foci of necrosis. There always appears to be skin involvement with this type, careful sectioning revealing at least one spot in which the light brown tissue has replaced the normal white colour of the dermis and reached and penetrated the epithelium. Type (2) is subcutaneous in position, and is formed of a tough capsule enclosing firm yellow granular-looking necrotic material, frequently quite dry and often gritty to the knife. The walls of these cavities may be thin and fibrous or may show variable thickenings of the light brown tissue of type (1). Type (3) is the abscess type comonly seen on the hind legs, and is similar to type (2) except that the contents are fluid, creamy or creamy-yellow pus of varying consistency. These abscesses always burst at some time in their development and discharge their contents to the surface. Afterwards more of the light brown tissue appears to develop, and the lesion becomes less prominent though more solid; pus, however, may form again and another discharge occur.

Histologically the appearance of sections of the nodules of the three types varies only in the amount and character of the necrosis. The essential granulomatous tissue is present in varying amount in all cases, giant cells being always present, usually in considerable number. The histological distinctions are not greater than those seen in tuberculous lesions of different stages of development, activity or regression. The authors maintain that in view of the considerable

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structural variations seen in tuberculosis, it does not appear to them to be possible to differentiate these skin-lesions on histological grounds from tuberculous granulomata. The significance of this similarity is not so impressive if it is remembered that saprophytic acid-fasts can be made to produce granulomatous lesions in guinea pigs, as shown by Hagan and Levine([31]), as well as in and under the skin of cattle as shown by the authors.

An interesting observation by those authors, is the connection with the lymphatic glands draining the affected area of skin found in some cases. Contrary to Mitchell's([9]) experience, they found in several cases that the gland involved is enlarged. On section these glands were firm and showed a homogeneous cut surface, sometimes flecked with a few irregular haemorrhages, but with one or possibly two exceptions, nothing was seen that could be described as a macroscopic lesion. They found that where enlargement is seen macroscopically, histological lesions were present. In general these took the form of a rather diffuse epithelioid cell invasion, and the appearance of such sections suggested that the structural changes tended to follow or to originate from the capsule trabeculae penetrating the lymphoid tissue. This is what might have been expected if the infective agent was carried to the gland by the affarent vessels.

In one case where they recognised macroscopic lesions in a lymphatic gland, the beast showed a number of lesions in a fore limb, following the usual " lymphatic line." The upper nodules dipped into the superficial muscle, and one lesion was situated on the very margin of the gland. The gland itself was enlarged and two hard centres could be felt in its substance. On section the hard centres were found to be rather gritty necrotic lesions, with a macroscopic appearance which could not be distinguished from tuberculosis.

In 1938 Krantz([32]) reported histological lesions of the regional lymph nodes in 12 out of 32 examinations made. In seven cases he was able to demonstrate acid-fast bacilli in these lesions. The above authors found acid-fast organisms in the gland lesion of one or possibly two cases, but otherwise his examination of gland smears and several histological lesions were negative.

Hole and Hulse describe some cases of special interest :—

(a) *Co-existent tuberculosis*: They found two cases of skin-lesions of tuberculosis. They were proved biologically to be of the bovine type. Two other skin lesion cases showed lesions in the mesenteric glands, macroscopically characteristic of avian tuberculosis. Acid-fast organisms were present, which in one instance proved to be of avian type while biological tests with the other material produced no lesions in fowls or guinea pigs, but the inoculated animals reacted to avian tuberculin.

Except that Wright([33]) found that 50 per cent. of the cases he examined had tuberculous lesions, skin-lesions in tuberculous animals

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do not appear to have been frequently reported. This does not necessarily indicate that skin lesions are most common in non-tuberculous animals, because it is in the clean herds that cases have been brought to light owing to unexpected tuberculin tests results. As pointed out by the authors the finding of bovine and avian infections in addition to skin lesions does suggest that there is very little or no cross-immunity between M. tuberculosis and the skin-lesion factor, and also that unless the tuberculous lesions are extensions from the skin, or vice versa, the skin lesions are not caused by either avian or bovine tubercle bacilli.

(b) *Muscle lesions*: Lesions situated in the muscle were seen in a specimen sent to them for diagnosis. The nodules occurred in front of the shoulder, and were embedded in the muscle instead of lying in the usual subcutaneous or intradermal position. They were separated from the muscle tissue by a fibrous capsule, which appeared to be an extension of the interfasicular connective tissue of the muscle. The lesions were mainly of their number (3) type, with thick pus, and acid-fast organisms were scantily present in smears. Histologically the necrotic centre was enclosed by a zone of lymphocytes, and a few centres of granulomatous tissue with giant cells were scattered in this zone. Plasma cells were very numerous, and there was some infiltration of the muscle tissue proper by lymphocytes but there was no evidence of granuloma formation outside the boundaries of the fibrous capsule. The micro and macroscopic appearances were quite distinct from those of Nodular Necrosis of the muscle. Animal inoculations carried out with this material gave entirely negative results.

(c) *Spontaneous absorption of skin-lesions*: This has been noted before and Andersson([29]) finds it quite common. The above authors have observed the lesions to diminish and state that naturally where pointing and discharge of the contents has occurred with type (3) lesions the size is considerably reduced. In only one case have they observed complete disappearance and at post mortem nothing could be felt or seen, except that on careful sectioning of the skin over the area concerned there was some faint scarring of the dermis with light brown tissue. Microscopically sections revealed the typical appearance of skin lesions type (1), except that giant cells were not seen.

The authors maintain that in view of the fact that there exists a histological similarity between their three types of skin lesions and that they all appear capable of provoking a tuberculin reaction leads them to assume that they are different forms or stages in development of one condition. They also consider injuries to the foot as possible portals of entry.

In regard to the tuberculin test the above authors state that they are unable to draw any parallel between the size of the reaction and the number or volume of lesions found. In one case with large lesions of the pus type and very numerous clumps of organisms, the animal

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never reacted to either bovine or avian tuberculin, while in another case the reactions increased in size as the lesions were absorbed, and a definite positive response was given to bovine tuberculin when no lesions could be seen or felt. The question arises how many of the so-called non-visible reactors are of the latter type where the skin-lesions have become completely absorbed. From their findings only a very small percentage of their cases have failed to react to one or more retests with tuberculin. They point out the fact that in America a single tuberculin test is carried out, not a double injection as used by them, and that this fact might account for their reactions with skin cases being larger. In their personal experience they consider that reactions can be read at the 48th hour. They state that there is no doubt, however, that the second injection does increase the reading when taken at the 72nd hour. If, on the other hand, the failure of skin cases to react to a retest is explained on the grounds that the amount of antibody stimulation by the lesions is so small that it is neutralised by the single injection of tuberculin, it would be expected that a double injection would have an even more marked effect in this respect. They also point out, that it has been suggested that a reactor can be made to give a negative test by injecting a volume of tuberculin shortly before the test is carried out, and one of their skin cases is an example of the effect of an overdose of tuberculin on a subsequent test. This animal was tested with three different brands of bovine tuberculin at the same time, and gave a well-marked reaction to all three; 22 days later when retested it gave a very definite negative to both avian and bovine tuberculins; numerous skin lesions, some very large, were present.

The above authors have demonstrated the presence of an acid-alcohol fast organism in smears from the lesions of all but one of their cases, and state that the form and staining properties of these organisms vary considerably. As a general rule they seem to be broader than the tubercle bacillus and stain a darker red, but they have had cases in which differentiation from M. tuberculosis on morphological grounds was, in their opinion, impossible. They have encountered curved forms, and a very small bipolar-staining form. The impression they gained from the appearance of a large proportion of their smears is that the organisms are degenerating and breaking up.

They attempted cultures in vitro under aerobic, an-aerobic and microaerophilic conditions, both at room temperature and at 37° C. They have used media such as plain egg, glycerin egg, plain and glycerin agar, Sabouraud's agar, serum agar, agar combined with extract of bovine epithelium, Zwart's medium and Löwenstein's medium. They have failed in all cases except in one instance with material from an affected prescapular lymph gland as already mentioned.

They have also carried out biological examination of skin lesion materials using small laboratory animals and calves as well as voles

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by injecting the material by various routes and also using oily suspensions. In no case have they been able to produce lesions of any significance, nor have they been able to record any degree of sensitisation to tuberculin. They do point out, however, that the organisms in the material injected might have been dead or the dosage insufficient because they have constantly obtained lung and usually kidney lesions, from which the organism has been recovered by intravenous inoculation of 0.025 mg. of M. phlei, M. smegmatis or M. butteri suspended in liquid paraffin. They therefore state that until more thorough titrations have been made with the oily suspensions they do not feel justified in using their failures as grounds for dissociating the acid-fast organism of skin-lesions from the Mycobacterium group.

These authors in summarising their experiments with known acid-fast organisms state that they have found no difficulty in reproducing solitary nodules simulating those of "skin-lesions," but have not succeeded in producing a chain of lesions from one inoculation, neither have they been able to infect the skin without infecting the neighbouring gland.

As already mentioned these authors have divided the skin-lesions on macroscopical grounds into three types. The histological appearance of types (2) and (3) are very similar, differing only in the nature of their necrotic contents. They describe the general picture of type (1) lesions as that of granulomatous tissue made up chiefly of lymphocytes, mononuclear leucocytes, plasma cells and epithelioid cells, with a variable amount of new fibrous tissue. Granular leucocytes are scanty, and although there is usually some necrosis it is present only as small centres. Giant cells are present in very large numbers. There is in general little of the focal character that is usual with tuberculous lesions, but the granulomatous tissue may form irregular nests. There is a plentiful formation of new vessels, which may show obliterative changes, endarteritis and periarteritis. Except for the presence of numerous giant cells and occasional necrosis, the lesions in many respects resembles Muir's description ([34]) of a primary syphilitic chancre. The cellular infiltrations may follow the vessels into the deeper layers of dermis or subcutaneous tissue and small islands may be found a considerable distance from the major lesions.

The epithelium over a lesion is much thickened and there is increased papillation of the underlying dermis. The hair follicles and the sebacious and the sweat glands are destroyed, and lesions which penetrate the epidermis appear to do so through infected hair follicles. The epithelium dips deeply into the dermis, and encloses a core of cornified-looking material, which penetrates into the dermis at the base of the depression. In size these lesions vary considerably, some being very large, but they think they are most probably distended hair follicles, an advanced stage of the early infection. The epidermis in general appears to be very resistant, masses of granulomatous tissue

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frequently lying under an apparently normal epidermal layer, except that the *stratum malpighi* is in a very active state. Sometimes the epidermis is infiltrated with blood, the corpuscles being packed between the cell layers. The epithelium of root sheaths offers great resistance to the destructive processes of the granulomatous growth.

Types (2) and (3) lesions present a rather different picture. These lesions are mainly subcutaneius in position, but may extend into the deeper layers of the dermis. The essential feature of both is multiple centres of necrosis in different stages of liquefaction, caseation or calcification. Granular leucocytes are more numerous than in type (1) lesions. The tissue surrounding these foci is again granulomatous, but with a more zonal arrangement than is present in type (1) lesions. Giant cells are numerous and are frequently seen undergoing destruction in the margins of the necrotic centres. The contents of the necrotic centres of type (3) lesions are usually so liquid that they drop out of sections in their preparation and only the granulomatous wall remains.

According to the authors, lesions set up by the subcutaneous injection of the avian type of tubercle bacillus are histologically not unlike those of skin lesions types (2) and (3), but the necrotic centres contain masses of granular leucocytes, particularly eosinophiles. The injection of the bovine organism resulted in extensive areas of necrosis margined by a regular zonal arrangement of granulomatous cells. The necrotic masses contained many degenerating leucocytes, and extensive areas of haemorrhage. Both these organisms, applied by scarification, caused lesions more like type (1) skin material but with a marked eosinophilia. The " hair follide " lesions were also present. M. phlei in an oily excipient gave rise to similar pictures with marked zonal arrangement of the cells and numbers of granulocytes infiltrating the lesions. Caseation occasionally occurred but frequently there was no necrosis even after several months.

The histological changes in lymphatic gland lesions as described by the authors usually consist of scattered nests of epithelioid cells in otherwise apparently normal lymphoid tissue. The lesions frequently appear to be connected with the trabeculae penetrating the gland substance. With the exception of one case with macroscopic lesions, giant cells, necrosis or caseation have not been seen. In many respects the lesions look more like proliferative changes of the reticular tissue of the gland than granulomatous formations. In the case where the gland showed macroscopic changes the lesions were composed of necrotic masses with very little reaction immediately around their margin. The gland was cirrhotic and irregularly distributed islands of epithelioid cells occurred in its substance. One giant cell only was found and that occurred in a necrotic area and was itself degenerating. A section of the gland not macroscopically abnormal showed a

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disseminated epithelioid invasion not unlike that seen in a mesenteric lymph gland in John's disease.

Concluding Note

An attempt has been made in this article to give a fairly comprehensive review of the literature of the so-called skin-lesions in cattle which may sensitize them to tuberculin. The review should prove of value to workers on the subject of these skin-lesions and the part they play in campaigns for the eradication of tuberculosis by means of the tuberculin test.

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PARALYTIC MYOGLOBINURIA (KIMBERLEY HORSE DISEASE, "BEWERASIESIEKTE") IN HORSES AND MULES UNDER FIELD CONDITIONS

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HISTORY

During July and August, 1944, serious mortality occurred among horses and mules on the Military Remount Farm near Andalusia, in the Kimberley area and in the south-western Free State. The disease occurred only in horses and mules which were subjected to very severe exercise after a period of rest, e.g. rounding-up of the animals for inoculation against horse-sickness, or hard riding or driving. Approximately 10 per cent. of the animals rounded-up for inoculation developed the disease. Horses and mules in good condition and pregnant mares were found to be more susceptible than other animals.

Experienced farmers in the areas where the disease occurred, informed me that they have known the disease for many years and that it usually appeared from July to September in years when good winter rains had fallen. They gave the name "Kimberley horse disease" or "bewerasiesiekte" ("shivers" or "shivering disease") to the condition. This disease should not be confused with the so-called Kimberley horse disease, which occurs in Australia and is caused by the ingestion of the plant, *Atalaya hemiglauca.*

SYMPTOMS

Major Daly, who was in charge of the Remount Farm, caused a number of the field horses to be driven hard and I was fortunate enough to see a full picture of the disease right from its initial stages, in addition to other cases which had been affected for some days.

Some horses and mules developed symptoms of "bewerasie" while still being driven, while the less severe cases developed them within a few to approximately 24 hours after having been ridden, rounded-up or inspanned. The very first symptoms seen were an anxious expression, the animal standing quietly or moving about slowly with the head held low down. The gait became progressively stiff and a certain degree of incoordination developed and affected horses soon went down. While standing or lying down, there was quivering of the muscles at the flanks and behind the shoulders, hence the name "bewerasie" or "shivers." The stiffness of the muscles could be

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very well observed in the act of lying down. The animals immediately became prostrate, usually on the near side. At this stage there was quite marked apathy and the eyes were usually closed, the corneal reflex being present. They sometimes rose after a while, but as a rule affected animals lay stretched-out for long periods. In the more severe cases they were unable to rise and death followed in one to four or five days. While down, respiration was very laboured, fast and more abdominal than costal. A characteristic of the abnormal breathing was that at times the animals inhaled until the abdomen was distended like a balloon. The breath was then held for quite a while before the animal exhaled. At times there was groaning. In mild cases the pulse was only slightly accelerated, while in more severe cases the pulse was fast with a lack of tone in the arterial wall. In fatal cases the pulse became thready or imperceptible. The conjunctivae were dirty reddish-brown. There was mild to profuse sweating in the groins and between the hind limbs, and on the buttocks.

After some time the croup muscles became very hard and it was obvious that the animals were affected with a spastic paralysis, mainly of the hindquarters. The spastic paresis and paralysis were responsible for the stiff gait, incoordination of movement and inability to rise. All the affected horses voided bright red urine. There was no elevation of the temperature. While the animals were down they repeatedly lifted the head and glanced at the hindquarters. This was probably not a sign of colic but due to the peculiar sensation (extreme tenseness of the muscles) which the animals experience in the muscles of the hindquarters. There was no diarrhoea. The surface of the faeces turned a dark greenish colour soon after being dropped. Blood smears were negative.

Mild cases recovered overnight, but still showed apathy and varying degrees of stiffness for a day or two, while more severe cases exhibited these symptoms for periods of up to a week. Major Daly informed us that the good appetite of the animals throughout the period of illness was most striking and that the animals ate well up to shortly before death.

POST MORTEM APPEARANCES

At autopsy the following was found :

Petechial haemorrhages on the surface of the lungs, varying degree of hydroperitoneum; liver appeared normal; gastric mucosa swollen and showed haemorrhages; hyperaemia and swelling of the mucosa of the small intestine; varying degree of swelling and hyperaemia of the large colon mucosa; spleen appeared normal; kidneys swollen and congested; in all cases the bladder contained red urine.

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DISCUSSION AND DIAGNOSIS

With the above information at my disposal, a diagnosis of paralytic myoglobinuria seemed justified.

Owing to heavy rains which had fallen in June, 1944, the mature grass pasture deteriorated seriously, with the result that the horses did not frequent the "vleis" (valleys) where grass was very plentiful, but grazed on the higher parts of the veld. In the latter areas there was luxuriant growth of various kinds of small bushes and especially were Pentzia incana O. Kuntze ("ankerkaro") and *Pentzia calcarea* Kies (Perdekaro). The horses concentrated on the areas where the *Pentzias* grew in abundance and ingested them in large amounts. These conditions prevailed in the Andalusia area. However, further south and in the south-western Free State, where a number of outbreaks of the disease were investigated, there was a serious lack of grass. In this area the above *Pentzias* and various species of *Salsola* (ganna) were very prevalent and they were all extensively eaten by the horses. The horse is essentially a grass-eater but abnormal conditions in the pastures on which the affected animals were running forced them to partake of large quantities of very highly nutritious bushes (*Pentzia* and *Salsola*) instead of grass, which is very plentiful in years of normal climatic conditions.

This is probably the first record of an outbreak of paralytic myoglobinuria in horses and mules on open grazing and can be explained by (a) exercise after rest, and (b) the fact that feed during the resting period was highly nutritious due to the state of the veld and plants as described.

I might add that subsequently I received various reports of the same disease occurring in field horses, which were rounded up for transportation by train. Some of the animals collapsed and died while being rounded-up, whilst others were found dead in the trucks.

PATHOGENESIS

In myoglobinuria[2] there is a marked increase in the blood sugar content (from 90.0 mg. % to 218.5 mg. %) and a pronounced decrease in blood alkali reserve (from 590.0 mg. % to 370.0 mg. %). During exercise the percentage of inorganic phosphorus in muscle increases as a result of the decomposition of the muscle phosphagen into creatin and phosphoric acid. At the same time lactic acid is formed in quantities corresponding to the decomposed phosphagen. During the period of rest following exercise or work phosphagen is re-formed from creatin and phosphoric acid. In cases of paralytic myoglobinuria in horses the urine contains an abnormally high percentage of creatinin and its origin is increased break-down of phosphogen or defective re-synthesis. The principle biochemical features of myoglobinuria are (1) an increase in the glucose, phosphate and creatinin, and a

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slight increase in the lactic acid content of the blood, and (2) a fall in the total phosphorous and phosphagen in the affected muscles.[3]

Bywaters' states that "myohaemoglobinuria" in crushing injury in man is similar to equine "myohaemoglobinuria." He detected "metmyohaemoglobin" as well as "oxymyohaemoglobin" in the urine of human patients suffering from crushing injury and expresses doubt as to whether this muscle pigment of itself plays any part in the pathogenesis of renal failure. It is possible that other break-down products of the damaged muscle are responsible for the renal damage (tubular degeneration, haem-pigment in the tubules, and pigmented casts in the kidney). In the above disease the urine is highly acid. MacKay and Oliver, Duguid and McFarlane have shown that phosphate in large doses produces renal lesions in animals somewhat similar in distribution to those seen in crush syndrome.

TREATMENT OF THE DISEASE

From the above discussion it is obvious that the reduced blood alkali reserve and the increased blood sugar content should be remedied as soon as possible and the following line of treatment is suggested: (a) As soon as the animals are noticed to develop the disease, they should be quietly left where they are. (b) The hyperglycaemia should be treated with insulin. Grzycki[3] and Fedotov[2] report good results with injections of 200 to 300 I.U. of insulin on each of two consecutive days. There was a rapid change of the blood sugar and blood alkali reserve to normal. (c) The lowered blood alkali reserve should be counteracted by sodium bicarbonate and potassium and sodium citrate or acetate per os [see also (d)]. (d) As the kidneys are damaged, non-irritant diuretics, such as caffeine (strong black coffee) and potassium and sodium citrate or acetate should be administered. (e) Affected animals should receive only green feed and hay and no grain or concentrates in any form.

PREVENTION

In areas where species of *Pentzia* and *Salsola* and other nutritious bushes are plentiful, horses and mules should not be subjected to sudden and strenuous exercise when there is little or no grass available, or only grass of an inferior quality. The practice of feeding stabled horses on concentrates for a few days in preparation for hard work is a dangerous one. The subjection of the animals to sudden hard work after a period of rest is very undesirable.

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THE TOXICITY OF VARIOUS SPECIES OF EUCALYPTUS TREES (BLUE GUM, "BLOUGOM," BLOEKOM")

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INTRODUCTION

Cases of suspected *Eucalyptus* poisoning have come to my notice on quite a number of occasions in the course of the last ten years. In all cases large quantities of *Eucalyptus* leaves were found in the rumen of the animals (cattle, sheep, wild buck in a Zoological Garden), and as no other cause of death could be found, it was concluded that the animals had died from poisoning with *Eucalyptus* leaves (*Eucalyptus* oil). No Hydrocyanic Acid was detectable in the leaves concerned. In some cases the leaves eaten were those of *Eucalyptus Sideroxylon* (A. Cunn.) *ex* Benth., while in other cases it was impossible to establish the source of the leaves. However, I can definitely state that in no case were the leaves of *Eucalyptus Cladocalyx* F.v.m. responsible for these deaths, as this species of *Eucalyptus* did not grow in the areas where the mortality occurred.

A. *Eucalyptus Oil*:

Chemical Constitution: Oil of *Eucalyptus*[1], [2] also known as *Eucalyptol* or *Cajaputol,* contains chiefly cineole (C_{10} $H_{18}O$). Eucalyptol is contained chiefly in the leaves, while the branches and seed are practically free from it. (See discussion.)

Oil of Eucalyptus also contains pinene, which is identical, chemically, with pinene in *Pinus* species. Furthermore, Phellendrene, various alcohols, aldehydes and esters occur in small quantities in oil of Eucalyptus.

Leschke (1932), Gibbin (1927) and Witthauer (1935) describe cases of poisoning with oil of *Eucalyptus* in human beings. The toxic dose is from 4.0 to 24.0 gm. and the symptoms are those of gastro-intestinal irritation and cerebral stimulation followed by paresis and paralysis. The following symptoms were exhibited by individuals who had partaken of toxic quantities of the oil: nausea, vomiting, giddiness, severe headache, cold sweats, rigors, diarrhoea, convulsions, followed by unconsciousness, cyanosis, all reflexes reduced, tonic and ultimately clonic spasms affecting the whole body. Death appears to be due to respiratory paralysis, as the heart action is only slightly affected even in advanced stages of poisoning. There are also signs of kidney damage (protein, epitheial cells and granulated cylinders in the urine).

Mixtures of *Eucalyptus* oil and other ethereal oils, are very

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frequently used in the steam kettle and in the form of nose drops. These nose drops are not without danger for babies. Leschke (1932) describes fatal poisoning of a ten months old baby with *Mistol* (a solution of eucalyptol, menthol, camphor and chlorbutanol in liquid paraffin).

After regular instillation of Mistol drops into the baby's nose, digestive disturbances appeared, which developed into haemorrhagic enteritis, repeated spasms, general paresis and paralysis with absence of reflexes, and sopor. The post mortem appearances were as follows: Pronounced fatty degeneration of the internal organs, especially of the liver which also showed incipient atrophic cirrhosis. The child had received at least 70 to 75 gm. of *Mistol* during nine weeks in the course of treatment for catarrh of the nose.

B. *Eucalyptus Leaves*:

The only reference to *Eucalyptus* poisoning I could find in the literature at my disposal is quoted as *Vet. Bull.*, Vol. 14, 1944, p 235.

Unfortunately, the reference is incorrect and after exploiting all the possible avenues, including the Index Medicus and Index Veterinarius, I failed to find any information on poisoning with *Eucalyptus* leaves.

ONDERSTEPOORT EXPERIMENTS

In 1945 a case of suspected poisoning with *Eucalyptus* leaves in a bull was reported to Onderstepoort by a farmer in the Riversdale district, and as we had no definite information on the toxicity of *Eucalyptus* trees, a few feeding experiments were conducted with the following species of *Eucalyptuss*

(a) *Eucalyptus Lindleyana.*

Origin: Pan Plantation, Middelburg, Transvaal.

The leaves were partly decomposed as ten days had elapsed between picking and arrival at Onderstepoort.

No hydrocyanic acid was detectable in the partly decomposed and dry leaves. Sheep 73251 (40 kg.) was drenched with 3.0 kg. of the dry decomposed leaves in the course of 5 days at the rate of 300 gm. twice daily, while sheep 73123 (35 kg.) received the same quantity of dry green leaves at the same rate over a similar period. Neither animal suffered any ill-effects.

It is highly probable that decomposition of the leaves caused a reduction in the ethereal oil content of the leaves, as the dry leaves also showed signs of partial decomposition.

(b) *Eucalyptus Sideroxylon* (*A. Gunn*) *ex Benth.*

Origin: Onderstepoort Laboratories.

The tree from which the mature leaves were collected was in the early fruiting stage.

(i) *Freshly picked mature leaves*: No hydrocyanic acid was

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detectable in these leaves. Sheep 72059 (47 kg.) was drenched with 7.7 kg. of the freshly picked mature leaves in the course of eleven days. Within 6 hours after the first 700 gm. of leaves had been administered, the urine of the animal showed a light reddish discolouration. Leaves soaked in water for a while also imparted the same colour to the water. The reddish colour of both the urine and the water turned dark reddish-brown when exposed to air and sunlight.

On the fourth day of dosing, and after the animal had received 4.2 kg. of the leaves, it showed diuresis, pronounced hoven, diarrhoea and anorexia. Drenching was discontinued for three days, but the symptoms persisted. In the course of the following three days another 3.5 kg. of the leaves were administered to the sheep, and its condition became steadily worse. In addition to the above symptoms, it showed pronounced apathy, weakness, inhibition of ruminal action, pronounced laboured respiration, mucous discharge from the nose, and increased and weak heart action. After discontinuation of drenching the animal made a slow recovery and appeared to be in good health within two weeks.

(ii) *Dry mature leaves*: These leaves were collected from the same tree and at the same time as the leaves which were drenched to sheep 72059 and were left to dry in the sun for two days. The test for hydrocyanic acid was negative.

Sheep 72211 (37 kg.) received per stomach-tube 3.2 kg. of the dry leaves in the course of seven days. From the second day of drenching the animal developed symptoms identical with those described in sheep 72059 and it died on the seventh day. Before death there were signs of respiratory paralysis, the animal gasping for breath, and the heart-action was markedly accelerated and weak.

At autopsy the following was found: Pronounced general cyanosis; emphysema of the lungs; ruminal contents emitted a pronounced odour of oil of Eucalyptus; acute catarrhal abomaso-enteritis; numerous petechiae in the mucous membrane of the urinary bladder; fairly pronounced hydrothorax; fatty degeneration of the liver and kidneys.

C. *Eucalyptus Cladocalyx F.v.M.*

I requested the Riversdale farmer, who had reported the cases of suspected poisoning, to send me a few bagfuls of the leaves of the suspected gum tree. The specimen was identified as *Eucalyptus Cladocalyx*. The material submitted, consisted of a mixture of immature and mature leaves and these arrived at Onderstepoort in a slightly wilted condition.

The immature wilted leaves were found to contain from 0.24 to 0.25 per cent. of hydrocyanic acid and the mature, dry leaves from 0.22 to 0.24 per cent. of this poison. From these few figures it therefore appears that the immature leaves contained a higher percentage of

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HCN than the mature leaves, as the former leaves still contained approximately 30 per cent. of moisture.

Sheep 66845 (45 kg.) and 72159 (31 kg.) each received 150 gm. of the wilted immature leaves per stomach tube, and sheep 66521 (56 kg.) and 64102 (56 kg.) each received 200 gm. of the dry mature leaves. Within 5 to 10 minutes after drenching all the animals developed typical symptoms of hydrocyanic acid poisoning and died from within 25 minutes to one hour and 25 minutes after drenching, with the exception of sheep 66521, which was given 6.0 gm. of sodium thiosulphate intravenously when almost *in extremis*. This animal showed immediate improvement and recovered within one hour.

At post mortem the above three sheep revealed the appearances which are usually seen in cases of acute hydrocyanic acid poisoning.

TREATMENT AND PREVENTION OF EUCALYPTUS POISONING

A. *Eucalyptus Oil*:

Gibbin (1927) treated a patient suffering from *Eucalyptus* oil poisoning with $^1/_{60}$ grain ($= \pm 1.0$ mg.) strychnine subcutaneously and 8.0 gm. of mustard in water as an emetic.

In addition to this treatment, it is essential that the threatening respiratory paralysis be treated with coramine, picrotoxin or lobeline. Furthermore, the gastrointestinal irritation should be treated symptomatically.

B. *Hydrocyanic Acid*:

Sodium thiosulphate, or preferably, sodium thiosulphate and sodium nitrite, should be administered intravenously. As preventives of hydrocyanic acid poisoning sulphur in licks and sodium thiosulphate in the drinking-water of stock have proved efficacious [Steyn and van der Walt (1944)].

DISCUSSION

Mr. Loock, Chief Forest Research Officer, Department of Forestry, Pretoria, who identified the species of *Eucalyptus* kindly supplied me with the following details concerning the ethereal oil content of species of *Eucalyptus*:—

Name of Tree	Ethereal Oil %	Cineole %	Chief constituents of the ethereal oil
Eucalyptus lindleyana			
(a) Immature leaves ...	2.1	very low	Phellandrene, pinene, cineol, piperitone, piperitol esters.
(b) Mature leaves	3.08	very low	Phellandrene, pinene, cineol, piperitone, piperitol esters.
Eucalyptus sideroxylon			
(a) Immature leaves ...	0.870	61.8	Cineol, pinene sesquiterpine.
(b) Mature leaves	1.048	81.0	Cineol, pinene sesquiterpine.

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From the above it appears that *E. sideroxylon* contains less ethereal oil than *E. lindleyana,* but that the cineol content of the ethereal oil is very much higher in the former than in the latter *Eucalyptus.* It is unfortunate that owing to the decomposition of the leaves of *E. lindleyana* it was impossible to compare the toxicity of its leaves with that of the leaves of *E. sideroxylon,* which definitely proved poisonous to sheep. The symptoms of poisoning by *E. sideroxylon* are typical of those of eucalyptol poisoning, while poisoning with *E. cladocalyx* is hydrocyanic acid poisoning.

SUMMARY

No hydrocyanic acid was detectable in the leaves of *E. Lindleyana* and *E. Sideroxylon,* while those of *E. Cladocalyx* were found to contain fatal quantities of this poison. The leaves of *E. Sideroxylon* proved poisonous to sheep and the toxicity appears to be due to the eucalyptol present in the leaves, while the leaves of *E. Cladocalyx* caused fatal hydrocyanic acid poisoning in sheep.

ACKNOWLEDGEMENT

I am indebted to Mr. P. A. Swanepoel for assistance rendered in the course of the above experiments and to Mr. Minné, who determined the quantities of hydrocyanic acid in the leaves.

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TUBERCLE BACILLI IN THE SPLEEN OF A GUINEA-PIG WITH BRUCELLOSIS

G. C. VAN DRIMMELEN
Onderstepoort

According to Topley and Wilson (1946) a guinea-pig will suffer from a double infection, if tubercle bacilli are present simultaneously with Brucella abortus, in milk samples injected for the biological test. Tuberculosis can be diagnosed on the macroscopic lesions and the demonstration of acid-fast bacilli in the organs. The abortus infection is shown by the agglutination reaction and cultures from the tissues. Wilson and Nutt (1926) reported that the two infections can develop coincidentally without the one influencing the other. However Pullinger (1936) showed that following the simultaneous inoculation of virulent tubercle bacilli and Brucella abortus into guinea-pigs the latter infection generally failed to become established, whereas control animals inoculated under the same conditions with Brucella but without tubercle bacilli became infected. The difficulty of isolating Brucella abortus from samples of "dirty" milk was also noted by Pullinger (1934, 1936). The agglutination test may be more reliable than the organ cultures in such cases. Calmette (1923) states that guinea-pigs do not infect themselves by contact with artificially infected tubercular animals. As in the case of brucellosis, the guinea-pig is one of the most susceptible species to tuberculosis. Ten tubercle bacilli or twenty-five Brucella abortus organisms may set up an infection. Guinea-pigs, eventually die of generalised tuberculosis though this may take months, but with brucellosis recovery usually takes place after a time.

For the biological tests on milk the similarity between slight tubercular tumour splenis and brucellosis in the guinea-pig is often a difficulty when post mortem examinations are done after six weeks.

The following case is reported to draw attention to the effect of coinciding delays in one set of post mortem examinations. It is hoped that this will stimulate reports of similar experiences if they have occurred.

On 14.11.46 a sample of milk was tested at Onderstepoort by arrangement between Dr. Henning, Professor of Veterinary Science, Pretoria University, and the City Health Department, Pretoria. Two guinea-pigs were inoculated in the thigh, one with 0.1 ml. of the cream and one with the deposit resulting from centrifugalization of the sample. The animals were mature males bred at Onderstepoort and

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placed in a sterilized cage on sheet metal shelves in the small animal house.

On 24.3.47 the guinea-pigs were slaughtered and Brucellosis infection was diagnosed from the macroscopic appearance of the spleen and glands. The spleen was handed to the author for bacteriological examination. Half of the spleen was suspended in saline and sub-inoculated into three guinea-pigs. From the rest of the spleen a pure culture of Brucella spp. was grown without difficulty on serum agar in a 10-15% CO_2 atmosphere. By subculturing six times on liver agar at 48-72 hours intervals, a rapid growth was obtained, which was transferred with little trouble to cultures grown in ordinary air. On thermostability tests in a saline suspension the strain was shown to be smooth. In view of the report of Bevan (1930) that Brucella abortus in South Africa is often easily grown in ordinary air this strain was considered to be a Brucella abortus and numbered A4710W.

On 11.6.47 all three guinea-pigs were slaughtered and found to be heavily infected with tuberculosis. The lesions in the omentum, spleen, liver, lungs, etc., left no doubt of this in all three cases. At this time the incident was merely recorded as of routine interest and a system was introduced by which biological tests in future included one guinea-pig of which the slaughter was delayed until about three months after infection. In addition subinoculations of the infected spleens have been carried out.

Although a fair number of milk samples tested since were found to contain Brucella spp., no other case of mixed infection of brucellosis and tuberculosis in any one milk sample was encountered. The organs of the tubercular guinea-pigs which had been preserved in 10% formalin were subsequently sectioned, stained and microscopically examined. Tubercular lesions were confirmed by demonstration of a few acid-fast bacteria in the spleen. It was not possible to demonstrate Brucella in the sections, as the lesions set up by the two diseases show great similarity.

The incidence of tubercle bacilli in milk in South Africa is sometimes considered relatively low. It has been shown that in forty samples of individual herd milk used in one municipality only one (2.5%) showed tuberculosis in the biological test. Pooled samples from wholesale milk depots showed the same result (Pullinger, 1942). The present report suggests that material may be available in some municipalities to show if tubercular milk, only capable of setting up a slight tumour splenis after 19 weeks, as happened in this case, is a common occurrence. It is also possible that some of the South African strains of Brucella abortus are capable of influencing the usual course of tuberculosis in the guinea-pig.

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SUMMARY

A case in which the milk of a cow contained material capable of producing both brucellosis and tuberculosis in guinea-pigs is reported. The tubercular infection was only recognised after a delayed subinoculation of the guinea-pig spleen which prompted the diagnosis of brucellosis only.

ACKNOWLEDGEMENTS

The author is indebted to Professor Henning for the material and to Dr. de Boom and the staff of the pathological section, Onderstepoort, for attempts at various methods of staining the Brucella in sections and smears.

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CASE REPORT

VAGINAL HERNIA

J. R. FREAN
Potchefstroom

Intestinal Hernia through the vagina is an obstetrical accident seldom encountered and the case reported hereunder probably merits recording:

At the Potchefstroom College of Agriculture it is the practice to run mares on the point of foaling in a handy lucerne camp.

Fig. I.

A Percheron mare was placed in this camp and, one morning, the attendant reported to me that he had found her dead. On inspection I found the condition so amply illustrated in Fig. 1, viz., the mare

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lying dead with a five yard trail of intestines from her vulva. Fig. 2 is a " close up."

Post mortem examination revealed the foetus in the anterior dorsal nape posture. Apparently pressure on the vaginal wall against the edge of the pubes by the frontal or nasal bones had produced a slit through which the intestines were forced.

My thanks are due to Mr. W. A. Verbeek for the excellent photographs which render description practically redundant.

Fig. II.

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BOOK REVIEW

Bovine Tuberculosis. Including a contrast with Human tuberculosis. John Francis. Staple Press, Cavendish Place, London W.1.

All veterinarians will welcome this very fine addition to our knowledge of bovine tuberculosis. The information in the book is very comprehensive and a number of quite recent articles are quoted. Chapters on the incidence of tuberculosis, its pathogenesis, tuberculosis of bovine origin in man, the detection of tuberculous cattle, vaccination against tuberculosis and the control of the disease are included.

Information is quoted to show that 80 to 90 per cent. of all tuberculous cattle are infected by the aerogenous route. The primary lesion is an alveolar or bronchial focus with a corresponding caseous focus in the regional lymph node. The complete healing of lung lesions in cattle is much less common than in man and infected animals always remain possible disseminators of infection. The part played by avian infection in cattle is discussed and reference is made to lesions caused by the avian organism in the uterus, resulting in abortion. Human infection produces minimal lesions and a transitory sensitivity to tuberculin occurs.

Bovine infection in man is mentioined and is referred to as probably causing 5 per cent. of deaths at all ages from tuberculosis. Recent articles from Scandinavia which were probably too late to be referred to in this book have shown that actual contact with tuberculous cattle in man, apart entirely from the consumption of tuberculous milk, may result in a high percentage of bovine infection in human beings.

The chapter on the value of the tuberculin test in the diagnosis of the disease is very comprehensive and up to date. Evidence is quoted to show that the double intradermal test has no real advantage over the single one. Results with the so-called Stormont test, a double intradermal one where the second inoculation is done a week after the first are referred to. The very good results claimed as compared with the ordinary intradermal tests are mentioned and an appeal made for an extensive trial of this test. The part played by skin lesions in tuberculin sensitivity is referred to. In the chapter on vaccination against tuberculosis, both BCG and Vole bacillus methods are mentioned.

Perhaps the best chapter in the book is that on the pathogenesis of tuberculosis in cattle with a comparison with that of the disease in man. It is obvious that the author is keenly interested in this matter and discusses very fully many controversial points. This chapter is well worth a careful study and in the preface by Dr. J. R. M. Innes it is pointed out that much information is still required on the pathogenesis of bovine tuberculosis, the study of which cannot compare with that on the human disease.

The book can be heartily recommended to all veterinarians interested in the study of this very important disease.

March 4, 1948. E.M.R.

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SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

Minutes of Council Meeting held at 2.15 p.m. on February 19th, 1948, at the Tilsim Hotel, Pretoria.

Present: J. H. Mason (President), A. M. Diesel, A. C. Kirkpatrick, P. S. Snyman, R. Clark (Editor), R. Alexander, J. G. Boswell, A. D. Thomas, S. W. J. van Rensburg, W. D. Malherbe (Secretary).

Apologies: P. J. du Toit and D. G. Steyn.

Minutes:

1. Minutes of meeting on November 20, 1947, had been circulated and were adopted.

2. *Arising from these*:

(a) *Distemper Immunization*: Dr. Alexander and the Secretary presented a resumé of experiences submitted by Branches. Decided: to publish a short report in the Journal for the information of members.

(b) *Welfare Societies*: Council considered that the Department of Public Health would exercise control of poisons and habit forming drugs.

(c) *Reciprocity with R.C.V.S.*: After full discussion, decided: Committee Drs. Thomas and van Rensburg to meet Faculty with proposal for immediate undertaking by R.C.V.S. to establish reciprocity, failing which the Veterinary Board will be asked to give effect to Faculty scheme.

(d) *Specialization*: Secretary reported on the position in overseas countries. Decided that there was at present no justification for specialization in the Profession in South Africa since, as in other countries, specialization in practice tended to be relative rather than absolute.

(e) *Turf Club Appointments*: (1) Cape Town (Milnerton Club) Council decided after full discussion that the veterinarians to the club in question would be advised to resign, and all other S.A.V.M.A. members be circularized not to accept this appointment.

East London: Decided that since the club in question is a small one the matter should be dropped.

(f) *Chicken Producers Association*: Council was pleased to learn from the Secretary that there had been a good response from practitioners and that the scheme would receive the necessary support from the Profession.

(g) *Publicity*: Council learned that suitable machinery for publicity had been created by the Government in the form of a State Information Bureau. The committee proposed by the last General Meeting would therefore be unnecessary. Matter should be raised at next General Meeting.

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3. *Pasteurization of Milk in Pretoria*: A letter from the Medical Officer of Health giving details of this scheme was discussed. Council found itself in complete agreement and considered that adequate safeguards for the efficiency of pasteurization were essential and that clean safe raw milk should be kept in mind as the ultimate aim.

4. *National War Memorial Health Foundation*:

(a) *Nomination for Regional Committees*: Decided that these should be nominated by Branches as far as possible. Others nominated were Dr. P. H. Brown for Port Elizabeth, Dr. L. L. Stonier for Kimberley, and Capt. J. L. Dickson for Bloemfontein.

(b) *Speaker from Foundation*: Decided that the General Meeting would provide a suitable occasion for an address.

5. *National Health Council*: Dr. Alexander reported on the first meeting (during November, 1947) of the Standing Committee of the National Health Council.

6. *New Members*: The following names were to be submitted to the next General Meeting for acceptance as new members: D. Burgess, M.R.C.V.S., of Salisbury; A. R. J. McGregor, D.V.M., M.R.C.V.S., of Livingstone, N.R.; K. Dalzell, M.R.C.V.S., of Pietermaritzburg; G. K. Shaw, M.R.C.V.S., of Pietermaritzburg; E. C. Carey, R.V.S., of Krugersdorp.

(b) *Resignation*: of Dr. A. H. Milne, Tanganyika, read. Decided to ask for reconsideration.

(c) *Hon. Life Vice-President*: Decided in view of valuable services to the Profession that Dr. P. J. du Toit be proposed at the General Meeting as Hon. Life Vice-President.

7. *Taxation of Spayed Bitches*: Council found this to be matter for local representatives to taxing authorities. In Pretoria and Johannesburg veterinary certificates are accepted for taxation of spayed bitches on same basis as dogs.

8. *Resolutions* 1947 *General Meeting*: Replies from the Secretary for Agriculture were read and noted. Regarding tuberculosis control Dr. Diesel reported that a comprehensive memorandum had been drawn up, for consideration by a large meeting of members of the Veterinary Division on March 9, 1948.

9. *General*: The Editor submitted the matter of reprints which had proved too expensive for free issue to authors. Council approved:

(a) That members could have reprints at cost price if required.

(b) That 50 unbound copies of each issue be obtained and "tear outs" be made available (at no cost) to authors.

The date of the next Council Meeting was fixed for the second Thursday in May.

The meeting adjourned at 5.45 p.m.

W. D. MALHERBE,
Hon. Sec.-Treas. S.A.V.M.A.

J. H. MASON,
President, S.A.V.M.A.

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Dr. J. A. Schutte is in practice in Bethal, Transvaal.

Dr. G. J. H. Stevens is practising in Kroonstad.

Dr. T. Veenstra has joined the Government Service and is stationed at Maritzburg.

Dr. H. E. Williams Jones who recently arrived from England has started practise in Colesburg, C.P.

Dr. T. Threlkeld has succeeded Dr. Faulkner as Director of Livestock and Agricultural Services, Swaziland.

Dr. D. E. Faulkner is now Deputy Director of Veterinary Services, Kenya, and is in charge of native areas.

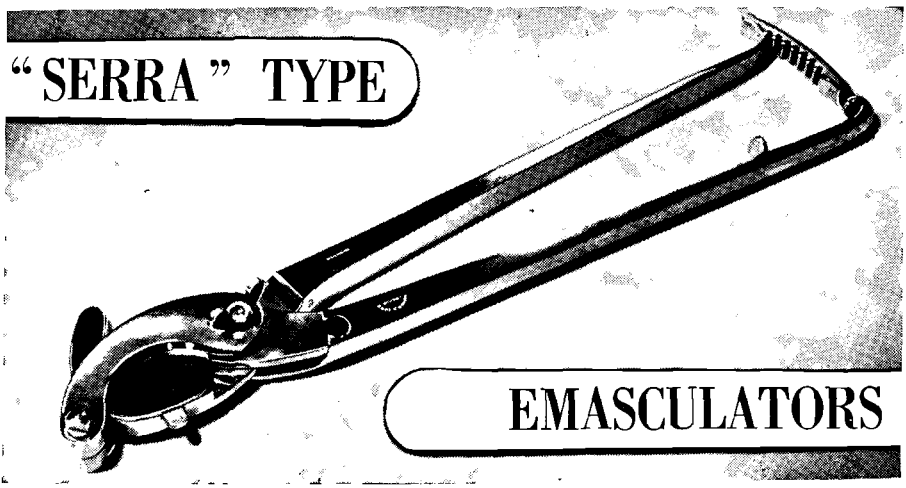
Lt. Col. E. J. Wadley has settled in Parklands, Johannesburg.

Major E. J. Weir has taken up residence in Somerset West.

Dr. G. D. Sutton has been appointed lecturer in General Hygiene and Animal Management.

Dr. W. O. Neitz has succeeded Dr. P. J. du Toit in the Faculty of Veterinary Science.

Dr. Niel Reid has been appointed Director of Veterinary Services, Tanganyika.



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EDITORIAL

THE CONTROL OF CONTAGIOUS ABORTION IN SOUTH AFRICA

A disease of stock is usually controlled by the State for one or both of the following reasons :—

(i) It is communicable to man.

(ii) It is capable of causing grave economic loss to the stock farming industry.

Two diseases, Anthrax and Contagious Abortion, appear in the list of scheduled diseases under the Stock Diseases Act. These two diseases have many points in common, viz. :—

(i) They are both caused by bacteria.

(ii) They are both pathogenic to man.

(iii) Both can be responsible for heavy economic losses.

(iv) Both can be controlled by vaccination.

Despite these points of similarity, the position in South Africa with regard to these two diseases is very different.

The success of the campaign against anthrax, which is too well known to need description, can be attributed to the large-scale use of a highly efficient vaccine. Whereas 5,281,030 doses of anthrax vaccine were issued in the last financial year from Onderstepoort, only 71,510 doses of contagious abortion vaccine were issued during the same period. As there is little dobut that contagious abortion infection is far more widespread than anthrax, there must be some explanation for this marked disparity.

Anthrax is rigidly controlled. All outbreaks must be reported and all contacts inoculated. Furthermore, large areas where the infection is known to be present are subject to compulsory annual block inoculation.

Although contagious abortion is scheduled under the Stock Diseases Act, no regulations are enforced in an effort to control it.

The reason for this difference in attitude towards the two diseases is probably to be found in the fact that anthrax is highly dramatic in its manifestations. Cattle drop down dead and humans suffer from a painful and obvious carbuncle. Contagious abortion, on the other hand, is very insidious. Even the direct effect of abortion is frequently not noticed under ranching conditions and humans suffer from a long drawn out undulant fever which is frequently not diagnosed as being due to infection with the contagious abortion bacillus.

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Before the comparison between anthrax and contagious abortion can be justified, the following questions must be answered.

(i) *Is contagious abortion widespread in South Africa?*

As everyone with practical experience in cattle farming knows, there can unfortunately be little doubt that this is the case. Of the odd 15,000 samples tested annually at Onderstepoort approximately 10% are positive. An average of not less than 100 letters a day are also received from farmers asking for advice and of these some third refer to contagious abortion either directly or indirectly. The position must be faced that the disease is rife almost throughout South Africa.

(ii) *Does the disease cause serious economic losses?*

The havoc played with catle and dairy farming is not fully appreciated. The loss of one, two or three calves from a cow is serious enough, but the losses by no means end there. Retained afterbirth, infection of the uterus and subsequent sterility are complications which probably cause greater losses than abortion itself. That these conditions are frequently the direct result of contagious abortion is not sufficiently realised. Deaths among cows from septicaemia following abortion are not infrequent.

(iii) *Is the disease dangerous to humans?*

The frequent and serious occurrence of undulant fever among our own colleagues would indicate that the infection is a major occupational hazard among veterinarians. The same position must apply to stockmen, dairy farmers and all humans who handle cattle in the course of their work. The danger to the general population through contaminated milk is difficult to assess as the disease is not easily diagnosed and is frequently missed. Undulant fever in humans is a serious condition often leading to long drawn out complications, such as abscessation and even chronic invalidism.

The ravages of contagious abortion in cattle also undoubtedly affect the health of the human population indirectly by lowering the plane of nutrition. Much of the high cost of production and shortages of dairy products in this country are due to this disease.

In view of the above facts there can be little doubt that an active campaign against contagious abortion is an urgent necessity. The question that arises is — how can the disease best be combated in the light of our present knowledge ?

The theoretically ideal method would be the total eradication of the infection by testing all cattle and disposing of the reactors. It must, however, be born in mind that a positive reaction merely indicates that the animal is, or has at one time been, infected. It gives no indication as to whether the animal is infective. In Sweden, for example, reactors are isolated till they abort or calve when a bacteriological examination of the foetal membranes is carried out. Only if

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this is positive is the animal destroyed. Such a procedure would be entirely beyond the scope of our facilities. To test and destroy all reactors would be utterly impracticable.

The method advocated by Ostertag is to isolate all reactors and so build up a clean herd. It has been realised that effective isolation is not possible even in settled countries such as England. Under ranching conditions it is of course out of the question. The disease can be eradicated from isolated herds, but the animals are then fully susceptible. It must therefore be assumed that the infection cannot be got rid of.

The only other way of combating contagious abortion is to render the cows insusceptible by inoculation. As the vaccine contains living organisms it has been suggested that its widespread use may increase the danger of infection in the human population. The answer to this is that, as the natural infection is so prevalent, the dissemination of Strain 19 is nothing more than a substitution of a relatively non-virulent infection for the natural strains already present.

Experience in America and Europe has shown that the losses from contagious abortion can be greatly reduced by the use of vaccine made from Strain 19. The introduction of "calfhood vaccination" has proved the most important advance yet made in the fight against the disease. It would therefore appear that the only rational course to adopt is one of wholesale inoculation.

For this purpose two things are necessary, viz :—

(i) An adequate supply of efficacious vaccine, and

(ii) An intensive propaganda campaign to popularise its use.

The latest official census of the cattle populaion of the Union reveals that there are more than 5 million cows of over two years old. If the three million of these calve annually it would require a similar number of doses to give each heifer calf two injections, the first at between six and ten months old and the second either before service or after the first calving. The future requirements would therefore be in the vicinity of three million doses annually. In addition there are nearly one and a half million heifers between one and two years of age, only an infinitesimal proportion of which have been inoculated. To this must be added a presumably similar number of heifers under one year together with a large proportion of the adult cows. The immediate requirements of vaccine to launch a full stage campaign would therefore be well over six million doses with a subsequent annual production of three million.

The present staff and facilities at Onderstepoort are overtaxed to produce 71,500 doses annually, in fact the production of even this totally inadequate amount leaves no time or opportunity for research work. Not only must the production be increased some fifty fold

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but intensive research work into the improvement of the vaccine and other aspects of the disease must be made possible. To do this a new conception of the staff and laboratory requirements is essential.

In addition to our own requirements, there is a considerable demand for vaccine from neighbouring territories such as Southern Rhodesia, which cannot be met. The large scale use of the vaccine in those countries would not only assist them but also serve to protect our borders. The revenue derived from such a market would also assist us in developing our output and research.

It must not be thought that the neglect of contagious abortion as a national problem is peculiar to South Africa. In America and England responsible veterinary opinion is demanding a more active campaign against the disease and the concensus of opinion is that this can only be done through large scale vaccination.

The present inability of the Institute at Onderstepoort to supply sufficient vaccine for a national campaign is no fault of the Division of Veterinary Services. Despite frequent and urgent representations the staff and facilities available are totally inadequate for such a project. It is for the veterinary profession to persuade the powers that be and the farming community that far greater use must be made of the contagious abortion vaccine.

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THE DIFFERENTIATION OF ACID-FAST BACTERIA BY MEANS OF SEROLOGICAL TESTS

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In a previous paper the author(19) gave a review of some of the work done on the study of skin lesions in cattle associated with acid-fast bacteria. Various workers have attempted to establish a relationship between the various types of acid-fast bacteria found in pathological conditions.

Koch(9) was one of the first to attempt to differentiate various acid-fast bacilli by means of agglutination tests but failed as have numerous other investigators subsequently [Defalle(4), Courmont and Potet(3), Fritzche(6), Zwart, Todd and Perkins(17) and others]. Koch showed that the agglutinins present in the blood of certain tubercular individuals were able to act not only on the mammalian tubercle bacilli but on the saprophytic-acid-fast bacilli. Moreover, the serum of animals immunised with the grass bacillus agglutinated the mammalian tubercle bacilli as well as the homologous organism.

Towards the end of the last century a considerable amount of work was done on the sero-diagnosis of tuberculosis, but this work was concerned with the demonstration of agglutinins in the blood of tubercular patients, not with the agglutinogens of the tubercle bacilli themselves.

Furth(7) states that sera of rabbits repeatedly injected with various acid-fast micro-organisms usually give strong complement fixation reactions with the homologous strain in spite of negative agglutination tests.

In 1925 Wilson(18) published a study on agglutination and came to the conclusion that the four main races of the acid-fast bacilli can be sharply differentiated by serological means. Independently Furth(7) arrived at a similar conclusion. Wilson(18) has shown that in spite of failures with direct agglutination, careful agglutinin-absorption experiments may demonstrate racial and individual differences within the acid-fast group. Furth(7) has found that agglutination often fails where clear-cut differences are indicated by complement fixation tests. Agglutination without a corresponding degree of complement fixation has not been observed in the course of his study. On the contrary, he has found complement fixation to occur without a corresponding degree of agglutination.

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Henderson([8]) studied the antigenic relationships of sixteen strains of mycobacteria isolated from leprosy. He concluded that thirteen of the sixteen leprosy strains could be placed in one large antigenically related group.

In this study an investigation was made into the antigenic relationships between various acid-fast organisms cultivated from the so-called bovine skin-lesions, and between members of that group of organisms and various acid-fast bacteria from other sources.

As most reports published on the serological work with acid-fasts were based on studies made with the micro-organisms or their extracts, it has seemed advisable to restudy the subject of the skin-lesion problem by improved methods as employed by Henderson([8]). Seibert([12]) has shown that purified proteins obtained from the human, bovine and avian types of tubercle bacilli, and from the timothy grass bacillus, can be differentiated by means of the precipitin test. This observation indicated the possibility of investigating the puzzling question of the relationships of acid-fast bacteria cultivated from skin-lesion reactors by employing similar purified specific proteins obtained from them.

It has been pointed out by Opie ([11]) that if a protein such as horse serum is injected into the subcutaneous tissue of a rabbit it is absorbed within a few hours with no evident inflammatory reaction, but if the injection is repeated at intervals of several days the animal reacts with acute inflammation at the site of injection. This phenomenon was first noted by Arthus([2]) and has been designated by his name. After the fourth subcutaneous injection the skin becomes red and there is a soft oedematous infiltration which disappears after two or three days. After the fifth injection infiltration is firmer and persists five or six days, while after the sixth, severe injury to the oedematous tissue is evident and a solid white mass resembling pus is formed. In most instances after the seventh injection the skin undergoes necrosis. The gangrenous area separates slowly from the surrounding tissue and cicatrisation occurs after several weeks.

In well immunised animals (after 6 or 7 injections) necrosis almost invariably occurs when antigen is injected into the skin of the abdomen. Injections into the subcutaneous tissue of the back cause oedema in most instances but no necrosis. The Arthus phenomenon may be reproduced in the lung of an immune animals by injection of the antigen. Injection of 0.2 cc. of horse serum through the thoracic wall into the lung of an immunised rabbit will cause localised consolidation with leucocytes and oedema surrounding a central focus of necrosis. The same antigen injected into a normal animal will be absorbed from the lung with no noteworthy change.

Skin sensitisation can also be transferred to a normal animal by injecting into it the serum of an animal which has already been

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sensitised by repeated injections of a foreign protein. In such an animal, passively immunised, the reaction may be so severe that necrosis occurs.

In animals immunised with a specific protein antigen, there is a very close but no exact parallel between precipitin content of the serum and the occurrence and severity of specific inflammation.

By dialysis Dorset, Henley and Moskey ([5]) have shown the tuberculin protein to consist of two biologically active fractions. It was found that the non-dialysable portions of tuberculin [the portions precipitated by ammonium sulphate as had been previously shown by Seibert and Long([13])] contained practically all the material capable of inducing a skin reaction in guinea pigs. In contrast to this the diffusible portions of tuberculin (the ammonium sulphate-soluble portions) though practically devoid of skin-reacting power, yet contained a large part of the material which exists in all tuberculin and which is capable of bringing about the death of sensitive, tuberculous guinea pigs.

The sensitising power of tuberculin is influenced by the size of the protein therein. Thus, Seibert([14], [15]) has shown that treatment of the protein in tuberculin by alkali or heat, can change it into a smaller potent unit which has practically no antigenic power to elicit precipitins or to precipitate immune sera.

Seibert([15]) has shown that by preparing a tuberculo-protein from unheated tuberculin made from a synthetic medium, and by precipitating the protein with either ammonium sulphate or trichloracetic acid a protein is obtained which possesses antigenic powers and will produce a typical Arthus reaction in rabbits. Preparations made from heated Koch's tuberculin or synthetic tuberculin are poorer antigens, especially that of Koch's old tuberculin, which is almost incapable of sensitising animals and able to elicit only small reactions in highly sensitive animals. An explanation may be found in the fact that both tuberculins made on synthetic medium and broth are heated during their preparation.

So far all the evidence indicates that the active principles of tuberculin is associated with the protein of the tubercle bacillus. This protein is similar to other well known proteins in chemical composition and in biological potencies and when repeatedly injected will sensitise animals to a very high degree with the production of a precipitin titre in the blood serum.

In these experiments no attempt was made to find a correlation between the precipitin titre and the degree of Arthus reaction in the same rabbit at the same time. In some cases there was marked cutaneous sensitisation, but usually the precipitin titres had reached a maximum when no Arthus reaction was evident.

In the case of the protein antigen prepared from the acid-fast organism from skin-lesion 21.10.31, two rabbits were injected intra-

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dermally each with 10 mg. protein in four different places at three-day intervals. A total of ten injections each was given. With the fourth injection in each rabbit the typical Arthus phenomenon was produced in both rabbits. The one rabbit showed a marked oedema of 35x50x11 mm. with a central black area of 11x8 mm., the other rabbit showed an oedema of 30x53x8 mm. with a black central necrotic area of 23x5 mm.

In this study protein extracts were prepared from a total of sixteen strains of mycobacteria by the method described by Seibert([16]). Antisera were obtained by immunising rabbits with these proteins, and their antigenic relationships were determined by means of the precipitin test. The organisms dealt with comprised nine strains of skin-lesion acid-fast bacilli*; one strain each of bovine, human and avian tubercle bacilli two strains of saprophytic acid-fast bacilli and two strains of so-called leprosy bacilli.† (See Table I.)

PREPARATION OF PROTEINS

Each strain of the acid-fast bacilli obtained from skin-lesions was first trained to grow on Long's synthetic medium. Each of the different strains was inoculated into a number of one-litre bottles each containing 200 cc. of the synthetic medium, and the cultures were grown for eight weeks at 37.5° C. The bacterial mass was filtered off through Büchner funnels lined with filter paper. The filtrate was preserved with 0.5% phenol, and filtered free of bacteria by passing it through a Mandler filter. Since there was the possibility of some protein being absorbed within the pores of the filter, in each case the filter was boiled in a strong sodium carbonate solution for one hour, after which approximately four litres of fresh, warm, carbonate solution was passed through it by suction. The alkali remaining in the filter was then removed by passing first tapwater and then distilled water through it. The final water filtrate was tested for the presence of protein before the filter was used.

The phenolised, bacteria-free filtrates were concentrated by means of ultra filtration through alundum cups impregnated with 13% guncotton dissolved in glacial acetic acid. Substances that would pass these filters were removed by repeated additions of distilled water (with 0.5% phenol). The non-filterable residue, representing about a hundred-fold concentration of the original filtrate, was passed through a Seitz filter and precipitated with trichloracetic acid, partially dried in vacuo, dehydrated with anhydrous ether and dried to constant weight. Solutions of the different antigens were prepared in 5%

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* The claims to authenticity of the so-called skin lesion acid-fast bacilli dealt with are not considered in this study.

† The claims to authenticity of the so-called leprosy bacilli dealt with are not considered in this study. However, the formal designation of *Mycobacterium leprae* is avoided.

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concentrations by first dissolving the proteins in minimal amounts of normal sodium hydroxide, neutralising with N/10 hydrochloric acid (litmus being used as indicator), and diluting to volume with normal physiological saline containing 0.5% phenol.

Two full-grown rabbits were injected intra-cutaneously, at widely separate points, with 10 mgms. of each antigen, at three-day intervals until a total of 100 mgms. had been injected. The increasing degree of local sensitivity of the rabbits was determined by observing the specific inflammatory reaction (Arthus reaction) which occurred 24 hours after the injection. Approximately eight days after the tenth injections the rabbits were bled to death. The sera were separated from the blood cells, filtered through Seitz asbestos filters, sealed in sterile, chemically cleaned test tubes, and stored in the ice-box until used.

The precipitin tests were performed by the addition of 0.1 cc. doses of the antisera to 0.1 cc. of dilutions of antigen solutions that varied in concentration from 1 : 200 to 1 : 1,000,000. The tubes were incubated at 37° C. for two hours, shaken and allowed to stand in the ice-box for 24 hours, when the precipitate in each tube was noted.

RESULTS OBTAINED

The results of the precipitin tests made with the proteins isolated from sixteen strains of bacilli and the antisera produced with those proteins are shown in Table II. The figures given in this table represent the reactions in their highest dilutions.

The average titre of each serum to each type of protein has been worked out and is given in Table III.

If the skin-lesions are first taken by themselves as a separate group it will be seen that, with some exceptions, the antisera gave maximum degres of precipitation with their homologous antigens. From the cross reactions between these organisms it is considered justifiable to place them in one large group, and to consider them as antigenically related.

Likewise Henderson([8]) found similar results with the proteins isolated from a number of strains of bacilli from leprosy and is of opinion that they can also be placed into one large group antigenically related.

Since purified proteins prepared from a number of strains of mycobacteria isolated from skin-lesions show definite group relationships and since there have been contradictory observations by various investigators as to the relationships of these organisms to other acid-fast bacteria, it was thought advisable to determine what antigenic relationship exists between purified proteins prepared from these various classes of bacteria. Among the more significant observations

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on this matter the following may be cited when studying Tables II and III :—

Relationship between skin-lesion acid-fast bacteria and other acid-fast bacteria

1. All the nine skin-lesion antisera never reacted once with the bovine antigen and the bovine antiserum reacted only with two skin-lesion antigens to any extent. This is strong evidence that serologically the acid-fast strains from skin-lesions differ from the bovine tubercle bacillus.

2. Only one of the nine skin-lesion antisera reacted with human antigen, but the human antiserum reacted fairly well with eight of the skin-lesion antigens.

3. All the nine skin-lesion antisera reacted to a marked degree with four of the skin-lesion antigens. This demonstrates the close relationship between skin-lesion acid-fasts and the avian tubercle bacillus.

4. The skin-lesion antisera reacted with the saprophytic antigens but only in very low titres. In this case it is noteworthy that the saprophytic antisera also reacted in very low titres with their homologous antigens. The saprophytic antisera on the other hand reacted with four of the skin-lesion antigens in very high dilutions. It would appear therefore as if there is some relationship betwen skin-lesion and saprophytic acid-fasts.

5. There were reactions between skin-lesion antisera and leprosy antigens and vice versa but the results are not convincing enough to draw any conclusions as to their relationship.

Relationship between the bovine tubercle bacillus and other acid-fast bacteria

1. The bovine antiserum did not react with the human antigen although the human antiserum reacted with the bovine antigen.

2. The bovine antiserum hardly reacted with the avian antigen and the avian antiserum gave no reaction with the bovine antigen. It therefore appears as if the bovine and avian tubercle bacilli are not related antigenically.

3. The bovine antiserum did not react at all with either of the two saprophytic antigens and nor did either of the two saprophytic antisera react with the bovine antigen. This is strong evidence that the bovine tubercle bacillus is not related antigenically to the saprophytic acid-fast bacteria.

4. The bovine antiserum did not react with either of the two leprosy antigens and neither of the two leprosy antisera reacted with the bovine antigen. This is strong evidence that the bovine tubercle bacillus is not related antigenically to the acid-fast organisms of so-called leprosy.

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Relationship between the human tubercle bacillus and other acid-fast bacteria

1. The human antiserum reacted fairly well with the avian antigen but the avian antiserum did not react at all with the human antigen.

2. The human antiserum did not react with either of the two saprophytic antigens and neither of the two saprophytic antisera reacted with the human antigen. This is strong evidence that the human tubercle bacillus is not related antigenically to the saprophytic acid-fast organisms.

3. The human antiserum reacted with one of the leprosy antigens but none of the leprosy antisera reacted with the human antigen.

Relationship between the avian tubercle bacillus and other acid-fast organisms.

1. The avian antiserum did not react with either of the two saprophytic antigens, but both the saprophytic antisera reacted well with the avian antigens.

2. The avian antiserum reacted with one of the leprosy antigens and one of the leprosy antisera reacted very well with the avian antigen.

Relationship between the saprophytic acid-fast organisms and so-called leprosy acid-fast organisms

Only one of the saprophytic antisera reacted with one of the leprosy antigens and the reaction between the leprosy antisera and saprophytic antigens was so slight, occurring only in one case, that it can be considered negligible.

DISCUSSION

In spite of all the investigations carried out by numerous workers on the aetiology of the so-called skin lesion tuberculin reactors the findings are very vague and opinions are conflicting. The histology of the skin lesions certainly shows resemblances to true tuberculosis in many respects but to-day the question is still asked whether the skin lesion reactor is infected with true tuberculosis or not.

A great deal of serological work has been done on the relationship of the tubercle bacillus and other acid-fast bacilli isolated from skin lesions.

From Table III it will be noted that the organisms from the nine skin lesions are closely related and that they can be classed as one big group, antigenically related. It will also be seen that a few reacted with some other acid-fast organisms and it is noteworthy that the antigen of one skin lesion organism reacted with the antisera of every acid-fast organism studied. The skin lesion organisms belong to one serological type but also show group reactions with other acid-fast organisms.

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In regard to the serology of the other acid-fast organisms, Wilson([18]), using both direct agglutination and agglutinin absorption tests found that for all practical purposes there is no difference between human and bovine sera and is of opinion that the human and bovine strains can be classed in one serological type and the avian in another. Furth([7]), Aronson and Lewis([1]) also found, by means of the complement fixation reaction, that the antigenic structures of the human and bovine tubercle bacilli are similar but that they differ from the avian bacillus.

In the present studies, using the purified proteins of the organisms concerned as antigens, there was a distinct difference between bovine, human and avian strains, for instance the bovine antiserum did not react at all with the human antigen, although the human antiserum did react to some extent with the bovine antigen. The avian antiserum did not react with either the human or bovine antigens. The two different types of mammalian and the avian tubercle bacillus can be classed into three different serological types.

Regarding the important question of the relationship between the skin-lesion acid-fast organisms and the mammalian and avian tubercle bacilli, the following can be cited from these experiments.

As none of the nine skin-lesion antisera reacted with the bovine antigen and the bovine antiserum reacted with only two of the skin-lesion antigens it seems justifiable to regard them as not related serologically. There is only a " group " reaction, which may explain some of the positive skin-lesion reactors to tuberculin, but that the skin-lesion acid-fast organisms are not true tubercle bacilli of the bovine type is very evident.

The relationship between skin-lesion acid-fast organisms and the human tubercle bacillus is closer. Only one skin-lesion antiserum out of the nine reacted with the human antigen, but the human antiserum reacted fairly well with most of the skin-lesion antigens. This can be expected as already pointed out there is a difference serologically between human and bovine tubercle bacilli.

On the other hand the relationship between skin-lesion acid-fast organisms and the avian tubercle bacillus is very close. All nine of the skin-lesion antisera reacted with the avian antigen and the avian antiserum reacted in very high dilutions with four of the skin-lesion antigens. These two types of organism cannot be differentiated serologically, and positive skin-lesion reactors possibly may be due to sensitisation with the avian tubercle bacillus.

The skin-lesion and saprophytic acid-fast organisms are related. Further there is also a relationship between skin-lesion acid-fast organisms and so-called leprosy bacilli. Also there is some relationship between saprophytic acid-fast organisms and the so-called leprosy bacilli. In regard to the latter Henderson([8]) also found common

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antigenic components. It is therefore also possible that positive skin-lesion reactors may be due to sensitisation with acid-fast organisms of these types. These findings may explain the difficulty of isolating the acid-fast organism from skin-lesions and producing any lesions in experimental animals. It is a well known fact, as pointed out by McKinley([10]), that biological tests with the so-called leprosy bacillus have always been negative.

What is of paramount importance, as will be noted from these experiments, is the fact that mammalian tubercle bacilli have nothing whatsoever in common with the saprophytic acid-fast organisms, they are not antigenically related and can be differentiated serologically. From this one can safely assume that positive skin-lesion reactors have not been sensitised by ordinary saprophytic acid-fast bacteria.

Summary

As no serological work has ever been conducted with the acid-fast organisms from skin-lesions it has seemed advisable to study this subject by improved methods.

The antigenic relationships of nine strains of acid-fast bacilli obtained from skin-lesions, seven other strains of acid-fast bacteria, viz., M. tuberculosis bovis, hominis, avian, phlei, butyricum and two strains of so-called leprosy bacilli were studied by testing their purified specific protein against the sera of rabbits immunised against those proteins.

The most striking observations from these experiments are, that between some strains of acid-fast bacilli there are quantitative differences in their antigenic structure. In other cases the differences are only qualitative, whereas in some cases there does not appear to be any difference.

Of great significance is the antigenic difference between the mammalian tubercle bacilli and saprophytic acid-fast bacilli. This is of utmost importance from a practical point of view solving the question of whether saprophytic acid-fast organisms can sensitise the host to respond to the tuberculin test. There is also this same difference between the bovine tubercle bacillus and leprosy bacilli.

The skin lesion bacilli show some group relationship to mammalian tubercle bacilli but, from the results obtained, these organisms would appear to belong to different serological groups. The common antigenic components may explain the positive skin-lesion tuberculin reactors, but that the acid-fast bacilli from skin-lesions are not true mammalian tubercle bacilli is very probable, especially not of the bovine type.

The antigenic difference between bovine, human and avian tubercle bacilli is also qualitative, these showing only group reactions with some common antigenic components. They can be placed in three different serological groups. This is especially true of the bovine and avian types where the difference is almost quantitative.

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Those acid-fast organisms which are closely related antigenically to and which cannot be differentiated serologically from those of skin-lesions are the avian tubercle bacillus, saprophytes and leprosy acid-fast bacilli. This is especially true in the case of the skin-lesion acid-fast bacilli and the avian tubercle bacillus, a point of great significance from a practical point of view where the host may become sensitised to these organisms and respond positively with avian tuberculin.

The avian tubercle bacillus and so-called leprosy acid-fast bacilli are related antigenically and cannot be differentiated serologically.

These experiments throw some light on a number of obscure points and puzzling questions in regard to the antigenic relationships of the acid-fast bacilli. They also contribute evidence on the two important questions of whether the skin-lesion reactor is infected with true mammalian tuberculosis or not, and whether the host can become sensitised with saprophytic acid-fast bacilli. Skin-lesion acid-fast bacilli show qualitative differences in antigenic structure to mammalian tubercle bacilli but, due to the group reactions, it is possible that the host can become sensitised and respond with a positive tuberculin reaction. That skin-lesion acid-fast bacilli are not true mammalian tubercle bacilli is obvious. Skin-lesion acid-fast bacilli, avian tubercle bacilli and so-called leprosy acid-fast bacilli are closely related antigenically. The other question as to whether the host can become sensitised to saprophytic acid-fast bacilli is also cleared up in this study. There is no antigenic relationship between mammalian tubercle bacilli and saprophytic acid-fast bacilli and they can be differentiated serologically.

Further as the skin-lesion acid-fast bacilli are closely related to the avian tubercle bacillus, saprophytic acid-fasts and leprosy bacilli, it is possible that animals can become sensitised from these sources, and respond positively to avian tuberculin. This may explain the difficulty of isolating some of the acid-fast organisms from the skin-lesions and failure to produce the disease in experimental animals as it is well known that saprophytic acid-fast bacilli and so-called leprosy bacilli have not yet been proved pathogenic to animals or man.

It is probable that saprophytic acid-fast organisms play no role in the sensitisation of animals to mammalian tuberculin.

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TABLE I

List of Mycobacteria Studied, Their History and Amounts of Protein Obtained.

Organism Used	Source of stock culture, date and by whom isolated, nature and amount of protein obtained.
Mycobacteria from skin-lesions. Cow skin 134 .... (1)	Received by Henry Phipps Institute. Heavy greyish white flocculent precipitate, stocky and clay-like consistency. Easily dried and dehydrated. From 5 litre filtrate obtained 4.77 gm. protein.
Cow skin 82 ..... (2)	Received by Henry Phipps Institute. Heavy fine white precipitate and formed a heavy white oil-like emulsion on dehydration with ether which took a long time before it went into an amorphous powder. From 5 litre filtrate obtained 0.82 gm. protein.
58–0–32 .... (3)	Received by Henry Phipps Institute in 1934. The organism was isolated by L. L. Daines in 1932. The precipitate was like No. 2: Cow skin 82. From 5 litre filtrate obtained 1.06 gm. protein.
16–0–30 .... (4)	Received by Henry Phipps Institute in 1934. The organism was isolated by L. L. Daines in 1930. Dark brown flocculent precipitate, dehydration was difficult as in the case of No. 2: Cow skin 82.
22–c–30 .... (5)	Received by Henry Phipps Institute in 1934. The organism was isolated by L. L. Daines in 1930. Heavy white precipitate which was easily dehydrated and easily went into an amorphous powder. From 6 litre filtrate obtained 0.925 gm. protein.
21–0–31 .... (6)	Received by Henry Phipps Institute in 1934. The organism was isolated by L. L. Daines in 1930. Dark brown precipitate which easily reached the stage of an amorphous powder after dehydration. From 6½ litre of filtrate obtained 0.66 gm. protein.
18–0–30 .... (7)	Received by Henry Phipps Institute in 1934. The organism was isolated by L. L. Daines in 1930. The precipitate first turned cloudy, then turned into very fine white powder, which on dehydration became gummy and after neutrality turned into an amorphous powder. From 3 litre filtrate obtained 0.385 gm. protein.
36–0–31 .... (8)	Received by Henry Phipps Institute in 1934. The organism was isolated by L. L. Daines in 1931. Heavy white precipitate which on dehydration became sticky and gummy until neutral and then went easily into an amorphous powder. From 5 litre filtrate obtained 0.63 gm. protein.

(*Table I continued on page* 57.)

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TABLE II

Specific Protein Antigens prepared from Acid-fast Bacteria. Highest Titres.

Antisera from rabbits immunised with the specific proteins	Skin-Lesions									Bovine	Human	Avian	Saprophytes		Leprosy	
	(1) 134	(2) 82	(3) 58–0–32	(4) 16–0–-30	(5) 22–c–31	(6) 21–0–31	(7) 18–0–30	(8) 36–0–31	(9) 4	(10)	(11) H37	(12)	(13) M.Phlei	(14) M.Butyr	(15) "L3"	(16) Walker 2
Cowskin 134 (1)	200,000	—	1,000,000	—	—	100,000	—	—	100,000	—	—	400,000	—	8,000	20,000	—
Cowskin 82 (2)	2,000	1,000,000	1,000,000	1,000,000	400,000	—	—	—	—	—	—	40,000	400	2,000	40,000	20,000
58–0–32 (3)	40,000	400,000	1,000,000	1,000,000	400,000	40,000	—	2,000	40,000	—	—	400,000	—	—	80,000	—
16–0–30 (4)	—	1,000,000	1,000,000	400,000	400,000	10,000	—	4,000	100,000	—	—	1,000,000	800	—	80,000	—
22–C–30 (5)	—	1,000,000	1,000,000	1,000,000	400,000	40,000	—	—	200,000	—	100,000	400,000	800	—	40,000	20,000
21–0–31 (6)	2,000	—	1,000,000	1,000,000	20,000	1,000,000	—	—	400,000	—	—	200,000	—	—	—	—
18–0–30 (7)	4,000	—	1,000,000	1,000,000	100,000	200	200,000	400,000	—	—	—	40,000	2,000	—	—	2,000
26–0–31 (8)	200	100,000	1,000,000	1,000,000	1,000,000	20,000	1,000,000	400,000	200,000	—	—	200,000	—	8,000	—	—
Cowskin 4 (9)	—	—	1,000,000	100,000	2,000	20,000	—	—	1,000,000	—	—	10,000	—	40,000	—	—
Bovine (10)	—	—	1,000,000	4,000	—	—	—	—	40,000	1,000,000	—	2,000	—	—	—	—
Human (11)	100,000	200,000	1,000,000	400,000	—	40,000	100,000	200,000	200,000	400,000	200,000	400,000	—	—	—	400,000
Avian (12)	—	—	1,000,000	1,000,000	—	40,000	—	—	400,000	—	—	1,000,000	—	—	—	400,000
M.Phlei (13)	400,000	—	1,000,000	1,000,000	—	—	—	—	—	—	—	200,000	40,000	—	80,000	—
M.Butyricum (14)	—	—	1,000,000	—	—	—	—	—	—	—	—	1,000,000	—	80,000	—	—
"L3" (15)	40,000	40,000	1,000,000	1,000,000	400,000	—	—	—	—	—	—	1,000,000	—	400	1,000,000	—
Walker 2 (16)	—	—	1,000,000	—	—	—	—	—	—	—	—	—	—	—	—	100,000

TABLE III

Protein Antigens Average Titres.

Serum Type	No. of Strains	Skin-Lesions									Bovine	Human	Avian	Saprophytes		Leprosy	
		(1) 134	(2) 82	(3) 58–0–32	(4) 16–0–-30	(5) 22–c–31	(6) 21–0–31	(7) 18–0–30	(8) 36–0–31	(9) 4	(10)	(11) H37	(12)	(13) M.Phlei	(14) M.Butyr	(15) "L3"	(16) Walker 2
Skin-lesions	9	27,600	388,900	1,000,000	722,200	302,400	136,700	133,300	89,600	226,700	—	11,000	298,900	400	6,400	28,900	4,700
Bovine	1	—	—	1,000,000	4,000	—	—	—	—	40,000	1,000,000	—	2,000	—	—	—	—
Human	1	100,000	100,000	1,000,000	400,000	—	40,000	100,000	200,000	200,000	400,000	200,000	400,000	—	—	—	400,000
Avian	1	—	—	1,000,000	1,000,000	—	40,000	—	—	400,000	—	—	1,000,000	—	—	—	400,000
Saprophytes	2	200,000	—	1,000,000	500,000	—	—	—	—	—	—	—	600,000	20,000	40,000	40,000	—
Leprosy	2	20,000	20,000	1,000,000	500,000	200,000	—	—	—	—	—	—	500,000	—	200	500,000	50,000

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TABLE I (*Continued*).

Organism Used	Source of stock culture, date and by whom isolated, nature and amount of proteins obtained.
Mycobacteria from skin-lesions. Cow skin 4 .... (9)	Received by Henry Phipps Institute. Dark brown precipitate which on dehydration became a clay-like paste and took a long time before it went into an amorphous powder. From 6½ litre filtrate obtained 8.15 gm. of protein. (This was the largest amount of puried protein ever obtained from any of the mycobacteria.)
Mycobacteria from tuberculosis M. tuberculosis bovis .... (10)	Received from F. B. Seibert at the Henry Phipps Institute.
M. tuberculosis hominis H.37 .... (11)	Isolated by E. R. Baldwin in 1905 at Saranac Lake from a chronic type of ulcerative tuberculosis. On June 6, 1935, 0.01 mg. injected intravenously produced typical human phthisis after 96 days.
M. tuberculosis avian (12)	Isolated from the spleen of a tuberculous chicken and received by Henry Phipps Institute.
Mycobacteria from Saprophytes. M. phlei .... (13)	Isolated at Henry Phipps Institute from timothy hay in October, 1933, by H. J. Henderson.
M. butyricum .... (14)	Isolated at Henry Phipps Institute from a sample of butter that had been purchased on the market, March 16, 1933, by H. J. Henderson.
Mycobacteria from so-called leprosy. Bacillus "L.3" (15)	Isolated by Aronson and Henderson at Henry Phipps Institute from the bone marrow of a bull-frog. This frog had been inoculated previously into the dorsal lymph sac with a suspension of human lepromata.
Bacillus Walker 2 (16)	Isolated by Dr. Walker, University of Southern California, from a human case of leprosy (Sam Hahi).

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THE VIABILITY OF BRUCELLA ABORTUS BOVIS IN MILK SAMPLES FROM INFECTED COWS

G. C. VAN DRIMMELEN
Onderstepoort

Brucella infection in milk is usually determined by guinea-pig inoculation. Huddleson (1920) described a simple cultural method for isolating Brucella from the cream in 24 hours old samples kept in a cold room, but this is limited to very hygienically collected milk. Contaminated milk can only be examined for brucellosis by the inoculation test and the material has to be injected subcutaneously. In positive cases agglutinins develop in the second to the fourth week. At one month the organisms can be isolated from the spleen, and at six weeks virulent strains show extensive microscopically visible lesions. In badly contaminated samples direct agglutination tests on the whey may be of use (Pullinger, 1934).

Several milk samples from infected herds were unsuccessfully examined at Onderstepoort whereas positive results were obtained from others. This suggested experiments to determine the viability of Brucella organisms in infected samples kept at room-temperature, i.e. the period milk will remain suitable for the inoculation tests. The preliminary tests produced some results of importance in connection with the contemplated field observations on the disease in South Africa, and these are reported here.

Experimental Data

A cross-bred Africander x Sussex cow was injected with a field strain of Brucella abortus, by intravenous injection of a culture. The strain was No. A 4716G which had proved very virulent for guinea-pigs and regularly produced marked lesions in the spleen and epididymides. The cow aborted on 9.9.47, seven days after the injection, and the organism was first secreted in the milk on 11.9.47. At different intervals after milking the sediment of 100 cc. centrifugalized milk was injected into guinea-pigs. Milk not immediately used was stored in sterile specimen bottles on the laboratory table.

Milk samples from consecutive days were inoculated into guinea-pigs on two occasions. The results are shown in the accompanying table.

Discussion

The Brucella organisms in these samples lost their infectivity after three or four days. This is in agreement with the recognized fact that contamination reduces the chances of isolating Brucella

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THE RESULTS OF THE INOCULATION TEST FOR BRUCELLA IN MILK KEPT AT LABORATORY TEMPERATURE FOR DIFFERENT PERIODS

Date milk collected from cow	Period milk kept	Date milk inoculated into guinea-pig	Date of agglutination test on guinea-pigs	Result of agglutination test	Date of slaughter (or death)	Post-mortem findings
12.9.47	1 hour	12.9.47	24.9.47	Positive	1.12.47	Positive for brucellosis: swollen spleen
13.9.47	4 days			Negative	26.2.48	Negative
14.9.47	3 days			Negative	26.2.48	Negative
15.9.47	2 days	17.9.47		Positive	26.2.48	Swollen spleen, bilateral purulent epididymitis and testicular atrophy: positive
16.9.47	1 day			Positive	17.12.47	Swollen spleen: positive
17.9.47	2 hours			Positive	(died) 12.12.47	Badly decomposed: probably died on Sunday 11.12.47
18.9.47	6 days		12.12.47	Negative	26.2.48	Negative
19.9.47	5 days			Negative	(died) 12.12.47	Negative
20.9.47	4 days			Negative	26.2.48	Negative
21.9.47	3 days	24.9.47		Positive	26.2.48	Swollen spleen: positive
22.9.47	2 days			Positive	(died) 17.1.48	Swollen spleen (decomposed): positive
23.9.47	1 day			Positive	26.2.48	Swollen spleen, bilateral purulent epididymitis and testicular atrophy: positive
24.9.47	2 hours			Positive	26.2.48	Swollen spleen, bilateral purulent epididymitis and testicular atrophy: positive

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organisms from the milk of infected animals. Since Brucella organisms are very sensitive to alterations in the hydrogen-ion tension of the medium in which they are kept, it has been suggested that the lactic acid is responsible for their destruction in milk. Pullinger (1936) found however, that the viability of Brucella in milk samples was maintained in spite of a drop in pH to 4.8. These tests were limited to 18 hours.

The present results demonstrated the futility of examining milk for Brucella, when it is forwarded in an ordinary bottle and several days old by the time it reaches the laboratory. Even when collected under hygienic conditions a milk sample to be tested for brucellosis should be packed in ice for despatch to a distant laboratory.

Pullinger (1936) found that Brucella infection of guinea-pigs often failed to become established in the presence of tuberculosis and in our case (v. Drimmelen, 1948) tubercular infection was almost overlooked on account of brucellosis. It will be interesting to find out, if the difference between the results of Pullinger's and our experience, was caused by difference in the inoculum and the contaminants present.

Literature

Huddleson, I. F. (1920): Studies in infectious abortion IV. The isolation of Bacterium abortus from milk. *Technical Bulletin* No. 49. Michigan Agric. Experiment Station.

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Pullinger, E. J. (1936): Influence of tuberculosis upon development of Brucella abortus infection. *J. Hyg. Camb.* 36: 456.

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THE JOURNAL

The Editorial Committee are anxious to make the *Journal* of the greatest interest to the practising veterinarian. To this end it is felt that more articles of a clinical nature should be included. Members are therefore asked to submit short reports of interesting cases.

Furthermore, many members undoubtedly encounter interesting conditions from time to time, but have no opportunity to conduct an investigation. They therefore feel that they are not in a position to write an article for the *Journal*. It is suggested that in such cases the observations made should be communicated to the editor in the form of a letter (under a pseudonym if desired). Colleagues could then offer comments and suggestions. Such a correspondence column would be an interesting addition to our journal.

EDITOR.

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CASE REPORT

FATAL, RECURRENT, MASSIVE EPISTAXIS IN A THREE-YEAR-OLD THOROUGHBRED COLT

G. FAULL and J. B. QUINLAN

History

The colt was in good health prior to the first attack of epistaxis. Immediately after having taken part in a race there was a slight left-sided nasal haemorrhage which stopped quickly without treatment.

The owner was advised to give the horse some weeks' rest before resuming training. While resting in the stable a week later, a fairly profuse haemorrhage again occurred from the left nostril, which continued for about 20 minutes. A similar recurrence took place a week later. A fourth attack took place two weeks later in which blood flowed profusely from both nostrils for some five minutes gradually decreasing in amount till it stopped after 20 minutes. After the haemorrhage the horse was very weak and the conjunctiva pale. During the period up to the last mentioned haemorrhage, the horse had been allowed daily exercise in a small paddock, but was subsequently entirely confined to the stall. He was weak, dull and listless for about two weeks, after which he made good progress and improved rapidly during the next three weeks. Then suddenly, while standing in the stall, a profuse haemorrhage occurred, blood flowing freely from both nostrils. This attack ended fatally within an hour.

Post-Mortem

The mucosa of the nasal passages, pharynx and larynx were coated with a thin fibrous deposit. Blood clots were present in the trachea and bronchi. The left guttural pouch was filled with coagulated blood. Examination of the wall of the pouch showed that the haemorrhage came from the region where the internal carotid artery crosses the wall. The artery was the seat of an aneurism which had ruptured through the mucosa.

Discussion

This case is recorded as it would seem to be of rare occurrence. It also shows that epistaxis may be serious and even fatal.

In cases of recurrent haemorrhage of similar aetiology the only safe procedure would appear to be ligature of the carotid. This would

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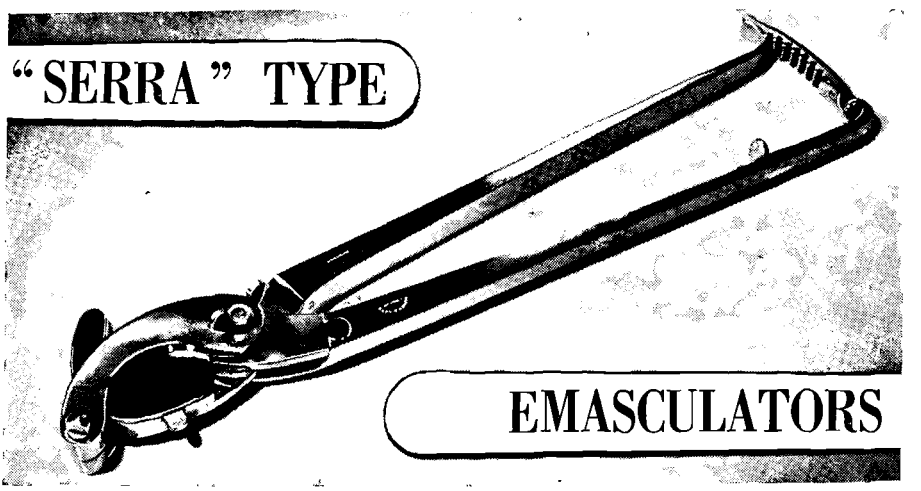
at least save a valuable animal for stud purposes, although it is unlikely that the animal would again be useful for racing.

A somewhat similar case was recently described by McArthur (1947). His case was in a man with no nasal or throat condition to account for continued haemorrhage. There was no blood dyscrasia. The blood pressure measured 200-220 systolic and 120 diastolic. This author considers the vessel involved was the spheno-palatine artery, with possibly a collateral branch of the ethmoidal. Ligature of the external carotid artery prevented an impending fatal termination.

REFERENCES

McARTHUR, J. G. (1947): Recurrent Massive Epistaxis Controlled by Ligature of the External Carotid Artery. *Canad. M.A.J.* 57, Oct. 1947.



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THE ONDERSTEPOORT JOURNAL

Volume 22. No. 1. November, 1947.

NOTE. — In view of the fact that many members do not receive the Onderstepoort Journal, it has been decided to give a short resumé of the contents of each number as it is issued.

The following articles are included in the Journal:—

"The Propagation of Blue-tongue virus in the Developing Chick Embryo with Particular Reference to the Temperature of Incubation." (pp. 7 to 26). By R. A. Alexander.

The technique for the propagation of the Bekker strain of blue-tongue virus in the developing chick embryo is described in detail and the important role played by the temperature of incubation on the multiplication of the virus is stressed.

"Further Observations on the Pathology of Blue-tongue in Sheep" (pp. 27 to 40). By A. D. Thomas and W. O. Neitz.

The authors state that the pathological changes in blue-tongue concern mainly: (a) the vascular system; (b) the skeletal musculature.

The well-known changes in the mouth and feet are due to vascular changes. It is suggested that the break in the wool is probably also due to circulatory disturbances.

The changes in the claws are reported to be an acute aseptic pododermatitis. The red streaks in the horn are due to haemorrhages into the medullary canals of the growing horny substances. These streaks later become brown and grow down with the claw. Their presence is often of assistance in making a diagnosis of blue-tongue after other symptoms have passed off. Cases are recorded where two such bands were seen in sheep which had reacted to two heterogenous strains in succession.

The changes in the skeletal muscle are described for the first time. These take the form of a focal degeneration usually of the sarcoplasm only. In many cases the sarcolemma remains intact, but contains only the debris of the degenerated sarcoplasm. Regeneration takes place to a remarkable degree, but is very slow. The degenerative changes are accompanied by haemorrhages. The authors point out that these findings explain the great muscular weakness, stiffness and rapid loss of flesh seen in blue-tongue. Torticollis is due to a greater loss of muscle on one side of the neck.

As the wasting of the musculature goes on for a long time after the passing off of the acute reaction and as regeneration is a slow process, the long recovery period is explained.

The losses caused by blue-tongue, apart from mortality, are stressed. These include loss of wool and protracted loss of flesh.

"The Diffusion Constant and Molecular Weight and Shape of Neurotropic Horsesickness Virus" (pp. 41 to 50). By Alfred Polson.

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"Mites, hitherto Unrecorded in South Africa, Collected in Natal from Fowls, Pigeons, Turkeys, Guinea Fowls, Wild Birds and Rabbits" (pp. 51 to 70). By V. R. Kaschula and S. A. R. Stephan.

Seventeen mites are described and illustrated.

"Studies on the Action of Potassium Monofluro-acetate (CH_2F COOK). [Dichapetalium cymosum (Hook) Engl.] Toxin on Animals" (pp. 77 to 90). By J. I. Quin and R. Clark.

In 1944 Marais identified the toxic principle of gifblaar as monofluoroacetic acid. The present authors worked with the synthetic chemical Their findings are as follows:—

1. There is a difference in susceptibility among species, e.g. the fowl and clawed toad are very refractory.

2. There was some evidence of the development of a tolerance among mice.

3. The compound is not affected by actively fermenting ruminal flora, nor does its presence affect such fermentation.

4. Direct observation on the hearts of rabbits and sheep injected with the compound proved it to be a heart poison probably affecting the cardiac conducting mechanism leading to partial or complete heart block.

"The Secretion of Abnormal Milk by Quarters Free from Known Pathogens" (pp. 91 to 226). By S. W. J. van Rensburg.

Milk samples from the individual quarters of ten grade Friesland cows were analysed regularly over a period of four and a half years. The test cows were known to have been free from infection with known pathogenic bacteria. The following factors were determined: solids-not-fat, fat, chloride, lactose, chloride lactose index and cell content.

The mean obtained for each of the six factors conformed in every case to the standard prescribed for normal milk, but a large proportion of individual samples yielded results which failed to conform to such standards. Every one of the 40 quarters at some time or other gave abnormal milk.

The results furnish striking evidence of the unreliability of all the recognised tests for streptococcal mastitis, which are based on changes in the composition of the milk.

The following factors are given as causes of the secretion of abnormal milk:—

(a) *Age.* The fat percentage decreased consistently after the first lactation. With successive lactations there was a progressive increase in cellular contents and general deterioration of the quality of the milk. This is attributed to normal wear and tear, but it is considered that bad management accelerates the process.

(b) *Season.* As the calving dates were evenly distributed throughout the year the effect of season could be assessed. Contrary to American and European experience it was found that the poorest quality milk was

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secreted during the winter. This is attributed to dietetic factors, but no deleterious effect of high atmospheric temperature on milk quality could be found.

(c) *Stage of Lactation.* Solids-not-fat declined rapidly from 8·6% in the first month to 8·40% in the third month. It fluctuated round this low level for the next three months and then rose to 8·71% in the final month. The mean percentage was below the legal limit from the 88th to the 172nd day after parturition.

Fat also reached its lowest level during the same period, but never fell below the legal standard.

The practical significance of these findings is that in order to ensure a bulk herd milk supply of satisfactory quality, the breeding programme should be so arranged as to have cows in all stages of lactation at any given time.

(d) *Individuality.* Three of the ten cows persistently secreted milk which was abnormal in all respects except fat.

High milk quality is not always associated with high milk yield, and the value of a cow should be assessed on fat and solids-not-fat produced rather than on the volume of milk.

(e) *Quarter differences.* The hindquarters were found to produce milk of a higher quality than the forequarters.

(f) *Conformation and Structure.* It was found that the udders which showed the most marked asymmetry also showed the most pronounced interquarter difference in composition of milk.

(g) *Non-Specific Mastitis.* Acute non-specific inflammation of the udder occurred five times in two cows. Although the affected quarters appeared to recover completely, some continued to secrete abnormal milk indefinitely.

(h) *Bacteria.* The bacterial count increased progressively with successive lactations. High bacterial count was frequently, though not invariably, accompanied by high cellular content of the milk.

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CORRESPONDENCE

The Editor,

Sir, — On the 5th of February, 1948, a blue monkey (vervet) was brought to me for examination. It was completely paralysed and *in extremis*. As it was not seen again it can be presumed to have died.

On the same day a second monkey of the same species was also brought in. This case showed a temperature of 106, lack of appetite and general apathy with constipation. Two days later the animal became paralysed in one fore and one hind limb. Despite being advised to destroy the animal, the owner continued to nurse it. The paralysis became progressively worse during the following two days until it involved all four limbs, the neck and the anal sphincter. The respiratory muscles were not affected. The animal was then destroyed.

In view of the symptoms shown and the fact that these animals are well known to be susceptible to poliomyelitis, there is a suspicion that they were suffering from this disease. There was no contact between the two monkeys, but the infection among humans was reaching epidemic proportions at that time in some parts of South Africa. This town was, however, relatively free.

W. J. B. DE VILLIERS.

Klerksdorp.

(The Director of the South African Institute for Medical Research, Johannesburg, would be very pleased if any future such cases could be reported to him, if possible before the death of the animal. — EDITOR.)

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SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

Minutes of Council Meeting held at 2.15 p.m. on May 13th, 1948, at the Tilsim Hotel, Pretoria.

Present: J. H. Mason (President), A. M. Diesel, R. Clark (Editor), A. C. Kirkpatrick, P. S. Snyman, D. G. Steyn, J. G. Boswell, S. W. J. van Rensburg and W. D. Malherbe (Secretary).

Apologies: R. Alexander and A. D. Thomas.

1. *Minutes of Meeting on February 19th, 1948*: As these had been circulated, they were taken as read, and adopted.

2. *Arising from these Minutes*:—

(a) *Welfare Societies*: After some discussion the Secretary was requested to take the necessary steps with the Public Health Department with regard to unauthorized use of drugs.

(b) *Reciprocity with the R.C.V.S.*: As this matter was now being attended to by the Veterinary Board, Council felt that it had passed out of its hands and that at the moment there were no further recommendations.

(c) *Importation of Veterinarians*: Two students of the Veterinary Faculty, on the invitation of Council, kindly attended at this stage to give information on their recent demonstration to draw attention to unsatisfactory conditions in the State Veterinary Service. They were thanked by the President and withdrew.

A letter by the Pretoria Branch to the Director of Veterinary Services for information on recent appointments in the Division had been referred back with the suggestion that Council should obtain the information from the Secretary for Agriculture. Decided that the Secretary should write in an amended form for this information.

(d) *Turf Club Appointment*: *Cape Town*: Council noted with satisfaction that the Club in question had now agreed to pay their veterinarians fees in keeping with those paid by other first-class clubs.

(e) *Regional Committees*: *National War Memorial Health Foundation*: Council noted that the following members had been appointed to committees by their branches:—
Major B. M. Horwitz: Cape (S.W.) Region.
Major E. J. Pullinger: Witwatersrand and Southern Tvl. Region.
Dr. I. P. Marais: Northern Transvaal Region.

3. *New Members*: The following names were accepted for recommendation to the next General Meeting: A. R. Dore, B.V.Sc., of Ixopo; M. J. S. Kropownicki, M.R.C.V.S., of Greylingstad; H. E. Williams-Jones, M.R.C.V.S., F.R.E.S., of Colesberg; E. J. Ortlepp, B.V.Sc., of Johannesburg; F. W. Goodall, M.R.C.V.S., R.A.V.C. (retd.), of Durban; W. L.

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Hindmarsh, M.R.C.V.S., B.V.Sc., of Sydney, Australia (vice M. Henry who had resigned); J. J. Hamman, B.V.Sc., of Pretoria; and L. R. Hurter, B.V.Sc., of Potgietersrust.

Resignation: That of Dr. S. G. Wilson, of Uganda, accepted with regret.

4. *Proposal*: *Hon. Life Vice-President and Associate Members*: Decided, in recognition of his services to the profession in developing his department in the Johannesburg Municipality, that Dr. A. C. Kirkpatrick be proposed at the next General Meeting as Hon. Life Vice-President.

Decided further that, as a token of appreciation of the recognition he has accorded the veterinarian in public health matters, Dr. H. Nelson, M.O.H., Pretoria, be proposed as honorary associate member at the next General Meeting.

5. *Jockey Club Scholarship*: The scheme put forward by the Jockey Club of South Africa was greatly appreciated by Council and was accorded its full blessing. It was considered that the scholarship should be of 3 (three) to 6 (six) months' duration and be in the nature of a refresher

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course in horse breeding and practice, and further that the value should be a free return passage to England and approximately £2 per day.

6. *Resolutions: Cape Branch:*

(a) *Public Relations:* On the suggestion that a Public Relations Officer should be appointed, Council found that adequate machinery was already functioning [see Item 2(g) of Council Meeting 19/2/48].

(b) *Artificial Insemination:* In the opinion of Council the veterinary profession must play a major role in this matter, in view of:—

(i) the danger of spread of disease;

(ii) the necessity of proper testing of semen for fertility;

(iii) the necessity for proper clinical examination of the cows for sterility.

The President was to write to the Secretary for Agriculture expressing this view and also protesting that no veterinarian was being sent by the Department of Agriculture to the International Conference on this subject in Milan. Council would be prepared to send a deputation to the Secretary for Agriculture if necessary.

7. *Veterinary Articles in the Lay Press:* Council felt that too much detail, especially with regard to the use of potentially dangerous drugs, should be avoided in articles in the lay press, as accurate diagnosis is a prerequisite to safe and successful treatment.

8. *Act 36 of 1947 — Registration of Drugs:* The Registering Officer under this Act would be prepared to consider representations from members as to drugs to be considered dangerous and which should be "supplied only on the prescription of a veterinarian".

9. *Anthrax Inoculation:* A letter from the Director of Veterinary Services was read, laying down conditions under which private practitioners would be allowed to perform anthrax inoculations in gazetted areas without departmental supervision. The onus of knowing which areas were so gazetted would be with the P.P., but a list of such areas would be published in the *Journal* from time to time.

10. *Sale of Ethical Products:* It was decided that certain matters complained of by a member would be dealt with by the secretary by writing to the firm concerned and by an interview with the Public Health Department.

11. *Payment for Treatment of Animals on "Results" Basis:* Council reaffirmed that any such practice (by previous agreement with the owner) was entirely unethical, and noted that in the redrafting of G.N. 925 of 6/7/34, this practice would be named as a transgression.

12. *General:*

(a) Mr. S. T. Amos was reappointed as the S.A.V.M.A. representative on the Natal Anti-Tuberculosis Association.

(b) *General Meeting:* It was decided this should be held in the first week in September of this year. The Editorial Committee would be responsible for the programme and Dr. De Lange (with power to co-opt) for entertainments.

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(c) *Next Council Meeting*: Second Thursday in August if business justifies one before the usual meeting preceding the General Meeting.

The President adjourned the meeting at 6 p.m.

W. D. MALHERBE,
Honorary Secretary-Treasurer, S.A.V.M.A.

J. H. MASON,
President.

DEATHS

We regret to announce the passing away of two of our oldest colleagues.

Dr. F. J. DUNNING died in Port Elizabeth during January, 1948.

Dr. J. H. SPRUELL died in East London on the 4th June, 1948, at the age of 74.

OBITUARY

JAMES S. H. SPREULL, F.R.C.V.S., died on the 4th June, 1948, at the age of 74. The late Mr. Spreull was the son of an eminent veterinary surgeon who practised at Dundee, Scotland, and the practice is still being carried on by his son and grandsons.

It was therefore only natural that Mr. Spreull should take up the profession of his father, and he qualified at the New Veterinary College, Edinburgh, on the 24th May, 1895. He then went to Alfort, France, for a year and joined the service of the Cape East at the end of 1896. At that time rinderpest was raging through the country and he was engaged on this work until the disease was cleared up. After this, he was stationed at Somerset East and did a lot of valuable work on bluetongue, producing the first vaccine to be used. In 1908, he returned to England and took a post-graduate course in London, under Sir John McFadyean and also took his fellowship in December, 1908.

On returning to South Africa, he was stationed for a time at Umzimkulu on account of the spread of East Coast fever, which eventually spread into the Transkei in 1910. In 1912, owing to the spread of East Coast fever, an extra senior veterinary officer was appointed for the Transkei, and Mr. Spreull got this appointment, his headquarters being at Umtata. In 1912, the inoculation of all cattle in the Transkei was commenced, and this continued until 1914 under his control. In 1916, he was moved to Pretoria as senior veterinary officer, Transvaal, and there he remained until 1921, when he was transferred to Cape Town as senior veterinary officer, Cape West, where he reained until he went on pension in March, 1934.

After a visit overseas he commenced private practice in East London, which he carried on until about 14 days before his death. He had been in poor health for some time and had to undergo an emergency operation from which he did not have the strength to recover.

To his sorrowing widow we extend our deepest sympathy.

J.N.

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BOOK REVIEW

DISEASES OF POULTRY, with specialist chapters on Poultry Husbandry. By W. P. Blount; Bailliere, Tindall & Cox, London, 1947.

To review a book which deals with both the diseases and husbandry of a species is a difficult task. The reviewer's opinion is inevitably coloured by his own experience and outlook. This book undoubtedly contains much useful information, but, strictly from the point of view of the South African student and practitioner, is somewhat disappointing. Many diseases of importance in the Union, such as spirochaetosis and aegyptianellosis, are given scant attention. Toxoplasmosis, which is becoming somewhat of a minor public health problem, especially in the United States, is dismissed in six lines. Haemoproteus, Plasmodium, Leucocytozoon and Trichomonas are genera also inadequately dealt with. The important roles played by wild and domestic birds in the dissemination of equine encephalomyelitis and St. Louis encephalitis are not even discussed.

The expert in avian diseases, who can appreciate the limitations of the book, will find much of interest and value in it, but the South African student and not-so-well informed practitioner will often fail to find the information which he seeks.

J.D.W.A.C.

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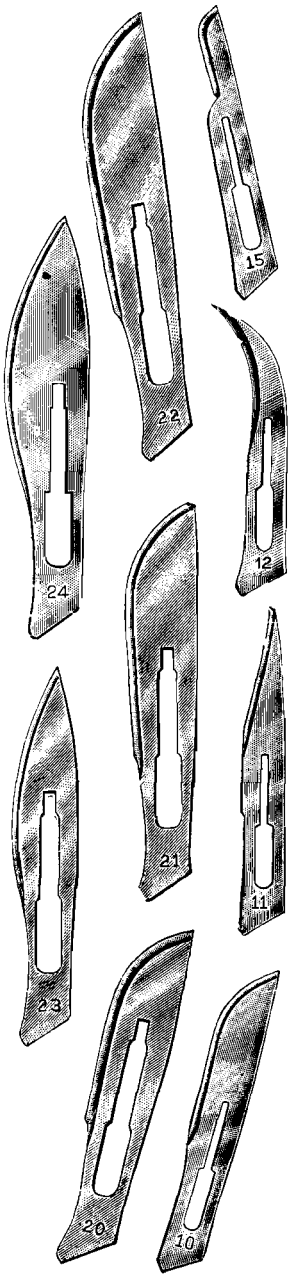

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FURTHER OBSERVATIONS ON THE GROWTH OF GREEN'S DISTEMPEROID VIRUS IN DEVELOPING HEN EGGS

D. A. HAIG,
Onderstepoort

In a previous report (Haig, 1948) it was shown that Green's distemperoid virus could be propagated in serial passage on the chorioallantoic membrane of developing hen eggs. No route of infection other than on to the chorioallantoic membrane was investigated and all eggs were incubated at 35° C. The strain was taken 30 egg generations and at that stage its virulence for ferrets appeared to have remained unaltered.

The strain is now in its 91st egg generation. In this report the effect of different temperatures of incubation on the growth of the virus in eggs and the use of different routes of injection are described. In addition some observations on a decrease of virulence for ferrets are noted.

Methods and Materials

The source of virus and the methods of handling eggs and virus have been described (Haig, 1948).

Eight-day-old embryos were used. Injections on to the chorioallantois were made by Alexander's (1938) modification of Burnet's technique; those into the yolk-sac by the method of Cox (1938); those into the allantoic cavity by the method described by Beveridge and Burnet (1946) and those into the amniotic cavity by the method of Beveridge (1947).

The Influence of the Temperature of Incubation on the Multiplication of Virus on the Chorioallantoic Membrane.

To initiate the series of experiments, infected membranes after 32 serial transfers at 35° C. were taken as the source of virus. Triplicate groups of eggs were injected for further passage in forced draught incubators at 32°, 35° and 37° C. As a routine transfers were usually made on the 5th day after injection.

i. *Propagation at 32° C.*

In the series passaged at 32° C., a gradual change in the appearance of infected chorioallantoic membranes was noticed. After 30 generations at this temperature little macroscopic indication of cellular proliferation was visible but the membranes were soft and greatly distended with a clear fluid.

Occasional titrations by the injection of decimal dilutions of infected membranes into ferrets indicated a drop in virus activity with continued passage at this temperature. Thus three generations after the change-over from 35° C. to 32° C. the end-point was found to be 10^{-5}. After 40 generations at 32° C. end-points higher than 10^{-2} were not obtained.

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Titrations of material at the 40th generation were made to study the influence of the time allowed for growth. Twenty-four embryos were inoculated with the supernatant fluid from freshly harvested membranes and were re-incubated at 32° C. Two days later three eggs were selected and the chorioallantoic membranes were collected. These were disintegrated and serial ten-fold dilutions of the supernatant fluid obtained after angle-head centrifugation were made in broth. The dilutions were then injected into ferrets. Each ferret received 1 cc. intraperitoneally. Again on the 4th and 7th day after injection, membranes were harvested and titrated in ferrets.

In all three titrations the end-points were 10^{-2}.

ii. *Propagation at 35° C.*

The appearance of infected membranes in eggs incubated at 35° C. has been described (Haig, 1948). With continued passage the lesions became more marked and regularly involved both that portion of the membrane exposed to the seed material and that which formed the base of the true air-space.

The membranes were thick and opaque, and showed numerous white areas which were coalescent in the centre of the lesion (see photograph fig. 1.)

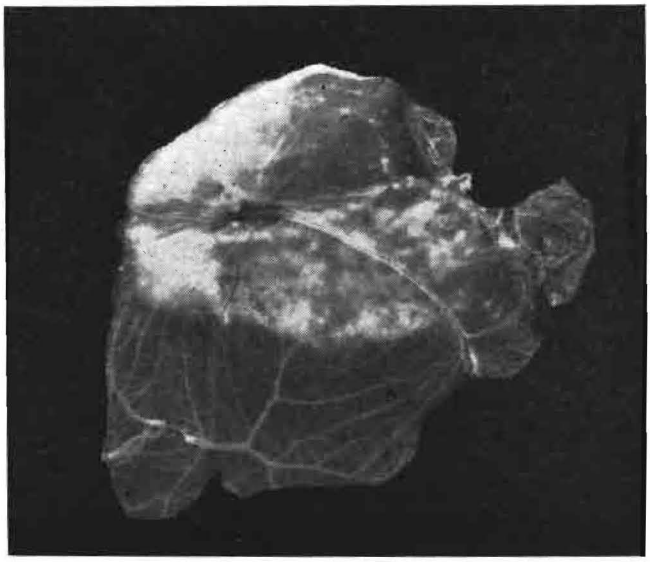

FIG. 1: *Infected chorioallantoic membrane; 84th serial egg passage at 351° C. Five days after injection.*

Titrations in ferrets of infected membranes harvested on the 5th day of incubation gave values of 10^{-4} and occasionally 10^{-5}. The effect of the time allowed for growth at 35° C. was examined when the strain had reached its 65th egg generation. Membranes were harvested at intervals from a group of eggs and the virus activity

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was measured by titration in ferrets. The end-points were 10^{-3} on the 4th day, 10^{-3} on the 6th day and 10^{-4} on the 8th day.

iii. *Propagation at 37° C.*

In the series cultivated at 37° C. the lesions were similar to those in eggs incubated at 35° C., but were more marked and there was a greater tendency for the small white areas to coalesce.

Titrations in ferrets of 5-day-old membranes gave values of 10^{-4} or 10^{-5}.

After 22 generations at 37° C. material was collected at intervals from a group of eggs and the activity measured in ferrets. The values obtined were 10^{-5} in material taken on the 3rd day of incubation and 10^{-4} in that taken on the 6th day.

Later when the strain had been passaged 45 generations at 37° C. the experiment was repeated. Here end-points were unfortunately not obtained in all the titrations. The highest dilution of 2-day-old lesions injected into a ferret was 10^{-4}. This ferret showed a typical reaction after an incubation period of 4 days.

Again in the titration of 41day-old material the highest dilution injected was 10^{-4} and this, too, produced a reaction after 4 days. The membranes harvested after 7 days produced a reaction in a dilution of 10^{-5}, after an incubation period of about 9 days. Those membranes harvested after 9 days produced a reaction in a dilution of 10^{-4} after an incubation period of 4 days.

Conclusion.

Although the results obtained from this series of experiments are not entirely conclusive, it is apparent that over the range of temperatures investigated a temperature of 37° C. is the most suitable for the multiplication of distemper virus in the chorioallantoic membrane of 8-day-old embryos. At that temperature not only are the macroscopic lesions more pronounced, but virus multiplication is probably more rapid as shown by the high virus content of membranes as early as 2 or 3 days after injection and the attainment of higher titres after further incubation up to 7 days.

Multiplication in Other Parts of Fertile Eggs.

(a) *Yolk-sac.*

Infected chorioallantoic membranes were collected from eggs in the 25th egg generation at 35° C. and were injected into the yolk-sacs of six 8-day-old embryos. Five days later all were alive. The embryos and portions of the yolk-sacs were pooled and were sub-inoculated into the yolk-sacs of other embryos. After five serial passages in this way a ferret was injected intraperitoneally with 1 cc. of mixed embryo and yolk-sac pulp. It showed no clinical reaction and was fully susceptible when challenged with undiluted infected chorioallantoic membranes three weeks later.

This experiment was repeated when the routine passage was in its 32nd generation. Here again the virus was lost by the 5th passage.

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(b) *Allantoic cavity.*

Chorioallantoic membranes from the 40th passage at 35° C. were injected into the allantoic cavity of twelve 8-day-old eggs. Five days later the allantoic fluid was collected and injected into the allantoic cavity of other eggs. Incubation at 35° C. After 15 serial passages in this way a ferret was injected intraperitoneally with 1 cc. allantoic fluid. It showed no apparent reaction.

(c) *Amniotic cavity.*

A series of passages was started from the chorioallantoic membranes of eggs in the 90th routine passage at 35° C. The membranes were injected into the amniotic cavity of ten day-old embryos. At five-day intervals sub-inoculations of pooled embryos were made. A ferret was injected with pulped embryo from the 5th passage and showed no reaction.

(d) *Embryo emulsion seeded on to the chorioallantoic membrane.*

Embryos were harvested from eggs injected on to the chorioannaltoic membrane in the 88th serial egg passage at 35° C. and after emulsification were used to seed the membranes of other eggs. In this way a series of passages was started in which the embryos were sub-inoculated on to chorioallantoic membranes. Incubation was at 35° C. and passages were made at about five-day intervals.

The embryos in the first three or four generations appeared somewhat whiter in colour than normal and development appeared to be somewhat retarded; the chorioallantoic membranes showed typical but not well-marked lesions. With continued passage in this manner the lesions became progressively less apparent, and by the ninth generation no macroscopic changes could be detected. A ferret which received embryo emulsion intraperitoneally from the 19th generation showed no clinical reaction.

A duplicate series carried at 37° C. behaved very similarly. Here a ferret received material from the 7th serial passage. It, too, showed no clinical reaction.

Conclusion.

Under the conditions of the experiments it was not possible to maintain the strain of distemper virus by serial passage using the yolk-sac, allantoic cavity or amniotic cavity routes of infection. Nor was there any evidence of virus multiplication when passage was attempted by seeding embryo emulsion on to chorioallantoic membranes.

Virulence of the Egg Adapted Strain of Virus for Ferrets.

Rather more than 100 ferrets have been used to control the routine passage of the virus through eggs. The reactions produced in ferrets with material up to the 30th egg generation have been described in a previous communication (Haig, 1948). The peracute form of distemper with an invariably fatal termination has been seen only in those animals which received virus up to about the 20th egg

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passage. From that stage onwards a gradual progressive decrease in virulence has become apparent so that now with the strain in approximately its 90th subculture only the subacute form of the disease is produced, with recovery rather than death being the rule. That this cannot be ascribed to the injection merely of a small dose of virus is evident from the results of virus titrations recorded above and that, following the use of undiluted routine passage emulsions, the period of incubation has remained constant at about 48 hours.

At this Institute the isolation accommodation for ferrets is limited and somewhat primitive. Consequently when this work was commenced the majority of ferrets, which did not die or become moribund within 72 hours of the first rise in temperature, were destroyed to minimize the danger of accidental air-borne or contact infections and to clear the isolation room rapidly for thorough disinfection prior to the introduction of a new batch of experimental animals. In the earlier stages of the investigation there was considerable evidence that infection did pass from reacting to healthy ferrets by indirect contact, for example, in virus titration experiments, from the early reactors which received injections of concentrated emulsion to those ferrets which received subinfective doses of virus. From time to time uninjected control ferrets were placed in separate cages on the shelves in close proximity to infected ferrets. Gradually it became apparent that accidental infection was not taking place and the precautions taken inside the room were relaxed considerably. Instead of eliminating reactors the disease was allowed to take its course.

An illustration of the course of the febrile reaction in a ferret which received intraperitoneally an undiluted emulsion of infective chorioallantoic membrane in its 92nd egg passage is shown in figure 2. After an incubation period of less than 72 hours the reaction commenced, but the ferret did not appear visibly sick until the 6th or 7th day, some two days after the temperature had returned to normal. At this stage eye and lip lesions appeared and the animal would not eat. A second prolonged fever began on about the 10th day, during which stage the ferret was in a debilitated condition, but it survived in spite of further minor fluctuations of temperature. Deaths have occurred during the late stage of the disease, but recovery appears to be the rule rather than the exception.

Conclusion.

From these observations it is concluded that with continued serial passage of the virus through fertile eggs two modifications have occurred:—

(1) The virus has lost, at least to some extent, its highly contagious character.

(2) A slow but progressive attentuation is taking place.

Discussion

Jenkins and Shope (1946) reported that a slight but definite attenuation of rinderpest virus for calves resulted from serial passage

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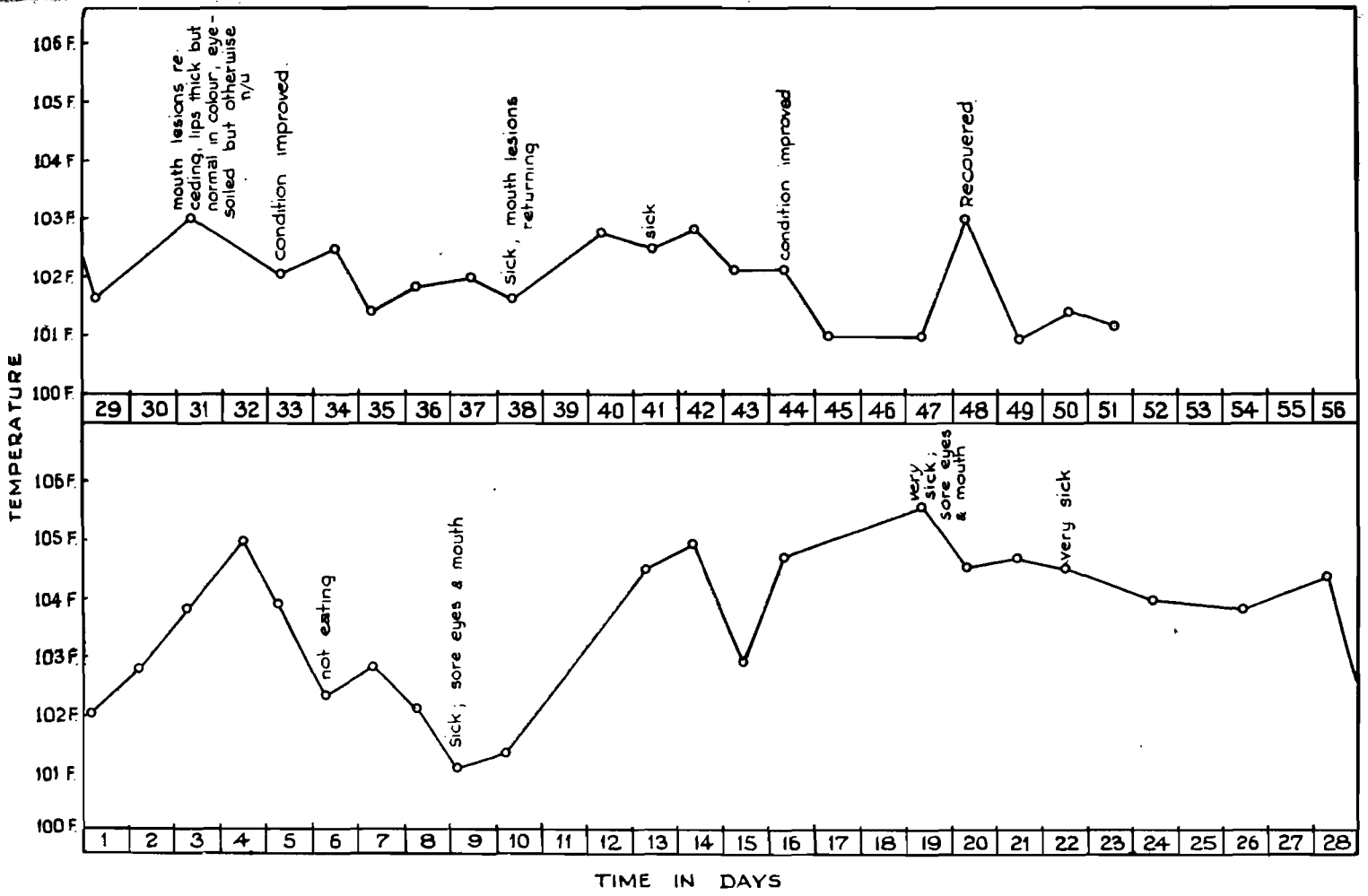

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on the chorioallantoic membrane of fertile eggs. Once the strain of virus had been adapted to membrane subculture it could be propagated with ease by injection into the yolk-sac. Following yolk-sac passage attentuation proceeded more rapidly and with greater regularity. Similar observations have been made with the virus of bluetongue of sheep (Haig, unpublished). No difficulty was experienced in propagating Green's Distemperoid virus by the chorioallantoic route and it was hoped that if the strain could then be adapted to yolk-sac passage the outcome would be a rapid attentuation. Unfortunately all attempts to passage the virus by a route of infection other than directly on to the chorioallatoic membrane failed. It is freely admitted, however, that considerable additional work is essential before it can be concluded that such proceedures cannot succeed, e.g., variations in the age of the embryos and the pre-incubation conditions in conjunction with a more detailed investigation of the post-injection temperature of incubation (Alexander, 1947).

Green's Distemperoid virus has been used extensively for the immunization of dogs and many favourable reports have been published (Yutuo, 1948, and others). In South Africa the general concensus of opinion is that use of the vaccine is not unattended by considerable danger (Council of S.A.V.M.A., 1948). Up to the present no opportunity has presented itself of investigating the effect of the egg attentuated virus by critical experiments on fully susceptible dogs. It is suggested that this aspect merits careful attention.

Summary

(1) The virus contained in Green's canine distemper vaccine of ferret origin has been maintained by serial passage through fertile hen's eggs for more than 90 subcultures over a period of 15 months by the chorioallantoic membrane method of subinoculation.

(2) Under the conditions of the experiments the virus could not be propagated by injection into the yolk-sac, the allantoic cavity or the amniotic cavity. Emulsified embryos injected on to the chorioallantoic membrane failed to maintain the virus.

(3) Over the range 32° C. to 37° C. the highest temperature was found to be the most suitable for the production of the most marked lesions and the highest titre of virus.

(4) The egg membrane adapted virus was found to have become partially attentuated for ferrets and to have lost some of its highly contagious character.

(5) The significance of the results and the possibility of the application of the modified virus to the immunization of dogs is discussed.

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Acknowledgments

I wish to take this oportunity of acknowledging the help of Mrs. Le Roux and the painstaking technical assistance of Miss Smith and Miss Erasmus. Also I tender my thanks to Dr. R. Alexander for his continued help, encouragement and constructive criticism. Mr. Odendaal took the photograph.

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THE DIAGNOSIS OF EAST COAST FEVER IN SOUTH AFRICA: A REVIEW

A. M. DIESEL, Pretoria. and G. C. VAN DRIMMELEN, Bloemfontein.

Neitz (1943, 1945) has indicated that the conventional views on the aetiology of East Coast Fever require revision.

The control of this disease has for many years taken a very high priority in the Veterinary Field Services of South Africa. Early diagnosis has played a particularly important rôle in this work. Although no modification in existing control measures was envisaged by Neitz (1943) the position with regard to the system of diagnosis at present employed may be altered when more information about the cause becomes available.

In relation to the value of the cattle which are infected with East Coast Fever in this country at present, the efforts made in connection with diagnosis are truly colossal. The records of this work deserve a more comprehensive report, but the graph given here will give some indication of what has been done as regards preparation, recording and examination of smears.

Historical

Robert Koch (1898, 1903) originally described the disease as African Coast Fever of cattle caused by a blood parasite. Known as "East Coast Fever" in the Transvaal, it was at first diagnosed by the heavy cattle mortality and the presence of small piroplasms (bacillary piroplasms) in the blood, which Theiler (1904) described as *Piroplasma parva*. The correct name, *Theileria kochi* (Stephens and Christopher, 1903) has been abandoned in favour of the more generally applied "*Theileria parva*" (see Neitz, 1943; Wenyon, 1926, etc.). At a conference in Bloemfontein, Koch (1903b), having seen small piroplasms in blood smears, reported that he had found East Coast Fever in cattle from East London. This is strange, because there was no mortality from East Coast Fever in that area at the time.

When more qualified veterinary staff was appointed the post mortem examination of carcases became an important item in the diagnosis of the disease. With the demand for early diagnosis and the stricter regulations for the control of cattle movements, the so-called "infarcts" or foci of lymphoid hyperlasia in kidneys and liver received much attention.

After the description of "*P. mutans*" (later included into the genus *Theileria*) by Theiler (1906), "Koch's bodies" or "Blue bodies" became the principal feature of the diagnosis of East Coast Fever. Subsequently the "Agamonts" and "Gamonts" were distinguished. In Theiler's own words, "the presence of these granules in lymphatic glands, kidneys and spleen, is specific for East Coast Fever". This view was upheld in South Africa for about two decades

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notwithstanding the publication of very controversial opinions on the subject of theileriasis elsewhere; (Carpano, 1915; Sergent e.a., 1924; Brumpt, 1923). In the southward spread of the scourge to the Cape Province in 1910, however, the mortality was still a guiding factor.

Turnbull (1926) and Viljoen and Martinaglia (1928) showed that the positive diagnosis was complicated by the presence of Koch's bodies in *T. mutans* infection, but while the uncertainty was accepted (Du Toit, 1930), these bodies still remained the most important criterion for diagnosing East Coast fever. The history of the area, the movement of stock and the conditions affecting viability of the vector of Eost Coast Fever received more and more consideration. The drive for early detection of infected properties led to an extremely intensive control of cattle census, even in remote areas. The large, though still inadequate field staff, was applied to the task of procuring spleen smears from all cattle that died or were slaughtered in potential East Coast Fever areas. As a result, the percentage of outbreaks in which no more than one death was confirmed by a positive smear, showed a sharp increase. A large proportion of these " single deaths " were in calves kept under conditions similar to the debilitating circumstances mentioned by Du Toit (1930) in connection with the cases of *T. mutans* infection showing Koch's bodies. The laboratory diagnosis of a positive smear has since been formulated in terms of Koch's bodies and small piroplasms istead of stating that East Coast Fever was present.

Very great difficulties attended the application of control measures under these circumstances. So much so that an appeal was made (Van Heerden, 1933) for intensified investigation into the problem of a reliable diagnosis. In practice epizootological factors were given the greatest consideration. To the stock-owners the veterinarian appeared to adopt an attitude of " wait and see," which reduced their confidence in the efficiency of smear-examination.

The method of arriving at a diagnosis was to some extent stabilised as the result of work clarifying the status of the *Theileria mutans* infection (also referred to as " Tzaneen disease " (De Kock, Van Heerden, Neitz and Du Toit, 1937). The interpretation of circumstantial facts in the event of an outbreak was materially assisted.

Diagnostic Considerations

The following have become the main considerations in the routine diagnosis of East Coast Fever:—

1. *Microscopic smear-examination.*

(a) The spleen smear is favoured. If fresh spleen pulp is spread thinly over a clean glass slide, erythrocytes, lymphocytes and tissue cells, showing small piroplasms and Koch's bodies to their best advantage can be seen in every field. The activity of the cells of the lymphocytic series can be seen fairly well. Unfortunately the spleen decomposes rapidly after death.

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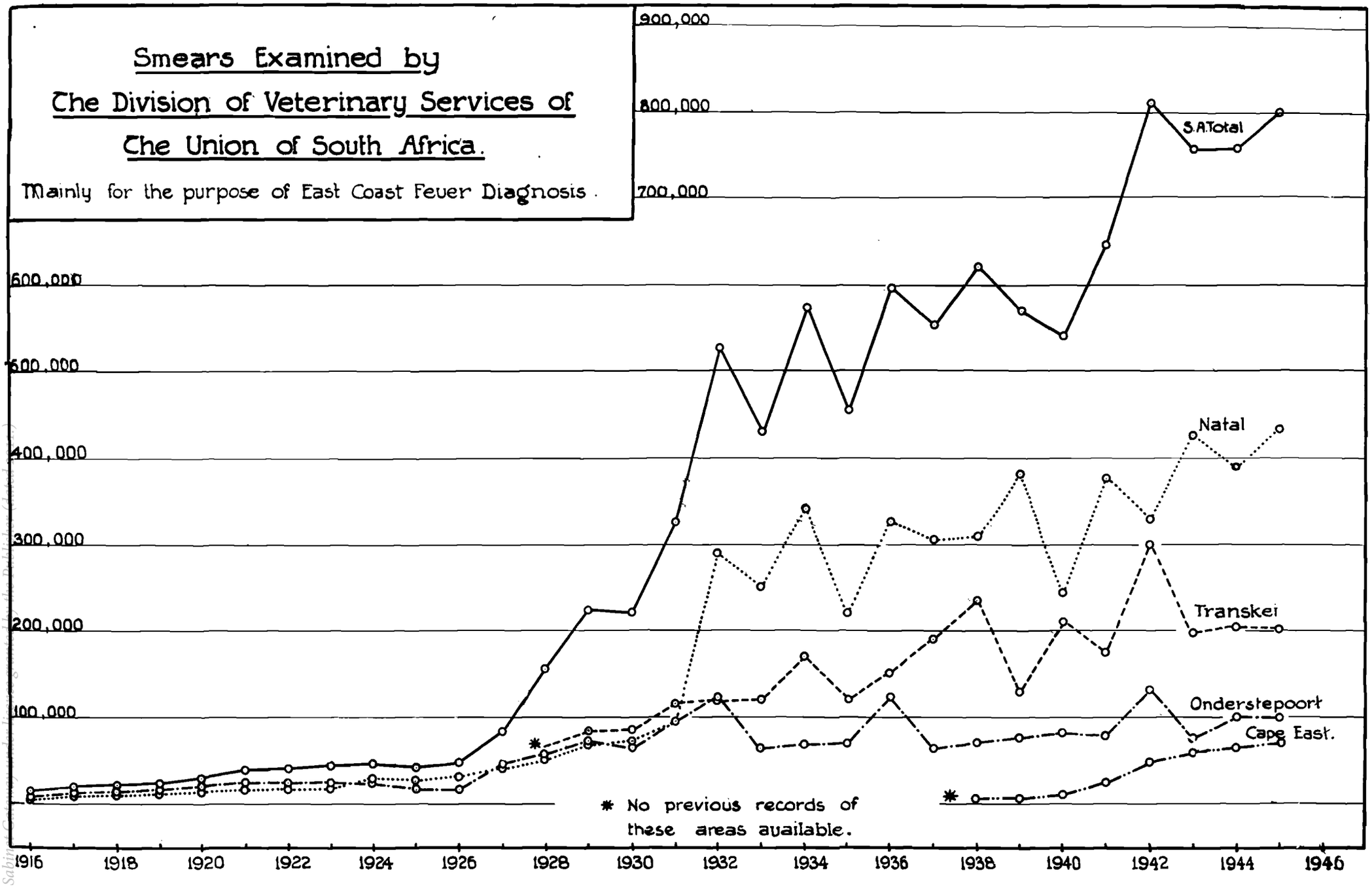

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Gland and blood smears should also be examined if the carcass is not fresh. Smears of red bone-marrow may be useful.

(b) The gland smear is usually lacking in erythrocytes. Koch's bodies may be rare in such preparations, especially if the animal should have been killed in the early stages of illness.

(c) The blood smear is often very informative if taken from the extremities of a partly decomposed carcass. Post-mortem changes are less advanced in the tip of the *tail* or in the *foot.*

(d) The bone-marrow is also fairly resistant to post-mortem changes.

The microscopical diagnosis is not given simply as negative or positive for theileriasis, but in terms of the organisms found. A **negative** diagnosis is given when no parasites are seen in a good preparation containing lymphoid tissue and erythrocytes. A **doubtful negative** diagnosis is made when a preparation lacks erythrocytes or lymphocytes, but is sufficiently fresh to show organisms such as *B. anthracis.* From the aspect of East Coast Fever control, these apparently negative smears should be classed as unsuitable. A smear is regarded as **unsuitable** when it is faultily prepared or taken from decomposed material.

Positive diagnoses are given in accordance with the determination of small piroplasms and Koch's bodies, cognisance being taken of the fact that isolated small piroplasms are found in bovine blood from many parts of South Africa where no East Coast Fever exists.

Different microscopic findings are described under the following circumstances:—

(i) If **rare small piroplasms** are noticed, the smear is submitted to a careful control examination. Particular attention is also paid to the farm of origin if this is situated in an East Coast Fever area.

(ii) A good smear showing **infrequent Koch's bodies** only, is considered suspicious of *Theileria mutans* infection, but the farm of origin, when in an East Coast Fever area, is temporarily subjected to strict control. A re-examination of previous smears is usually made.

(iii) Where either **small piroplasms only** or **Koch's bodies only** are frequent, the diagnosis is highly suspicious and if the farm is in an East Coast Fever area it is treated as a property suspected to be infected.

(iv) In smears showing both **small piroplasms** and **Koch's bodies** in large numbers, with signs of very active multiplication of lymphocytes, the frequency of the small piroplasms in the erythrocytes is considered a determining factor of the positive diagnosis of *Theileria parva.* However, the laboratory report merely states: "Numerous Koch's bodies (Agamonts and Gamonts), small piroplasms frequent".

The Veterinary Officer in charge of the field section is immediately advised of a positive laboratory diagnosis and this is correlated with the history of the farm from which the smear was sent. The East

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Coast Fever areas are demarcated by law in South Africa, and within these areas the regular census of cattle, control of their movements by permit and supervision of dipping of cattle is organised in minute detail. The laboratory findings are transmitted to the technical field officers for immediate action and further investigation on the following aspects:—

(a) **The case history:** The movements of, and symptoms shown by the affected animal prior to slaughter or death, are noted with a full description of the circumstances under which the animal died and the smear was made. This is necessary to control the accuracy of smear recording.

(b) **The epizootological considerations:** The last previous infection in the surroundings, the distance from the nearest active outbreak and cattle movements that have taken place in the area are carefully studied. Notes are made of communications, roads and paths liable to be used for illegal purposes. The weather conditions in relation to tick activity are taken into account.

(c) **The record of control measures:** In an East Coast Fever area a very careful census of cattle is kept. Movements only take place on written permission. All cattle are inspected and for every death a smear must be sent in for microscopic examination. The efficiency of these measures varies with the personal qualities and the number of officials available. The type of stock-owner is naturally variable. Good information concerning these variable human elements often assists in arriving at a diagnosis, particularly where the records are accurate.

Only after correlating the laboratory with the field reports, is the Director of Veterinary Services in many cases able to decide on the diagnosis to be made. Considerable experience, tact and skill is required in negotiating the investigations on the spot, and unless the field officers are acquainted with the "human element" of the population as well as the topography of the area, the final diagnosis may have to be postponed for weeks. During the cooler and drier months of the year when tick activity is lowest, cessation of deaths is often experienced on infected farms. Numerous opportunities of drawing faulty conclusions exist. A common hazard, for instance, is the substitution of smears from dead cattle, by smears from an animal previously slaughtered and known to be free from parasites. Another deception commonly attempted, is to remove a beast from a neighbouring (sometimes infected) farm where a new calf was born and to substitute this animal for one that may have died on the adjoining farm. On the neighbouring farm the calf takes the place of the missing beast in the total count, and should the inspector not keep a careful record of pregnant and lactating cows the deception succeeds. With highly specialized field officers and efficient records of cattle on a farm over a period of three years, it is usually possible to arrive at a diagnosis immediately. In a number

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of cases developments over a period of thirty days to three months have to be awaited, whilst the farm is temporarily treated as suspected.

East Coast Fever History

The East Coast Fever history of many properties shows a special feature in periodical recrudescence of infection, but other localities of similar topography and comparable situation have not experienced these unexpected recurrences after the disease was eradicated. Analysis of the records of all properties that have been infected in South Africa should form the basis of an interesting study on the epizootology of East Coast Fever. A preliminary examination of the reports on outbreaks diagnosed since 1920, however, shows that the history of the disease in a few localities holds a clue to the smouldering nature of the infection sometimes encountered. For instance, the outbreaks on Gos Farm, Komgha district, in 1946, and on Zibungu, Libode district, in 1947, are striking examples of recrudescences in areas where reintroduction of the infection from a known infected property can definitely be excluded. No known infection was present within a radius of 100 miles from these farms when the disease broke out again after mortality from East Coast Fever had ceased eight years and two years before, respectively. The history of these outbreaks shows that the infection of cattle with *T. parva* may under certain conditions in the field terminate in recovery. Non-fatal cases of East Coast Fever on a property could be a source of infection for vectors to such an extent that the disease could remain obscure for a period of years. No information on the infectivity of East Coast Fever cases which terminate in recovery is at present available, but Neitz (1946) has drawn attention to the fact that some artificially infected cattle (Theiler and Du Toit, 1928, 1929) recovered after reactions during which Koch's bodies and small piroplasms were demonstrated in the smears. Wilson (1946) also mentions records of such sub-lethal cases.

Although many of the farms which show a record of repeated recrudescences are situated in the vicinity of properties that were infected at the time when the deaths recommenced, it does not follow that the infection was in all cases introduced by the transfer of infected cattle or ticks. The careful control measures instituted in many of these areas justifies consideration of the possibility that the disease may have been smouldering on the farms. The Komgha and Libode infections smouldered, when they were surrounded by a closely controlled cattle population free from all diagnostic signs of East Coast Fever.

Table I shows in a few figures the periods during which no East Coast Fever was diagnosed on 23 representative properties. These properties were selected because they had experienced at least three outbreaks since 1920 and because the available records were relatively complete.

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TABLE I.

The incidence of time intervals of different lengths between the last death of a previous outbreak and the first death of a subsequent outbreak in twenty-three localities where fifty-four outbreaks were diagnosed.

Length of interval (in years) during which no case of East Coast Fever was diagnosed.	The number of outbreaks preceded by the given intervals free from East Coast fever mortality.
1¼ to 2	5
2 to 3	15
3 to 4	9
4 to 5	6
5 to 6	6
6 to 7	4
7 to 8	1
8 to 9	4
9 to 10	1
10 to 11	2
11 to 13	1
TOTAL	54

A summary of the records on these farms is given in Table II.

Areas where East Coast Fever was again diagnosed after removal of all cattle subsequent to a previous outbreak are few. Some are listed in Table III. The details given show that after the cleaning of these infected properties by the removal of the susceptible cattle hosts for the period during which the vectors could remain infective, the factors responsible for infection of the cattle on the property had disappeared. There is no case on record in South Africa where East Coast Fever has spontaneously recurred on a property from which all cattle were removed after a previous infection when the property was maintained free from cattle as long as the ticks could retain their infectivity.

In a few areas the repeated occurrence of only one fatal case of theilerasis has given much trouble. (See Table IV.) *T. mutans* has often been held responsible for these cases.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis of Eost Coast Fever requires exclusion of protozoal diseases such as the theileriases other than those caused by *T. parva,* and redwater, anaplasmosis and nagana. Malignant catarrhal fever, snotsiekte, lymphatic leukaemia and lymphatic aleukaemia may also be characterized by gland enlargement.

The present method of East Coast Fever diagnosis is based on both epizootological and protozoological studies. In the laboratory the main difficulty is the failure to detect the parasites in faulty and

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decomposed preparations and the similarity in the microscopic appearance of the various *Theileria* spp. In the field, the maintenance of a staff suitable in experience and integrity, at full strength, is extremely difficult.

The Director of Veterinary Services thus takes a greater share in the making of East Coast Fever diagnoses than in the case of most other proclaimed diseases in South Africa. He considers the correlation of laboratory and field reports in the light of the vast records of experience, before a final opinion is expressed.

The authors acknowledge the help of the officers of the Veterinary Division and access to their records.

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TABLE II.

Localities where more than two outbreaks of East Coast Fever have occurred since 1920.

No.	District	Farm or Area	Period free from E.C.F. prior to outbreaks (in months)	Year of outbreak	Period infected with E.C.F. (months from first to last deaths)	Number of deaths during outbreak	Number of cattle on infected property	Policy adopted for eradication D = Dipping; S = Slaughter; C = Farm cleared of cattle	Topography and Vegetation	Remarks
1	Libode	Zibungu	15*	1929	24	164	4,644	D	Very rough country thickly bushed	
			30	1933	20	84	3,439	D		
			47	1939	15	51	811	D		Area reduced, 1936, to Lower Zibungu
			31	1943	29	510	782	D		
			20	1947	5	4	500*	C		
2	Komgha	Gos Farm	15*	1926	30	22	805	D	Rough and partly bushed	
			104	1928	3	7	876	D		
			99	1946	10	11	800*	S		
3	Engcobo	Upper Gqaga	15*	1927	13	25	1,133	D	Very rough and very thickly bushed	
			59	1933	16	402	1,406	D		
			69	1940	5	15	1,637	D		
			32	1943	1	1(KB)	1,433	D		
4	Umzimkulu ..	Rasmeni Location	15*	1921	26	112	1,947	D	Undulating country moderately bushed	
			45	1926	19	94	7,000*	D		
			35	1931	4	2	3,772	D		
5	Ixopo	Tank Area 90; Location 8	15*	1923	42	303	7,674	D	Rough and wooded	
			37	1930	3	4	1,993	D		Tank area reduced
			70	1936	2	2	2,868	D		
6	Polela	Tank Area 258; Location 1	15*	1929	25	155	769	D	Very rough and bushy	
			27	1933	8	19	570	D		
			105	1942	16	380	991	D		
7	Polela	Tank Area 394; Lot F.P. 388 ..	15*	1929	59	105	330	D	Very rough and bushy	
			35	1937	14	8	282	D		
			34	1941	18	67	384	D		

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TABLE II. — *Continued.*

No.	District	Farm or Area	Period free from E.C.F. prior to outbreaks (in months)	Year of outbreak	Period infected with E.C.F. (months from first to last deaths)	Number of deaths during outbreak	Number of cattle on infected property	Policy adopted for eradication D = Dipping; S = Slaughter; C = Farm cleared of cattle	Topography and Vegetation	Remarks
8	Polela	Tank Area 184;	15*	1926	15	27	1,135	D	Very rough and	
		Mofu	18	1929	4	2	1,530	D	bushy	
			47	1933	1	1	2,400	D		
9	Pinetown	Rose Cottage	15*	1929	13	14	100	D	Bushed	
			47	1934	5	5	49	D		
			33	1937	1	1	108	D		
			60	1942	3	3	89	D		
10	Pinetown	Kleinzeekoe	15*	1925	9	15	259	D	Bushed	
		Valley	120	1936	10	45	433	D		
			70	1943	1	1	317	D		
			40	1946	9	2	300*	D		
11	Bergville	Tank Area 453 ..	15*	1923	10	2	800*	D	Partly rough and	
			76	1930	6	4	1,377	D	sparsely bushed	
			52	1935	9	6	1,399	D		
12	Bergville	Tank Area 167 ..	15*	1923	14	265	1,200	D	Rough and	
			70	1930	13	71	2,017	D	sparsely bushed	
			48	1935	1	1	1,468	D		
13	Richmond	Lot XY	15*	1922	4	16	55	D	Very rough and	
			20	1924	21	6	50	D	bushed	
			26	1928	12	128	202	S		
14	Helpmakaar ..	Wilhelmshöhe ..	15*	1923	9	26	222	D	Rough and bushed	
			110	1933	1	1	316	D		
			48	1937	13	16	269	D		

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15	Vryheid	Verniet 172	15*	1926	1	1	72	D	Fairly open grasslands	Origin doubtful
			74	1932	9	40	175	C		
			120	1943	26	38	178	D		
16	Babanango ..	Langgewacht 449	15*	1922	4	3	212	D	Undulating hills and grasslands	
			154	1935	10	10	282	D		
			76	1942	12	223	1,052	D		
17	Babanango ..	Springfield 440 ..	15*	1922	12	18	477	D	Undulating hills and grasslands	
			25	1935	5	3	252	D		
			92	1943	2	3	246	D		
18	Umvoti	Goudini Area, including Waterfallview	15*	1922	2	2	129	D	Rough and bushed	
			25	1924	1	1	290	D		
			107	1933	20	6	127	D		
			36	1938	4	9	162	D		
			53	1942	18	20	917	D		
19	Mtunzini	Msasandile Area, including tank areas 632 and 633	15*	1925	52	698	5,896	D	Rough and bushed	
			28	1932	2	2	8,201	D		
			35	1935	2	12	8,600	D		
20	New Hanover	Tank Area 51, Mbava	15*	1924	25	133	1,500*	D	Very rough and bushed	
			35	1929	25	4	1,183	D		
			46	1935	14	8	1,706	D		
21	New Hanover	Tank Area 148, Manda Location	15*	1925	13	40	1,300*	D	Very rough and bushed	
			23	1928	24	7	1,300	D		
			34	1933	1	1	1,669	D		
			16	1934	10	105	1,616	D		
22	Piet Retief ..	Anhang 41 area, including Meyershoop 78	15	1929	3	3	84	C	Undulating grasslands	Reintroduced
			47	1933	1	9	131(Ang)	S		
			77	1939	15	17	160(Meyh)	S		
23	Ermelo	Mayflower 224 ..	15*	1926	12	64	226	D	Rough and sparsely bushed	
			59	1932	6	46	223	D		
			66	1938	1	1	185	C		

* Conservative estimate.

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TABLE III.

Localities where East Coast Fever was again diagnosed on farms previously cleared of cattle.

No.	District	Farm or Area	Period free from E.C.F. prior to outbreaks (in months)	Year of outbreak	Period infected with E.C.F. (months from first to last deaths)	Number of deaths during outbreak	Number of cattle on infected property	Policy adopted for eradication D = Dipping; S = Slaughter; C = Farm cleared of cattle	Topography and Vegetation	Remarks
1	Piet Retief ..	Anhang 44	15	1929	3	3	84	C	Open grasslands moderately bushed	Infection reintroduced
			47	1933	1	9	121	S		
		(Adjoining farm Meyershoop 78)	77	1939	15	17	160	S		,,
2	Pietermaritz-burg	Wombat	15	1933	1	5	193	C	Open grasslands moderately bushed	
			34	1935	1	1	74	D		Doubtful case
3	Weenen	Blinkwater	15	1922	2	25	398	C	Rough and bushed	
			189	1937	1	1	502	D		Calf 3 weeks old showing Koch's bodies only
4	Port Shepstone	Marburg L 37	15	1923	1	1	26	S	Open grasslands without bush	
			118	1933	14	3	330	D		All three doubtful cases
5	Vryheid	Township	44	1934	1	1	16	C	Open grasslands without bush	
			107	1943	16	7	?	D		Reintroduced
6	Vyrheid	Verniet 172	74	1932	9	40	175	C	Open grasslands without bush	
			120	1943	26	38	178	D		Reintroduced

N.B. — All recrudences of East Coast fever on cleared farms, followed introduction of infected cattle. Suspected cases on other cleared farms apparently showed only *T. mutans* infection.

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TABLE IV.

Localities where several single cases of Theileriasis have been encountered.

No.	District	Farm or Area.	Date	Smear No.	Laboratory findings	Field Findings: Animal	Cause of death	History and Symptoms: Age	History and Symptoms	Diagnosis	Remarks, and date restrictions released
1	Lower Umfolozi	Ngweni No. 623	23. 3.39	27122	K.B.R., N.S.P.	Bull	Died	2 yrs.	.....	T3	Released 30.6.39
			31. 3.40	43807	K.B.R., N.S.P. (Tzaneen)	Heifer	Died	18 mths.	Gored on 25/3 P.M.: neg.	T2	Released 14.5.40
			20. 3.41	39567	K.B.R., N.S.P.	Calf	Died	.....	.....	T2	Released 20.6.41
			10. 8.42	10430	S.P.F.F., B. bigem.	Cow	Died	Aged	Gradual looss of condition for 2 months. P.M.: emaciation.	T1	.....
			24.11.41	31647	S.P., B. bigem.	Bull	Died	.....	.....	.....	.....
			23. 3.44	53165	K.B.A.	Bull	Killed	2½ yrs.	.....	T2	.....
			13. 6.44	65298	S.P.R.	Bull	Died	.....	.....	.....	Released 23.6.44
2	Mtumzini	Ndlovini No. 631	6. 3.34	.....	?	.....	.....	.....	.....	.....	.....
			21. 5.35	1.....	K.B., N.S.P.	Ox	Killed	.....	Introduced 13/5/35; killed 14 or 21/5/35	T3	.....
			3. 3.36	.....	?	.....	.....	.....	.....	.....	.....
			14. 3.37	.....	?	.....	.....	.....	.....	.....	.....
			20. 2.40	38803	K.B.F., N.S.P. Tzaneen disease doubtful	Calf	Died	5 mths.	Loss of appetite, progressive weakness and emaciation	T3	Released 6.6.40
3	Mtunzini	Mkobora No 638	21. 5.25	.....	?	.....	Killed	.....	.....	.....	.....
			29. 6.36	.....	?	.....	Killed	.....	.....	.....	.....
			13. 3.38	35400	K.B.F., N.S.P.	Ox	Killed	4 yrs.	Introduced. Healthy when killed	T3	Released 25.7.38
			17.11.41	39397	S.P., B. bigem.	Heifer	Killed	10 mths.	Sick 3 days. Poverty	T1	.....
			1. 3.42	57077	S.P.	Ox	Died	.....	.....	.....	.....
			4.10.42	23912	S.P.F.F., B. bigem.	Cow	Killed	.....	Off feed 1 day. Killed for meat	T1	.....
			20. 2.43	44871	K.B.R.	Bull	Killed	.....	.....	T2	Released 27.10.43
			23. 3.43	48455	K.B.V.R.	Calf	Died	.....	.....	.....	.....
			24. 7.44	5859	S.P., B. bigem. and bovis	Cow	.....	.....	.....	.....	.....
4	Eshowe	Mlogalwane No. 648	6.12.27	.....	?	.....	.....	.....	.....	T4	.....
			2. 2.39	23237	K.B.F., N.S.P., B.	Calf	Died	9 mths.	General debility. Enlarged spleen	T3	Released 30.6.39
			7. 3.40	41161	K.B.V.R.	Calf	Died	4½ mths.	Born healthy. Mother: udder atrophy. (malnutrition)	T2	Released 17.5.40
			2. 2.43	42370	S.P., B. bigem.	Cow	.....	.....	Sick one day	T1	.....
5	Eshowe	Honati No. 662	1926	.....	?	Four positive cases of E.C.F.				T4	.....
			1934	.....	?	.....	.....	.....	.....	.....	.....
			1936	.....	?	.....	.....	.....	.....	.....	.....
			25. 1.38	34156	K.B.F.F., N.S.P.	Calf	Died	3 mths.	Progs. Weakness after 1 month old. Died in extreme debility	T3	Released 25.7.38
			12. 2.39	23443	K.B.R., N.S.P.	Cow	Killed	3 yrs.	Born in area, injured when served. Killed 4 days later	T3	Released 30.6.39
			26. 1.43	40895	K.B.F.	Ox	Killed	.....	Gored and slaughtered	T2	Released 30.6.43

K.B.=Koch's Bodies; A=agamonts; G=gamonts; K.B.R.=Koch's Bodies Rare; V.R.=Very Rare; K.B.F.=Koch's Bodies Frequent; S.P.=Small Piroplasms; S.P.R.=Small Piroplasms Rare; S.P.F.=Small Piroplasms Frequent; F.F.=Fairly Frequent; N.S.P.=No Small Piroplasms; T1=Not suspicious of East Coast Fever; T2=Suspicious Theileria mutans infection; T3=Suspicious Theileria parva infection; T4=Theileria parva infecton.

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PRELIMINARY REPORT ON AN INFECTIOUS ENTEROTOXAEMIA-LIKE DISEASE IN SHEEP

K. C. A. SCHULZ and C. McINTYRE

Introduction: Every winter the Director of Veterinary Services, Onderstepoort, receives numerous reports of losses among sheep grazing on green wheat, rye, oats, lucerne or barley lands. The mortality rate among this class of stock may vary considerably from year to year, being small or very high at times. The losses recently encountered were the most serious experienced for a number of seasons, and were linked with the prevailing abnormal climatic conditions. Copious late autumn rains had fallen and the winter was extraordinarily mild, excepting for a few cold spells, therefore, the growth of the pastures was much better than in former years. The heavy losses occurring on good rich grazing were rather perturbing, especially as there is a tendency to improve pastures by modern agricultural methods in these areas.

In the past the deaths of the sheep were ascribed either to poisoning caused by frost-damaged fodder crops(1) or to malignant oedema.(2) The latter condition could, however, never be confirmed bacteriologically.(3) The aetiology of this disease still remains obscure, but there is evidence indicating that possibly a bacterial toxin is evolved in the small intestine, such as that causing infectious enterotoxaemia in sheep (4, 5, 6, 7) or " pulpy kidney " in lambs (8, 9, 10) in other parts of the world. If the above assumption is confirmed, then a rational prophylactic measure could be devised for the proper control of the disease.

Although it is impossible to compute them in round figures, the total losses, ascribed to this malady, must be very considerable and are undoubtedly of such economic importance as to warrant further investigation.

The object of this publication is to record the occurrence of such a disease in certain parts of this country and to stimulate further investigations re this affection of sheep.

Field Observations: Since last April, heavy mortalities occurring among sheep were reported on several farms in the Queenstown, Aliwal North, Grahamstown and Bloemfontein veterinary areas. On investigation, it became apparent that the losses reported could not be ascribed to a single cause only. A variety of diseases, such as pronounced liver fluke infestations, senecio poisoning, bloating and intussusception of the small intestine, were observed. However, a disease with a definite syndrome ,anatomical-pathological changes and a high mortality rate was encountered on various farms. The latter conditions only will be dealt with in some detail.

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Distribution: The disease is fairly widely spread over a large area involving portions of the Eastern Cape and of the Southern Free State. It is of interest that "bloedpens", a disease affecting young lambs, is apt to occur in the same locality.

Incidence: The incidence varies according to the age and condition of the sheep, the climatic conditions and the stage of growth of the pastures.

Age: The experience is that young sheep in good condition, born during October of the previous year and having access to rich pastures consisting of wheat, oat or lucerne, are principally affected. Older sheep, however, may also succumb to it, but to a lesser extent. Exceptionally a heavy mortality occurs among young sheep grazing on veld which is rather on the hard and sour side, but no unusual losses are recorded among the other sheep. It would appear that young sheep in prime condition are the most susceptible to the disease, thus within certain limits age is not such an important factor as bodily condition and the stage of growth of the vegetation.

Climatic Conditions: There is evidence that the mortality rate was raised after a sudden change in weather conditions conducive to wilting and retarded growth of the crop plants. The number of deaths increased appreciably a day or two after a severe frost was followed by hot days. The green fodder plants damaged by the adverse climatic conditions may produce poisoning in animals feeding on them, as stated on a previous occasion.(1) However, another aspect must be considered, namely, the abnormal metabolic products formed in the damaged plant need not necessarily produce poisoning directly, but rather may create suitable conditions in the gut for the propagation of a bacterial flora leading to an excessive formation of toxins.

The mortality usually ceased after the sheep had been moved off the crop on to the veld, that is on to a dry and coarser vegetation, but in some cases the losses continued in spite of all methods of handling.

Sex is apparently not a determining factor though some farmers are inclined to believe that young ewes are more frequently affected.

Seasonal Incidence: The disease presumably has a seasonal occurrence; the severest losses occurring mainly during the late autumn and winter months.

Breeds Affected: Only merino sheep are bred on the farms visited, therefore no information is available of the susceptibility of other breeds.

Symptoms: Sudden death at any time of the day or night is most characteristic of the disease, though on some occasions most deaths occur during the night. In the vicinity of such carcases some signs of a slight struggle and the passage of a small quantity of soft greenish discoloured faeces may be evident. Not uncomonly an affected sheep is seen alive, but the illness is of comparatively short duration, lasting only up to a few hours. The symptoms are principally

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of a nervous (cerebral) type and of a variable nature. Restlessness, inco-ordination and spasmodic contraction of the limbs may be the first indications that something is amiss. Later the animal becomes dull, depressed and dejected, holding its head downwards (Fig. 1).

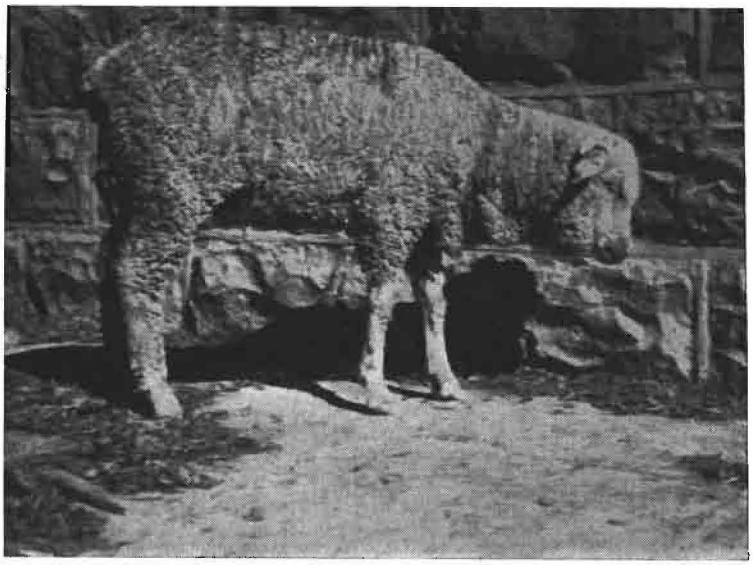

FIG. 1. — *Typical attitude of sheep in the early stages of disease. Drooping of the ears is a characteristic.*

As the disease progresses the lamb lies either in the sterno-abdominal position with its head turned to one side or is recumbent, lying flat on one side with legs extended and the head retracted backwards (opisthotonus) (Fig. 2). The latter stage may easily be mistaken for tetanus. Laboured respirations, dilation of the pupils, occasionally lachrymation, salivation, grinding of the teeth, hyperaesthesia, convulsions at intervals, pronounced paddling movements with all four limbs and nystagmus (rolling of the eyes) are additional symptoms noted.

Sometimes an affected animal roams about aimlessly and runs into obstacles; its vision presumably being affected, or its supports itself on its jaw, knees and hind feet.

The wool around the anus is usually soiled with soft, dark green discoloured faeces (diarrhoea). The temperature in these cases is raised and varied from 102° F to 104° F or 105° F even during the course of a cool morning. The animals when forced to move, tire easily and soon show signs of exhaustion. In addition the visible mucous membranes are injected, and in some cases a seromucoid secretion is seen in the medial canthus of the eye and the nostrils. The blood-smears were negative.

Chemical Analysis: The Ca, P and Mg contents of the blood did not differ from the normal and the nervous symptoms are apparently

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not attributable to a deficiency of these substances. The blood sugar content was variable; some animals showed a hyperglycaemia, a glucosuria and a slight aceturia, while in others a hypoglycaemia was demonstrated. The number of cases examined, however, are too small

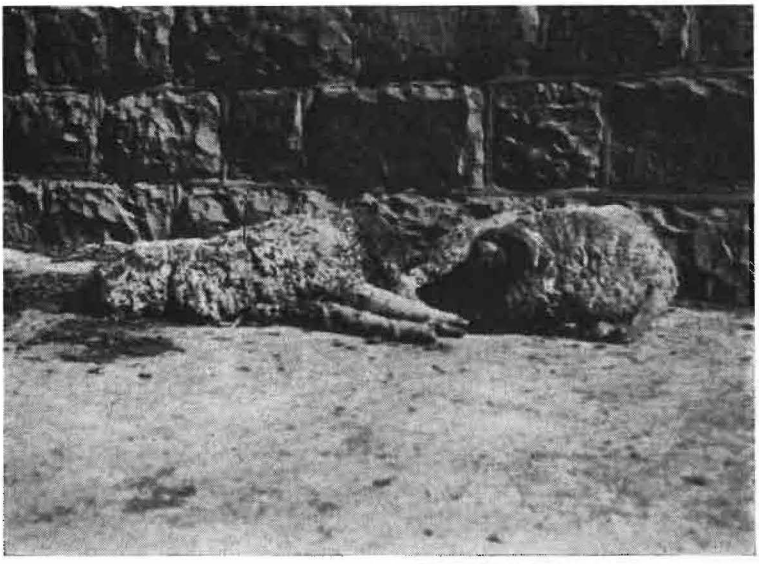

FIG. 2. — *End stages of the disease, one animal in the sterno-abdominal position with its head turned to one side, the other animal is lying flat with legs extended and the head thrown backwards.*

to draw definite conclusions regarding these factors. The N.P.N. of all cases was within the normal limits.

The examination of the ruminal content of a few cases proved negative for arsenic, lead and hydrocyanic acid poisoning.

Pathological Anatomical Changes: These varied considerably, depending on whether the animal had been killed or according to the period which elapsed between the time of death and the autopsy. In the former case nothing exceptional is noticed except congestion of the bloodvessels of the meninges and central nervous system, slight hyperaemia of the lungs, a hydropericard of variable degree and congestion of the mesenteric blood vessels.

Lesions were, however, most marked and distinctive when the autopsy was delayed for some hours. Even with a distinctly cool to cold outside temperature, putrefaction commences early and progresses rapidly. A blood-stained frothy fluid may come from the nostrils. Shortly after death the abdomen becomes considerably distended, the wool may be easily plucked out and the wool-free parts in the axillary and inguinal regions are dark purplish in colour. On opening the abdominal cavity the fore-stomachs and coils of intestines bulge out as they are markedly distended with gas. The blood vessels on the internal surface of the skin are very prominent, haemorrhages varying

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in size and reddish discoloured patches are usually noted over the forequarters and the neck. The subcutaneous tissue in these areas may be oedematously infiltrated, the fluid having a reddish tint. A sweetish odour may be present. Post-mortem changes were specially noticeable in the kidneys two or three hours after death, though absent in carcasses of sheep that died from other causes. The kidneys are extremely soft and pulpy and sub-capsular haemorrhages may be present. The cortex is principally affected. The renal capsule strips off easily. The pulpiness of the kidneys is presumably a post-mortem change, since, if the examination is made immediately after death the organ is still firm, although there is marked congestion in the intermediary zone and medulla. Although the blood vessels in the cortex are also injected, its colour is reddish-brown and not so intense as that described for pulpy kidney.

Subepicardial and subendocardial haemorrhages are not a constant finding. However, marked hyperaemia and a variable degree of oedema of the lungs, pronounced congestion of the blood vessels and catarrhal changes of the nasal mucous membranes; enlargement, venous stasis and degenerative changes of the liver; petechial areas under the serous covering of the intestines and the existence of bowel stasis; distension of the small intestines with gas. They have a translucent appearance and are comparatively empty; and a variable amount of congestion of the mesenteric vessels are some of the usual features of the disease. The pleural cavity contains a variable amount of fluid not necessarily in excess, though the pericardial fluid is usually abnormal in quantity and in autopsies which have been delayed, it may contain a large clot or become blood-stained. The myocard has a lighter tint than usual and its consistency is reduced.

All carcasses contained a large amount of fat.

Aetiology: As previously stated, the aetiology still remains obscure, although several attempts have been made to arrive at a definite diagnosis. The symptoms and the changes seen at autopsy not being pathognomonic for any particular disease, the difficulty in diagnosing the disease may be appreciated. By the process of elimination the following affections are considered to be unlikely causes:— anthrax, braxy, malignant oedema, blackquarter, tetanus, listerellosis, pasteurellosis, rabies, enzootic cerebrospinal meningitis, metallic poisons such as arsenic or lead, plant poisoning such as tulp, "bitter-appels" (*cucumis sp.*), bietou (*Dimorphotheca*) *matricaria nigellifolia,* smut in oats and possibly *diplodia zea* (these plants and fungi were present on several farms), infestations of internal parasites of the abomason and gut and *coenurus cerebralis.*

It may be stated that several blood smears and brain smears proved negative on microscopical examination. All attempts to reproduce the disease in susceptible animals by the inoculation of blood either subcutaneously or intravenously or by introcerebral inoculation of an emulsion of brain substance failed in all cases. In a few of the

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latter cases purulent foci developed at the site of injection. The bacteriological results were also all negative.

Prophylactic Measures and Treatment: As the cause of the disease could not be definitely determined, a rational treatment could not be prescribed. Treatment on general lines was advised such as immediate change of the grazing, dosing the animals with a purgative and thereafter with strong coffee to which sugar had been added. Beneficial results are often obtained by inoculating stock, suffering from obscure diseases, with anthrax vaccine, therefore farmers were advised to inoculate a portion of their flock and if the losses stopped thereafter, to treat the rest of their sheep in this manner. It would appear that some benefit was gained by this measure, considering some of the reports received.

Conclusion: All diseases, demonstrable by the examination of a blood smear, could be excluded. The disease was not transmissible to sheep, goats, guinea-pigs, rabbits, white rats or white mice, either by means of blood or emulsions of the central nervous system. The failure to produce the disease by the injection of filtered abdominal content, does not exclude the possibility of a bacterial toxin, being produced in the small intestine, as a likely cause. Plant poisoning, as a possible aetiological factor, could not be definitely excluded, but the symptoms and post-mortem changes were not typical of any of the suspected plants found. If the poisonous plants were a factor they should be regarded as contributory causes. The change brought about by the unusual climatic conditions (late rains and severe frosts) in the growing crop plants possibly may have created gastro-intestinal disturbances, thus forming suitable conditions for the production of abnormal toxic breakdown substances or toxins of bacterial origin especially in the ileum. The absorbed toxin entering the blood stream and circulating through the brain and nervous ganglia might have caused the serious nervous derangement. Poisons such as arsenic, lead and hydrocyanic acid are probably not associated with this disease.

In view of the fact that the post-mortem picture is that of a toxaemia and the early decomposition of the carcass suggests an anaerobic infection, it is assumed that the disease may be a form of infectious entero-toxaemia. The history, symptoms and pathological anatomical changes of the disease described are suggestive of an enterotoxaemia. The economic losses are of such a magnitude to justify further investigations.

Summary

A fatal disease causing severe losses and principally affecting young sheep in good condition, grazed on green crop plants, is described. The most striking features are nervous symptoms of cerebral origin and an affection of the intestinal tract (signs of diarrhoea) rapid putrefaction of the carcasses and a marked blown-up condition thereof. Although the aetiology could not be definitely determined, a number of diseases could, at this stage of the investiga-

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tion, be excluded as likely causes. It is suggested that the toxaemia noted may possibly be produced by the absorption of a toxin of bacterial origin from the small intestine especially from the ileum.

Acknowledgment

Sincere thanks is expressed to Dr. G. de Kock, Director of Veterinary Services, who authorized this investigation, to Dr. E. M. Robinson for carrying out the bacteriological examinations, and to Dr. W. Neitz who willingly carried out and supervised all the transmission experiments.

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TREPONEMA THEILERI OF A DONKEY AND ITS TRANSMISSION TO A CALF

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Spirochaetosis has been demonstrated in nearly all domestic animals in South Africa. Spirochaetosis of poultry, caused by Treponema anserinum (*Spirochaeta anserinum*) is fairly common in the flocks of the "back-yard" poultry farmer. Cutaneous Spirochaetosis of pigs, as described by Neitz and Canham (1930), is fairly common, and recently Canham (1947) described a small spirochaete in the blood of pigs. Spirochaetosis of cattle is also occasionally met with, but there is no doubt that this condition is wide-spread. The causal organism, *Treponema theileri* (*Spirochaeta theileri*) is often seen during the routine examination of field smears. In some few cases it is accompanied by marked blood changes which would indicate that it was the actual cause of spirochaetal "gallsickness". It has been demonstrated all over the world, though varying claims of virulence for it have been made. In South Africa, Theiler's view that it is usually secondary to some other condition, is generally held. Neitz (1935) transmitted *T. theileri* to blesbuck. In sheep *T. theileri* was first seen by Theiler (1904) in the Transvaal and has since been reported from other portions of Africa. Theiler (1904) also demonstrated *T. theileri* in the blood of horses. Dodd (1906) showed that it was inoculable to sheep and cattle. This organism has been noted in the blood of horses in various parts of Africa. The spirochaete of the donkey has been observed by Trautmann (1913) in German East Africa and by Mason (1916) in Egypt.

The object of this article is to record *T. theileri* in a donkey in Natal and to report its transmission to a calf.

On 2.1.47 a donkey foal about 2 months old showing extensive skin lesions was examined. The foal was obviously ill. It was lethargic, listless and reluctant to move. The temperature was 105°. A keratitis was present, the conjunctiva was reddened, the eyelids were slightly swollen and there was a watery discharge from the eyes. The skin was in poor condition and large masses of dandruff were peeling off over large areas. This was really an exfoliation of the surface layers of the skin, but no pruritis was, however, evident. A blood smear was prepared. Fair numbers of *T. theileri* were present and *Babesia equi* (*Nuttalia equi*) was rare. There were, however, no marked anaemia changes in the blood and the urine was a normal colour. Large numbers of *Rhipicephalus evertsi* were seen on the foal, but no other species of ticks. No treatment was undertaken, but the donkey was kept under observation. Two days later (4.1.47) this foal was very much brighter, the eye lesions were clearing and its general habitus had very noticeably improved. The temperature had

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dropped to 103°. Spirochaetes, although present in the blood smear, were very few in number.

Experimental Work

From this time the donkey foal improved daily and when seen again a month after the first attack of illness it was in excellent health. A blood smear was prepared, but no blood changes could be noted. When examined on 4.1.47, blood without preservative or anti-coagulant was taken from the jugular vein and injected subcutaneously into two rabbits and two guinea-pigs. A sample of citrated blood was also collected and 10 cc. of this was injected subcutaneously an hour later, into a 6-months-old calf. Twice daily the temperatures of this calf were recorded and smears were taken once a day. Eighteen days later (22.1.47) there was a slight rise in the calf's temperature when 103.2° was recorded. The smear, on this day, revealed several *T. theileri* in the blood, but the calf itself looked normal in all other respects. No further temperature fluctuations were recorded and no more spirochaetes were found in subsequent smears. The temperature of the rabbits and guinea-pigs was not recorded, but smears were prepared daily. No spirochaetes were ever found in their blood.

Discussion

The listlessness of the donkey foal, when observed on the first day, was undoubtedly due to either the biliary fever or the spirochaetosis, or both diseases. One is inclined to suggest that the spirochaetosis, although secondary to the biliary fever, did help to aggravate the condition. Donkeys are normally very resistant to biliary fever and seldom show any symptoms of the disease. *T. theileri* has since been noted in other blood smears from cattle on the same property.

Summary

(1) Spirochaetosis in the donkey has been described. It was complicated by biliary fever.

(2) It was transmitted to a calf, but not to guinea-pigs and rabbits.

(3) This spirochaete is considered to be identical with *Treponema theileri.*

Acknowledgments

Thanks are due to Dr. A. S. Canham for permitting me to carry on this experiment at Allerton Laboratory and to Dr. W. O. Neitz, Protozoologist at Onderstepoort, for confirming my diagnosis of the smears.

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VIBRIO FOETUS INFECTION IN CATTLE

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The first report of abortion in cattle caused by this organism appeared in an article by Snyman (1931). This case occurred in a dairy herd in Pretoria. In Snyman's summary he states: " The infection is more widely spread and causes more abortion than is generally accepted. The reason for this is that many cases of abortion due to vibrio foetus remain undiagnosed, owing to the difficulty of cultivating the organism artificially and of obtaining foetuses fresh enough for bacteriological examination."

With these statements the writer agrees, but to them must be added the fact that many farmers are reluctant to bring cases of abortion to the notice of the veterinary surgeon until a large number of cases have occurred .

Since 1939 a number of outbreaks of vibrio abortion have been investigated at Allerton. The history of these has all been very similar, and at no time has the farmer lost the number of calves he might have done, had the disease been contagious abortion, caused by Br. abortus. Further, the disease has died out fairly rapidly without recourse to special treatment. Odd cases have recurred in these herds at fairly long intervals, but not on a scale to cause anxiety.

The following case report, chosen at random, bears out the statements made above.

Early in 1940 a single case of abortion occurred on a farm in the Pietermaritzburg area. No notice was taken, as it was classed by the farmer as a case of sporadic abortion. The cow that aborted had been on the farm for several years, and had given birth to a number of healthy calves. Within the next month five other abortions had taken place and the farmer, becoming worried, brought in samples of blood for the contagious abortion test. These were all negative and the farmer was advised to bring in a fresh foetus, should he be unfortunate enough to have any further cases. Another case of abortion occurred the following day and from the fourth stomach of the foetus the vibrio was obtained.

The last six cases had taken place in cattle that had been born on the farm, and all had had normal calves. The sire of the herd had been on the farm for four years. No outside animals had been brought on to the farm for service, and the bull had never been off the farm. No previous cases of abortion had taken place on this farm for as long as the farmer had been there, which amounted to a number of years. No sheep or goats were running on the farm.

All the cows that aborted retained the placenta and showed a whitish discharge for periods up to a month. The ages of the foetuses varied from about four to seven months.

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These animals were isolated until they were clean, the only treatment being daily irrigation with saline. They were returned to the herd and were in due course served by the bull, holding to their first service. These animals gave birth to normal, healthy calves during December.

One further case of vibrio abortion took place on 22.4.40. She was treated similarly to the others and, in due course, gave birth to a health calf.

On 29.10.40 a case of vibrio abortion took place. This was not in a cow that had previously aborted. From that time to the present no further cases have been reported.

Unfortunately, no agglutination tests were carried out on the cows that had aborted.

A fair number of similar outbreaks have been investigated from various parts of Natal. In no instance has the disease continued very long, and the losses in calves have been relatively light.

Conclusions

(a) Vibrio foetus infection is thought to be fairly widespread, not only in Natal, but probably in other parts of the Union.

(b) It does not appear to be as serious a disease as contagious abortion, caused by Br. abortus.

(c) The infection cleared up rapidly and no bad after-effects were shown.

(d) Diagnosis of this disease requires no special methods, the hanging drop method of examination being the usual one.

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THE USE OF GAMMEXANE DIPS IN THE CONTROL OF EQUINE MANGE

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Gammexane was used most effectively in combating mange in horses both by spraying and dipping. In both cases special attention was given to the affected parts. An attempt was made to determine if one, two or three dippings are necessary. Two dippings appeared necessary and although good results were obtained with the spraying, the results obtained by dipping were definitely superior.

The spraying was done at two locations, i.e. Ncihana West Location No. 41 in the Elliotdale district, where 15 horses were treated, and Cezu Location No. 29 in the Mqanduli district, where 14 horses were treated. At each of these locations the horses were divided into three batches, one batch receiving three treatments, one two treatments and one batch was only treated once. A spray wash calculated to give 100 parts per million of gammexane was used and was applied by means of the ordinary locust pump (pressure pump). While spraying was in progress the wash was continually stirred to keep the gammexane in suspension. Every horse treated was thoroughly sprayed, the affected parts well scraped and again thoroughly sprayed. Approximately 4 gallons of the solution was used per horse at each spraying. Scrapings were taken from all horses prior to the first treatment and although they were all visibly infected the parasite was demonstrated in 11 horses from Elliotdale and 9 in Mqanduli.

The treatments were done on the following dates:

	First		Second		Third	
	No. Treated	Date	No. Treated	Date	No. Treated	Date
Elliotdale	15	25.8.47	10	2.9.47	5	10.9.47
Mqanduli	14	27.8.47	10	5.9.47	5	15.9.47

The horses were re-inspected on 21.11.1947 and were apparently completely cured.

In October further outbreaks of mange were discovered in the Elliotdale district at Location 41 and locations bordering on it. As approximately 200 horses were involved, it was decided to dip these horses. The matter was fully discussed with the magistrate, who agreed to supply the dip. The Ncihana Cattle Tank No. 27 was used for this purpose. The tank was cleaned out, water accurately measured in and dip added; the test at the first dipping was 59 parts per million B.H.C.

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Details are as follows:—

Date	Number Dipped	Test
21.11.1947	183	59 p.p.m.
1.12.1947	202	
10.12.1947	210	

All the horses which were visibly infected were dipped and scraped while in the draining race and again dipped, i.e. all infected horses actually went through the tank twice at each dipping. Approximately 45 horses were visibly infected. Of the horses dipped, two have so far become reinfected. Whether this is due to a reinfection or the old infection not having been cured completely is a debatable point.

HORSE PRACTICE

NOTES FROM CURRENT LITERATURE

Prepared by The Jockey Club of South Africa

SOME CLINICAL PROBLEMS OF HORSE BREEDING

In a paper presented at Lincoln on 5th February, 1948, John Burkhardt mentioned that breeding mares early in the year to get forward two-year-olds, breeding from mares more than 15 years old, the conformation of the hind quarters permitting the entrance of air and dust into the vagina, and heredity (certain blood lines produce shy breeders), all help to complicate infertility in the thoroughbred.

Aero-vagina is very prevalent; the resulting infection usually clears up after suture of the culvar orifice to reduce its size. [Quinlan found aero-vagina in nearly all mares that have had several foals, in mares over 14 years of age, and in mares with a horizontal vagina. He always sutures the vulva of old mares that have missed a season.] Stilboestrol implants are recommended for infections that do not clear up after suture, but care is necessary as long-continued treatment may result in an atrophied and inactive ovary, requiring a long convalescence. [Quinlan prefers injections of stilboestrol every three days, combined with penicillin and sulphanilamide for purulent conditions.]

For anoestrus with follicle development 10 to 15 mg. stilboestrol in oil is recommended, plus, if necessary, 1000 I.U. of chorionic hormone. Anoestrus without follicle development is a difficult problem. Improvement of the environment and massage of the uterus and ovary are recommended. [Quinlan uses frequent small doses of F.S.H.

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(Anteron) followed by stilboestrol, chorionic hormone (Prolan B) and large doses of vitamin A and E, a good ration, and plenty of green food.]

The importance of good, hard condition in mares at the time of mating is emphasised. The mare improving in condition is most easy to impregnate; fat mares are bad breeders.

Large normal follicles are frequently mistaken for cysts, especially towards the end of the breeding season. True cystic ovaries are not easy to recognise during the autumn and winter months. Affected mares usually enter a prolonged oestrus during the breeding season, and do not ovulate. The ovaries are abnormal in size and consistence. They are enlarged and studded with small cysts, which may number 30 to 40 in each ovary. They are found in old mares, 15 years and upwards. Small cystic degeneration does not readily respond to treatment. Unilocular cysts respond to expression or puncture.

Suckling mares sometimes show complete anoestrus; some may have silent heat. Others do not show oestrus until shortly after weaning. Most mares, however, are receptive to the stallion during the foal heat, and those with a bad breeding history should be mated then.

Twin foals are commonly conceived to a service late in the season. The author suggests the examination of mares prior to service and the rupture of one of the follicles, should there be a double follicular maturity, prior to mating.

The author states: " No practitioner can hope to be of real service to horse breeeders unless he has familiarised himself with the technique of rectal examination, which can best be perfected in the slaughter house, where findings can be confirmed at post-mortem examination."

In reply to the discussion Dr. Burkhardt stated that the best time to mate mares was from 48 hours before up to the time of ovulation, while the Russians claimed good results up to 10 hours following ovulation. An injection of 1000 I.U. pregnancy urine extract could be given at the time of mating to ensure ovulation within 48 hours, provided the follicle was mature.

When the stallion is heavily taxed Burkhardt suggests the injection of 1000 I.U. pregnancy urine extract to cause ovulation at a period when the spermatozoa are still alive.

The use of the speculum in artificial insemination is not recommended, as it allows the entrane of air into the vagina and definitely mitigates the chances of impregnation.

BURKHARDT, JOHN (1948). *Vety. Rec.* 60, 21 (22 May, 1948) :243 - 248.

NOTE. — The portions in [ ] are comments by Dr. Quinlan on Burkhardt's paper.

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ANTERIOR PITUITARY HORMONES AND THE OESTRUS CYCLE

In this address, in which present knowledge on the subject was reviewed, attention is drawn to the dangers of over-stimulation of the ovarian follicles, resulting in cystic degeneration or premature luteinisation, and mention is made of the rapidity with which ovulation follows the use of chorionic gonadotropin.

During the discussion it was stated that the correct dosage of hormones is of the greatest importance; much harm may result from incorrect dosage. The response of the ovary to intravenous use of chorionic gonadotropin is of great practical value, since the arrival of active spermatozoa in the fallopian tubes can be synchronised with the arrival of the ovum. The use of the chorionic hormone for the treatment of cystic degeneration of the follicles in the cow and mare is mentioned. Foetal resorption in the mare is explained as follows: "During the period when P.M.S. was abundant in the blood of the mare the ovaries were very active and contained numerous follicles which ovulated and formed accessory corpora lutea to maintain pregnancy. If there were excessive follicular activity in pregnancy it is likely that the level of oestrogen in the blood would increase; if it rose above a certain threshold it would interfere with pregnancy."

[Quinlan believes that early foetal death and resorption is far more common than is generally believed. He knows mares that have given a marked positive reaction to the Zondek-Ascheim test, and which appeared to be undoubtedly in foal, later prove non-pregnant. It is not uncommon to observe the same mare behave similarly during successive seasons.]

ROWLANDS, I. W. (1948). *Vety. Rec.* 60, 16 (17 April, 1948) : 181 - 186.

NOTE. — The portion in [ ] is comments by Dr. Quinlan on Rowland's paper.

ICTERIC FOALS

In red blood cells of man the two substances designated A and B give rise to four blood groups; the red blood cells of horses carry, in adition, combinations of elements C, D, E and F, giving rise to a larger number of blood groups, which are not always easy to demonstrate.

The twenty-one icteric foals studied were produced by twelve mares, all of which had previously had normal foals (one had raised ten normal foals and two had each raised nine). Icteric foals are born normal, but develop icterus within twelve to ninety-six hours. On post-mortem examination there were all the characteristics of abnormal destruction of red blood cells. In each case the serum of the mare agglutinated the red blood cells of the stallion, and the serum of the stallion did not agglutinate the red blood cells of the mare. The red blood cells of a three-months'-old foal that had recovered from

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jaundice were agglutinated by the serum of its dam. The colostrum contains a high concentration of the agglutinating factor. If the serum of the mare agglutinates the red blood cells of the stallion and the blood of the foal is of the same type as that of the sire, the colostrum and the serum of the mare will agglutinate the red blood cells of the foal and produce icterus.

The condition is prevented by breeding mares only to sires with compatible blood or by providing a foster-mother and not allowing the foal to drink from the mother. (Depriving the foal of the colostrum may prevent the disease.) Treatment is by the removal of the foal from the mother on the first apearance of icterus and by the transfusion of large quantities of blood of the proper type.

BRUNER, D. W., HULL, F. E., EDWARDS, P. R., and DOLL, E. R. (1948). *J.A.V.M.A.*, 112, 855 (June, 1948) : 440 - 441. The Blood-Horse, 3 July, 1948.

TREATMENT OF LAMINITIS

In a short note the author gives the results of treating laminitis in a pony, a bull and a pig with Anthisan (May & Baker), which is a 5% pryanisamine maleate. The basis of the treatment was the work of Chavance & Tinel on the sympathetic nervous system. For the child's pony he gave 20 cc. of 5% Anthisan intravenously, repeated 24 hours later. The response was spectacular and merits further trial of this drug.

KOCHAN, W. F. *Vety. Rec.*, 6J, 20 (29 May, 1948) : 257.

TREATMENT OF TETANUS

In this note, J.T.E. comments on the observations of the French workers summarised by Couvy in the Bull-Acad. Med. III, 143, on the "blood brain barrier", represented by the meninges and the walls of the blood capillaries which supply the brain and other parts of the central nervous system. This barrier is impermeable to tetanus antitoxin as well as to a large number of medicinal agents.

A marked exception is urotropin, which not only traverses the renal capillary plexuses but also flows to the central nervous system, and in addition, renders the barriers permeable to other agents which otherwise are incapable of traversing it. This factor has been successfully used in the treatment of advanced cerebro-spinal meningitis, nervous syphilis (which had entirely failed to respond to prolonged arsenical treatment) and human trypanosomiasis.

In the treatment of tetanus an injection of serum intravenously or subcutaneously is followed after half an hour by the intravenous or subcutaneous injection of urotropin, following again after half an hour by an injection of anti-serum.

J.T.E. *Vety. Rec.* 16, 22 (29 May, 1948) : 259.

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EPISTAXIS IN RACE HORSES

In the questions and answers columns of The Veterinary Record, the treatment recommended for epistaxis is 5 to 10 cc. of 1/1000 adrenalin, two or three injections being given at intervals of 5 or 6 days. Good results are usually obtained though the explanation is not forthcoming.

In a later number Tutt writes that he has not found adrenalin of much use, but has had good results with intravenous injection of 5 cc. haemoplastin, repeated after 12 to 24 hours, plus a course of calcium lactate, and exercise restricted to walking.

Vety Rec. 60, 24 (12 June, 1948) and 60, 26 (26 June, 1948).

PURPURA HAEMORRHAGICA IN THE HORSE

Jennings & Highet describe the blood picture of ten cases of equine purpura, and the findings appear to indicate that in the horse the disease is a non-thrombocytopaenic purpura. Various therapeutic agents were tried with little success, the best results being obtained from the intravenous injection every other day of 4 oz. calcium lactate in 20 oz. water.

JENNINGS, A. R., and HIGHET, D. R. *Vety. Jnl.* 103, 11 (Nov., 1947): 269 - 376.

RECENT ADVANCES IN CHEMO-THERAPY

This is a very full review of recent advances in chemo-therapy. The article, which does not lend itself to abstraction, should be consulted, and will well repay careful study.

OGILVIE, D. D. *Vety. Rec.* 60, 12 (20 March, 1948): 129 - 134.

A NEWLY DEVELOPED ANAESTHETIC FOR LARGE ANIMALS

Reports on an anaesthetic consisting of 100 gr. nembutal, 1 oz. chloral and ½ oz. magnesium sulphate in 1000 cc. of water. This is injected slowly intravenously until the horse begins to stagger, when the flow is increased. The surgical stage of anaesthesia lasts about 30 minutes. A minimum dose will keep the horse under complete anaesthesia for 15 to 30 minutes and an additional 15% will prolong the anaesthesia to 40 to 60 minutes. This mixture has been used on about 250 cases without a death. It is claimed that the mixture is safe, produces complete anaesthesia and relaxation without struggling, and recovery is rapid, the horse usually standing up about an hour after the injection. The average dose required for a 1000-lb. horse is 67 gr. nembutal, 20 Gm. chloral hydrate and 10 Gm. magnesium sulphate.

MILLENBRUK, E. W. *J.A.V.M.A.* 112, 854 (May, 1948): 345 - 347.

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THE ONDERSTEPOORT JOURNAL OF VETERINARY SCIENCE AND ANIMAL INDUSTRY

Volume 23. Nos. 1 and 2. March, 194h

The journal contains an appreciation of the work of Dr. P. J. du Toit.

The following articles are included:—

THE CAMPAIGN AGAINST EAST COAST FEVER IN SOUTH AFRICA.

By A. M. Diesel.

NOTES ON SEROLOGICAL TESTS CARRIED OUT ON EQUINE SPECIES INFECTED WITH DOURINE.

By E. M. Robinson.

DOURINE INFECTION IN YOUNG EQUINES.

By E. M. Robinson.

1. Foals may become infected with dourine before sexual maturity. Cases are described where infection had occurred at 9 months or younger.

2. Such foals on reaching sexual maturity are capable of transmitting the infection to a stallion during service.

THE DEMONSTRATION AND TRANSMISSION OF THE SOUTH AFRICAN STRAIN OF *TRYPANOSOMA EQUIPERDUM* OF HORSES.

By B. S. Parkin.

The identification and the transmission of the causal trypanosomes of the South African type of Dourine has resulted in an improvement of the methods of diagnosis by means of the examination of the blood and of the Complement Fixation Test.

TRANSMISSION OF THE SOUTH AFRICAN STRAIN OF DOURINE TO LABORATORY ANIMALS.

By D. A. Haig and (the late) A. S. Lund.

CYTAUXZOON SYLVICAPRAE GEN. NOV., SPEC. NOV., A PROTOZOON RESPONSIBLE FOR A HITHERTO UNDESCRIBED DISEASE IN THE DUIKER [*SYLVICAPRA GRIMMIA* (LINNÉ)].

By W. O. Neitz and A. D. Thomas.

Summary.

1. A new genus and species of a protozoan parasite from the duiker (*S. grimmia*) is described. The name *Cystauxzoon sylvicaprae* is proposed for it and it is provisionally classed as a member of the family Theileridae, Du Toit, 1918.

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2. The symptomatology and the pathological changes of the disease produced by this parasite are detailed.

3. The attempt to transmit the disease to sheep was not successful.

4. The mode of transmission is unknown.

5. The importance of studying this and similar diseases in our wild animals is stressed, since valuable information may be brought to light on the life histories and the role played by such parasites in our stock diseases.

THE 1944 EPIZOOTIC OF HORSESICKNESS IN THE MIDDLE EAST.

By R. A. Alexander.

1. The history of horsesickness in Egypt and Palestine is traced.

2. It is believed that the 1944 epizootic was started in Egypt by the introduction of one or more infected equines into the Komombo area from the South and that it was not a recrudescence of the infection introduced the previous year.

2. The chief characteristics of the epizootic are described and figures are quoted to show the morbidity and mortality in horses, mules, and donkeys.

4. The manner in which infection was introduced into Palestine remains obscure, and the various factors involved are discussed. The possibility that infected insect vectors were carried by aircraft, not only from Egypt, but from some other focus, is discussed.

5. The great similarity but not complete identity between the Egyptian and Palestine strains of virus, as determined by *in vitro* and *in vivo* laboratory experiments, is reported. The chief point of resemblance is the similarity of antigenic structure; the chief points of difference are the period of incubation in horses and the virulence.

6. Attention is directed to the susceptibility of the donkey.

7. The general measures of control and their relative effectiveness are described.

8. Mass immunization is shown to be the only effective measure of control, and figures are given to indicate the rate of development of immunity.

9. The future of horsesickness in the Middle East and the measures necessary to prevent reinfection are discussed .

IMMUNOLOGICAL STUDIES ON BLUETONGUE IN SHEEP.

By W. O. Neitz.

1. Complaints that the present method of immunization against bluetongue is not safe and that it produces an inadequate immunity have been justified.

2. A plurality of antigenically different virus strains has been established.

3. There appears to be an antigenetic component common to all strains investigated and in addition an unknown number of different specific components.

4. There is a wide variation in the virulence of different strains.

5. The virus is not attentuated by serial passage through sheep.

6. The significance of these findings is discussed.

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THE PARTICLE SIZE OF BLUETONGUE VIRUS AS DETERMINED BY ULTRAFILTRATION AND ULTRACENTRIFUGATION.

By ALFRED POLSON.

PRELIMINARY NOTE ON THE CULTIVATION OF GREEN'S DISTEMPEROID VIRUS IN FERTILE HEN EGGS.

By D. A. HAIG.

Green's distemper vaccine virus has been propagated 30 generations in developing hen eggs.

The reactions produced by the egg-adapted strain when injected into ferrets fere similar to those produced by the parent strain.

Five cc. of anti-distemper serum neutralized the egg-culture virus.

Thirteen dogs were inoculated with suspensions of chorio-allantoic membranes. In nine there was no reaction. In one there was a slight reaction, but in three the reactions were very severe and one died after showing typical distemper symptoms.

THE EFFECT OF INFLAMMATION ON THE SURVIVAL OF GUINEA-PIGS INFECTED WITH ANTHRAX.

By MAX STERNE.

1. An acute inflammation has the same general inhibitory effect on immunizing power that it has on the virulence of anthrax strains.

2. Irritant excipients have the same local stimulating effect on small immunizing doses of anthrax that they have on small virulent doses.

3. The apparent difference in the effect of irritants on small and on large immunizing doses of spores is because the raising of a sub-immunizing dose to a full immunizing is far more perceptible than the same order of increase of a large dose.

4. The probable advantages of using 20 per cent. NaCl solution as an excipient are pointed out.

BACILLARY WHITE DIARRHOEA OF POULTRY AND ITS ERADICATION IN THE UNION OF SOUTH AFRICA.

By A. S. CANHAM.

The technique of the test is discussed.

All carriers of either bacillary white diarrhoea or fowl typhoid will not be picked out by every antigen used, and therefore all positives are unlikely to be detected by one round of testing.

Young stock should be tested only after egg-laying has commenced, or at five or six months of age.

ZOOLOGICAL SURVEY OF THE UNION OF SOUTH AFRICA. TICK SURVEY — PART I.

By GERTRUD THEILER.

1. The distribution of *A. hebraeum* has been given in terms of political divisions as well as in terms of vegetational coverage.

2. *A. hebraeum* is seen to be present in the parklands and in the bushveld of the summer rainfall areas, where the bush coverage offers

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adequate shelter; it is absent, however, from the more arid bushveld regions even though the bush shelter would be adequate.

3. It is concluded that where farming conditions are favourable the tick could be controlled by dipping.

LANTADENE A, THE ACTIVE PRINCIPLE OF *LANTANA CAMARA L.* PART II.—ISOLATION OF LANTADENE B, AND THE OXYGEN FUNCTIONS OF LANTADENE A AND LANTADENE B.

By P. G. J.Louw.

THE DIGESTIBILITY, FOR SHEEP, OF THE CELLULOSE IN A POOR VELD HAY, AS AFFECTED BY SUPPLEMENTS OF A MIXTURE OF CONCENTRATES AND GREEN FEED.

By J. G. Louw, S. I. Bodenstein and J. I. Quin.

The influence of varying amounts of a supplement consisting of starch, casein, brewers yeast and minerals, alone and in conjunction with one of green feed, on the digestibility of the cellulose in a basal ration of poor veld hay, containing only 2.2 per cent protein, has been tested in a series of digestion trials with sheep. It is concluded that:—

(1) The ability of sheep to digest cellulose was impaired when kept for any length of time on the basal diet of veld hay only.

(2) Daily supplements of 20, 50 or 85 grams of the concentrate mixture per sheep did not improve the digestion of the cellulose of the basal ration. Unlike the lowest one, the two higher supplements had, however, the effect of preventing deterioration of the digestive powers and appetites of the sheep.

(3) The highest supplement of concentrate, 170 grams per animal per day, more than compensated for the energy deficiency of the basal ration, but depressed the digestion of its cellulose.

(4) Ability to digest cellulose, which had been temporarily weakened, as under (1) and (3) above, was restored by an additional supplement of green feed.

ON THE AVAILABILITY OF PHOSPHORUS IN BONEMEAL, BONEMEAL SUPPLEMENTED WITH RED OXIDE OF IRON, AND BONEASH TO WHITE RATS.

By P. G. J. Louw.

RESEARCHES INTO STERILITY OF COWS IN SOUTH AFRICA. THE INFLUENCE OF: (i) DRY RATIONS, (ii) LACK OF EXERCISE, AND (iii) LACK OF SUNLIGHT ON REPRODUCTION OF BEEF HEIFERS AND COWS.

By John Quinlan, Lucien L. Roux, W. G. van Aswegen and M. de Lange.

1. The effects of a dry ration, high condition, and the restriction of sunlight, and exercise upon sexual activity and reproduction of beef females have been studied.

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2. When a dry ration consisting of maize, wheaten bran and teff hay was fed for nine months of each year and maize silage of good quality was added during the remaining three months of each year, very satisfactory results of growth and reproduction were obtained.

3. High condition caused no ill-effects upon general health or the reproduction processes.

4. The restriction of sunlight and exercise in no way detrimentally affected the health, growth and vigour of heifers and cows being fed dry rations.

5. A restriction of sunlight and exercise did not affect the period between calvings.

6. Restricted sunlight and exercise had no effect upon conception rate.

7. The lengths of gestation was unaffected by limiting sunlight and exercise.

8. Unrestricted exercise and sunlight did not reflect any advantage upon the weight of calves produced.

9. High-conditioned heifers, under conditions of restricted sunlight and exercise, showed no tendency towards abnormal sexual activity when breeding was delayed until the heifers were 35 months of age, that is, they calved down at 44 months of age.

10. The environment enforced appears to improve the expectation of life and reproduction of beef cattle on the high veld of the Transvaal. This is, no doubt, due to protection from cold and ticks, as well as from diseases, such as contagious abortion and trichomoniasis, affecting the genital tract.

11. There is a predisposition to the development of cystic degeneration of the Graafian follicle during advancing age in cattle maintained under the environmental conditions enforced even when they are protected from genital infection by suitable hygiene.

BIOCLIMATOLOGICAL STUDIES ON WHITE RATS IN SOUTH AFRICA. No. 1.—SKIN CANCER IN RATS FOLLOWING CONTINUED EXPOSURE TO SUNLIGHT.

By Gilles de Kock and J. I. Quin.

1. Skin cancer in rats (and in mice) can be produced by exposing them daily for definite periods to *ultraviolet light.*

2. Roffo produced identical neoplasms in rats by exposing them daily for 5 hours to *sunlight.* This was confirmed in the experiments at Onderstepoort, where rats were daily exposed for 4½ hours to sunlight. In one instance a new growth developed in a rat exposed daily for only 2½ hours.

3. So far no spontaneous skin cancer has been observed in the rats at Onderstepoort when kept under sheltered conditions, but in one rat in these experiments, a fibroblastic sarcoma was found in the liver, lung, and omentum.

4. The skin cancers occurred on the hairless parts of the skin, and in the majority of rats new growths appeared in more than one place on the body. The ears were most frequently affected.

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5. There was no definite occurrence of metastasis into other organs.

6. The earliest appearance of a new growth, to which attention is drawn, was ± 10 months after exposure of the rats to sunlight.

7. In all the new growths a microscopical diagnosis of an epidermoid carcinoma was made. The statement by Roffo that some of these neoplasms were of the nature of sarcomata could not be confirmed at Onderstepoort.

8. The earlier lesions revealed the usual characteristics of an acanthoma associated in some cases with hyperkeratosis, while in the large actively growing neoplasms there was much evidence of anaplasia.

STUDIES ON THE ALIMENTARY TRACT OF MERINO SHEEP IN SOUTH AFRICA. XI.—DIGESTION OF SYNTHESIS OF STARCH BY RUMINAL BACTERIA.

By J. G. VAN DER WATH.

1. The only diastases present in the rumen seem to be those secreted by ruminal bacteria, which would then be responsible for the entire starch disintegration seen there.

2. In the rumen of sheep receiving a regular supply of starch in the diet, the bacterial disintegration of starch granules commenced after 5 hours and was completed within 18-20 hours. In the case of sheep not receiving starch in the diet, disintegration of the starch administered through the fistula commenced after 7 hours and took 8-10 hours to complete.

3. Starch granules of the various cereals differ in size and shape. The diameter of starch granules influences their rate of disintegration within the rumen.

4. Some of the products of starch degradation are resynthesised into glycogen and starch-like polysaccharides within certain ruminal bacteria and pseudo-yeasts.

5. The iodophilic micro-organisms encountered in the rumen and associated with the disintegration and digestion of starch, are described.

STUDIES ON THE ALIMENTARY TRACT OF THE MERINO SHEEP IN SOUTH AFRICA. XII.—A TECHNIQUE FOR THE COUNTING OF RUMINAL BACTERIA.

By J. G. VAN DER WATH.

STUDIES ON THE ALIMENTARY TRACT OF MERINO SHEEP IN SOUTH AFRICA. XIV.—THE EFFECT OF SOME COMMONLY USED ANTIFERMENTATIVES ON THE *IN VITRO* FORMATION OF GAS IN RUMINAL INGESTA AND ITS BEARING ON THE PATHOGENESIS OF BLOAT.

By R. CLARK.

1. It has been shown that turpentine and two proprietary coal-tar preparations have little or no inhibitary action on gas formation in ruminal ingesta incubated *in vitro* when added in therapeutic concentrations.

2. Very small concentrations of these substances have a marked effect on the physical consistency of the ingesta, raising surface tension and breaking down foam.

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3. This affords evidence that it is by their physical action on surface tension that these drugs exert their undoubted beneficial effect in acute bloat.

4. The " foam theory " of the pathogenesis of bloat is discussed.

5. Formalin and copper sulphate may have some inhibitory action gas formation, but the use of ruminal disinfectants cannot be recommended.

STUDIES ON THE ALIMENTARY TRACT OF MERINO SHEEP IN SOUTH AFRICA. XV. — THE INFLUENCE OF DIFFERENT FACTORS ON THE RATE OF CELLULOSE DIGESTION (a) IN THE RUMEN AND (b) IN RUMINAL INGESTA AS STUDIES *IN VITRO*.

By S. Hoflund, J. I. Quin and R. Clark.

1. The rate of cellulose digestion in ruminal ingesta was studied both *in vivo* and *in vivo* by a new technique in which cotton threads were used as test material.

2. It was found that the rate of cellulose digestion was markedly influenced by the diet.

3. The appetite for either lucerne or grass hay was directly affected by the rate of cellulose digestion.

4. On a basic diet of poor quality grass hay both cellulose digestion and appetite were stimulated by small amounts of sugar, but markedly depressed by excessive amounts. More sugar could be tolerated if protein was also given. Optimal cellulose digestion necessitated a balance between readily available carbohydrate and protein.

5. Excess protein suddenly introduced after a period on a diet low in both protein and carbyhydrate caused marked inhibition of cellulose digestion and inappetence. One case of sudden death was possibly associated with ammonia poisoning.

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OBITUARY

S. T. A. AMOS

Sydney Thomas Arundell Amos died in Durban on the 31st of July, 1948, at the age of 72. Born in Clevedon, Somerset, in 1876, he qualified at the Royal Veterinary College, London, in 1897, and came out to Natal in the same year as one of eight veterinarians selected to take part in the campaign against Rinderpest.

During the Anglo-Boer War he saw service with the Natal Mounted Rifles and was among the forces besieged at Ladysmith, as well as being in the battle of Elandslaagte. During the Zulu rebellion of 1906, he was again on active service.

In 1902 he married Jane Alberta Martin, of London.

In 1909 Mr. Amos resigned from the service and returned to his old college where he took the F.R.C.V.S. He started private practice in Durban during the following year.

In 1914 Mr. Amos was gazetted Deputy Assistant Quartermaster-General and was with the forces in South West Africa, and later acted as Officer Commanding the Veterinary Hospital at De Aar.

Mr. Amos was always keenly interested in the Turf and held many positions in this connection. He was official veterinary surgeon to the Durban Turf Club since 1911 and to the Clairwood Turf Club since its foundation in 1921. Both these posts he held till the time of his death. He was also keenly interested in the welfare of apprentice jockeys, and, in fact, all who took part in the sport of kings.

Being a keen horseman, Mr. Amos was a great polo player and did not give up this strenuous game till he was over 60 years of age. He was a member of the Durban team which won the South African championship for five successive years.

Like all good veterinarians, Mr. Amos was a great protagonist of animal welfare and was President of the Durban and District S.P.C.A. from 1920 until his death.

As all members know, Mr. Amos always took a very active part in the work of our Association. He was our President for nine consecutive years from 1936 to 1945. Largely due to his never-ending zeal and tact the Association emerged from the difficult war years with greater strength and vigour than ever before.

He was also closely associated with the administration of veterinary legislation, having been Secretary of the Natal Veterinary Board as far back as 1908. He was also a member of the South African Veterinary Board and was the Association's representative on the Natal Anti-Tuberculosis Association at the time of his death.

In the death of Mr. Amos we of the veterinary profession have lost not only an esteemed and trusty colleague, but a very dear friend. To his two daughters, Mrs. Vera Morford (one of our colleagues) and Mrs. Van der Poel, we extend our heartfelt sympathy in their sad loss.

R.C.

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SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

Minutes of Council Meeting held at 2.15 p.m. on August 5, 1948, at the Tilsim Hotel, Pretoria.

Present: J. H. Mason (President), A. M. Diesel (Vice-President), R. A. Alexander, J. G. Boswell, R. Clark, A. C. Kirkpatrick, D. G. Steyn and W. D. Malherbe (Hon. Secretary-Treasurer).

Apologies: P. J. du Toit and P. S. Snyman.

Minutes: Having declared the meeting open, the President paid fitting tribute to Mr. S. T. Amos who, after a full and useful life, had passed away the previous week. Members of Council stood up as a token of respect to the departed.

1. *Minutes of Meeting on May* 13, 1948: As these had been circualted they were taken as read.

2. *Arising from these Minutes*:—

(a) *Welfare Societies*: The Secretary reported progress.

(b) *Importation of Veterinarians*: The Secretary reported on the reply from the Secretary for Agriculture to questions in this connection. (See minutes Council Meeting 13.5.48.) It was decided to await the Government's action on the recommendations of the Leighton Committee of Inquiry into Salary Scales of Professional Officers.

(c) *Regional Committees N.W.M.H.F.*: Since only the Durban nominee was still to be obtained, the Natal Branch would be requested to expedite their nomination.

(d) *Artificial Insemination*: The reply to a letter to the Secretary for Agriculture (see Minutes 13.5.48) was read. It was stated that a permanent committee had been appointed by the Department, the veterinary profession being represented by two members. These would be asked to continue to put forward the views of the veterinary profession. Discussion showed that a good basis of co-operation had already been established.

(e) *Veterinary Articles in the Lay Press*: This matter had been suitably dealt with, as far as at present possible.

3. *New Members*: The following names were accepted for recommendation to the next General Meeting: J. R. Ferguson, M.R.C.V.S., of Johannesburg, G. J. H. Stevens, B.V.Sc., of Kroonstad, J. A. Schutte, B.V.Sc., of Bethal, A. I. Robertson, M.R.C.V.S., of Krugersdorp, W. P. van Aardt, B.V.Sc., of Bedford, J. J. Oosthuizen, B.V.Sc., of Ermelo.

Resignations: Those of A. H. Milne, of Tanganyika, and C. K. Mager, of Queenstown, accepted with regret.

4. *Registration of M.R.C.V.Ss.*: *British "Veterinary Surgeon's Bill,* 1948": The Secretary reported on correspondence with the Royal College. Provision was being made in the Bill for the Royal College to prescribe an annual fee not exceeding 5 guineas for all persons for the time being on the Register. The Secretary of the R.C.V.S. had explained that in the case of overseas Members the fee would be likely to be lower than for U.K. members, and, as the possibility of its being £1 1s. had been suggested, the three members of Council holding this diploma expressed themselves prepared to pay a token fee of this order if required to do so.

5. *Leighton Committee of Inquiry into Salary Scales of Professional*

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Officers: Dr. Alexander reported on the interview he and Dr. Parkin (Dr. van Rensburg was away) — as a Committee of Council had had with the Leighton Committee. They had had a very favourable reception to their recommendations. An unanimous vote of thanks for the good work of this Council Committee was passed.

6. *Registration and Training of Technical Assistants*: Dr. Alexander explained that the Leighton Committee had expressed themselves as keen on J.C. Standard plus appropriate technical training for technical assistants, on the same lines as envisaged for medical auxiliaries. Provision would be made for the registration of existing trained personnel.

Council gave the scheme its blessing.

7. *Resolution Natal Branch re separate Department of Veterinary Services*: Council felt that this resolution should be presented at the General Meeting by the Natal Branch.

8. *General*:

(a) *Registration Fee*: *Conference*: Council confirmed the decision previously taken by an informal meeting that a registration fee of £2 would be payable by members attending the Annual Meeting, this sum to be used to defray expenses and cover entertainments, lunches, etc.

(b) *Separation of offices of Honorary Secretary and Treasurer*: The Secretary proposed that there should be a separation since the work had become too heavy for a part-time honorary occupation. Council agreed unanimously and decided that the necessary changes in the Constitution would be proposed at the General Meeting. The Honorary Treasurer would be nominated and elected at this Meeting and then annually in the usual way.

(c) *Description of Horses*: The President presented a letter from Dr. Pfaff of the Jockey Club of S.A. in which he complained of the lack of uniformity in description of horses in certificates. The Secretary produced lists of colours, markings, etc., of horses (plus Afrikaans equivalents) compiled by a Faculty Committee some years ago. It was decided that a committee consisting of Drs. Pfaff (convenor), Kirkpatrick and van Rensburg would study the recommendations of an R.C.V.S. committee and compile a statement for publication in the *Journal*.

(d) *Business Meeting*: Decided that the annual business meeting would be held on the evening of September 8, 1948.

(e) *Students' Funds*: Council approved an appeal to members for small donations to the Onderstepoort students' funds in view of certain abnormal expenditure for representations designed to be of benefit to many present and future veterinarians.

(f) *Heartwater Immunization*: A letter from a member was read, complaining against the present Onderstepoort policy of supplying H.W. blood to the public for immunization. It was found that immunization was fraught with so many difficulties that in practice more and more of this work was entrusted to veterinarians.

The meeting was adjourned at 6.15 p.m.

W. D. MALHERBE,
Honorary Secretary-Treasurer, S.A.V.M.A.

J. H. MASON,
President.

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SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

Minutes of Council Meeting held at 2.15 p.m. on September 2, 1948, at the Tilsim Hotel, Pretoria.

Present: J. H. Mason (President), A. M. Diesel (Vice-President), A. C. Kirkpatrick, A. D. Thomas, S. W. J. van Rensburg, R. Clark (Editor), M. de Lange and W. D. Malherbe (Hon. Secretary-Treasurer).

Apologies: D. G. Steyn and J. G. Boswell.

Absent from Union: A. R. Alexander and P. S. Snyman.

1. *Minutes of Meeting on August* 5, 1948: As these had been circulated they were taken as read, and adopted.

2. *Arising from these Minutes*: Item 2(c): Notification had been received from the Natal Branch that Dr. L. R. Morford had been nominated as the Association's representative on the Durban and Natal Coast Regional Committee of the National War Memorial Health Foundation. The nomination was accepted by Council.

3. *New Members*: The following additional names were approved for submission to the General Meeting: F. D. T. Good, M.R.C.V.S., of George, and P. N. Humphreys, M.R.C.V.S., of Umtentweni.

4. *Amendments of Constitution*: The Secretary submitted the wording for three proposed alterations of Constitution:—

(a) To separate the functions of Honorary Secretary and Honorary Treasurer.

(b) To provide for proxies where Council members are unable to be present at meetings.

(c) To provide for the suply of S.A.V.M.A. Journal to cadet members at a reduced subscription.

The wording was accepted.

5. *Finance — Auditor's Report*: This was read by Dr. Van Rensburg on behalf of the Finance Committee. Council examined it in detail and noted explanations and clarifications. The President thanked those responsible for the way the Association's finances had been handled.

6. *Arrear Subscriptions*: Action proposed by Finance Committee approved.

7. *Standing Committees*: The following were nominated by Council:—

(a) *Finance*: R. A. Alexander (convener), B. S. Parkin, S. W. J. van Rensburg, A. D. Thomas, with Treasurer to act as secretary of Committee.

(b) *Editorial*: R. Clark (Editor and convener), G. de Kock, J. Quin, E. M. Robinson and P. S. Snyman.

(c) *Library*: D. Coles (convener), E. M. Robinson and G. D. Sutton.

(d) *General Purposes*: A. M. Diesel (convener), R. A. Alexander, P. S. Snyman, A. C. Kinkpatrick and P. J. J. Fourie.

(e) *Bood Fund*: G. D. Sutton (convener), A. D. Thomas and M. de Lange.

8. *Non-Attendance of Council members at meetings*: After discussion it was decided that no action would be taken at present. It was hoped

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that with the new proxy rule, Council would be able to function more effectively.

9. *Building up Healthy Herds for Municipal Milk Supplies*: A letter from a Pretoria member was read in connection with the role to be played by private practitioners in the "accredited" milk scheme provided for in the new pasteurization by-laws.

It was decided that since Council as yet had no copy of the by-laws at its disposal, discussion would be resumed when fuller information was available.

10. *General*:

(a) *Tuberculosis*: The secretary requested information as to the progress of plans for combating tuberculosis. Dr. Diesel explained that a short memorandum containing draft proposals had been drawn up and would shortly be circulated to interested parties for comments and criticism. An interim scheme would then be brought into operation pending the comprehensive national scheme of eradication proposed by the Director of Veterinary Services. He indicated that the memorandum favoured the system operating in Britain.

(b) *National Health Council*: A letter from the Secretary for Health was read, asking for two delegates to be appointed by the Association to attend a meeting of interested bodies on September 15 in Pretoria, to thrash out the proposal by the Health Officials' Association on powers of condemnation of meat. Council nominated Dr. M. C. Robinson (or his nominee) and Dr. I. P. Marais (or his nominee) to attend the meeting.

(c) *Registration and Sale of Drugs*: A committee had been appointed by an unofficial meeting of Council to consider drugs which should in its opinion be "sold on the prescription of a veterinarian only." The Registering Officer, entrusted with registration under Act 36 of 1947 had been appointed to this committee, but as he felt that he should be outside the committee (to receive representations) it was constituted as follows: M. de Lange (convener), D. G. Steyn and A. D. Thomas.

The meeting was adjourned at 5.15 p.m.

W. D. MALHERBE,
Honorary Secretary-Treasurer, S.A.V.M.A.

J. H. MASON,
President, S.A.V.M.A.

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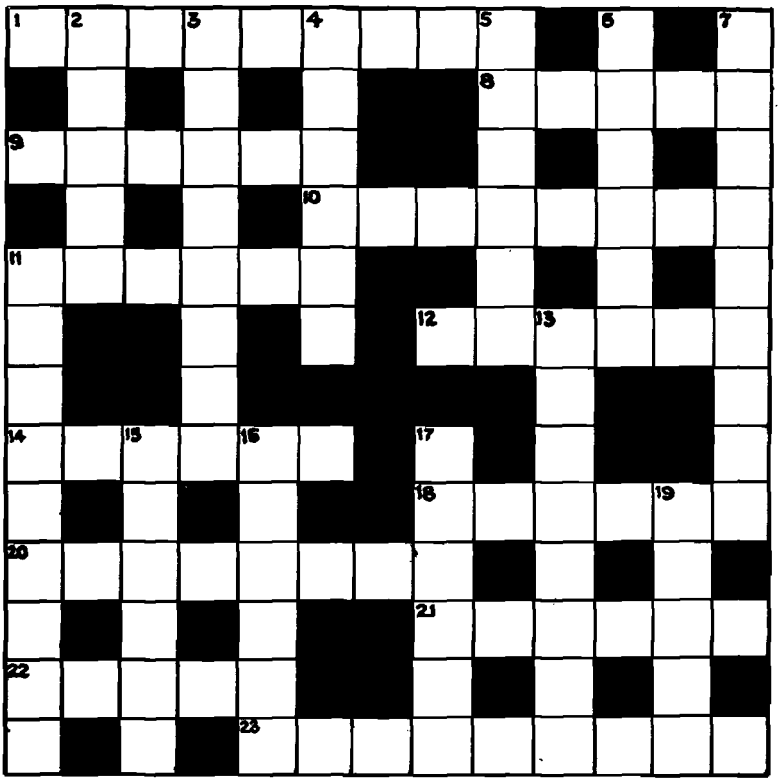
VETERINARY CROSS-WORD PUZZLE.

(Most of the words in this puzzle have some connection with veterinary science.)



CLUES

ACROSS

1. It suffocates. (9)
8. Container. (5)
9. A pain in the neck ? (6)
10. A detoxicated poison. (8)
11. Young birds. (6)
12. Where cattle may be kept. (2 words, 2, 4.)
14. No beer without them. (6)
18. Valve that is never right. (6)
20. You look through it. (8)
21. Sluggishness. (6)
22. Rickettsia of sheep. (5)
23. A clean tin (anag.). (9)

DOWN

2. Some horses are long in it. (5)
3. Scant aid (anag.). (8)
4. A lubricating disease ? (6)
5. An exostosis. (6)
6. A colourful town. (6)
7. I meant all (anag.). (9)
11. Protuberance on a membrane. (9)
13. American vaccine. (8)
15. Acid. (6)
16. Pertaining to a class. (6)
17. Don't throw this clue up. (6)
19. Arrive before due. (5)

The answers appear on page 124.

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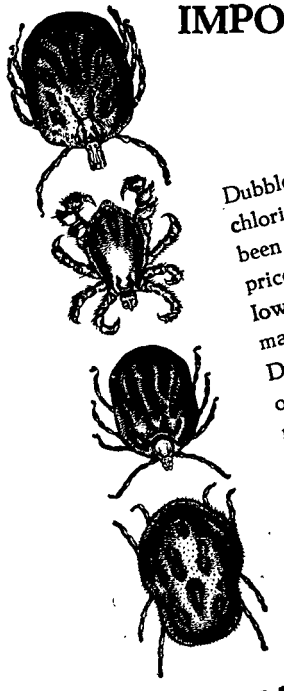

IMPORTANT PRICE REDUCTION

Dubble Benhex, the popular Benzene Hexachloride concentrate dipping material, has been made more economical than ever. New price reduction makes Dubble Benhex the lowest priced Benzene Hexachloride dipping material available.

Dubble Benhex contains 4% Gamma Isomer of BHC. It kills ticks, especially the arsenic-resistant blue tick, lice, fleas, flies, keds and controls mange.

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25lb. drum 45/-

Makes 2,000 gallons of dipwash

KOP **DUBBLE BENHEX**

Klipfontein Organic Products, P.O. North Rand, Transvaal. Makers of Insecticide for Agriculture.

ANSWERS

ACROSS

1. Strangles.
8. Phial.
9. Goitre.
10. Anavenom.
11. Chicks.
12. In barn.
14. Yeasts.
18. Mitral.
21. Torpor.
20. Eyepiece.
22. Ovina.
23. Lancinate.

DOWN

2. Tooth.
3. Antacids.
4. Grease.
5. Spavin.
6. Sienna.
7. Alimental.
11. Cotyledon.
13. Bacterin.
15. Acetic.
16. Tribal.
17. Emetic.
19. Abort.

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A STATE VETERINARY SERVICE FOR SOUTH AFRICA

A. M. DIESEL.

(Read at the 43rd Annual General Meeting)

Dr. Diesel introduced the subject by giving a resumé of the position of the veterinary services in some 32 countries. He had gone to considerable trouble in collecting these data and expressed his gratitude to the authorities of the countries concerned for supplying the information. The following table gives the salient features of the numbers of veterinarians, and their distribution between state and private enterprise.

Country	Total No. of Veterinarians	Percentage in Full Time State Service	No. of Livestock in thousands per Veterinarian
U.S.A.	12,500	12	15
Canada	1,250	25	16
New Zealand	115	33	300
United Kingdom ...	1,870	17	10
Netherlands	500	3	6
Norway	197	3	15
Denmark	1,076	4	5
Switzerland	610	2	4
Union of S.A.	266	33	200

The Total No. of Veterinarians.

As will be seen from the right-hand column of the above table, New Zealand and the Union would appear to be very poorly off for veterinarians in relation to their animal populations. The position in New Zealand is materially affected by the large preponderance of sheep. The numbers of cattle per veterinarian in New Zealand and the Union are 41,000 and 47,000 respectively. In view of the absence of tropical infectious diseases in New Zealand this country can definitely be stated to be far better served than our own.

Proportion of Veterinarians in State Service.

It will also be noted that New Zealand and South Africa have by far the greatest proportion of their veterinarians employed in full-time State service. In neither of these countries does the State employ veterinarians in part-time capacity as is done in all other countries listed.

The Employment of Veterinarians by Co-operative Private Enterprise.

Dr. Diesel pointed out that very interesting developments were taking place in the United Kingdom and New Zealand. In Great Britain the Animal Health Trust, a private institution, has been formed to assist the private practitioner. An address by Dr. Wooldridge, the scientific director of the Trust, is published in the Veterinary Record of May 15, 1948, giving the origin and motives of the Organization.

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In New Zealand 57 veterinarians are employed by Veterinary Clubs and attend to the animals of suppliers to Co-operative Dairies. This method of collective employment of private practitioners appears to be increasing. In South Africa there are two veterinarians who are at present employed by farmers' co-operative societies.

Dr. Diesel continued as follows:—

The relationship, both professionally and numerically, between State Veterinarian and Private practitioner and the relative importance of each class of Veterinarian seems to be determined by:—

(1) The amount of scheduled disease control necessary.
(2) The degree to which the State is prepared to permit practitioners to assist in this control.
(3) The extent to which veterinary education maintains its existence, wishes to increase its activities, and promote its graduates.
(4) The inter dependence of large-scale stock raising projects and veterinary requirements.
(5) The degree to which the practising veterinarian regards the part-time or intermittent employment offered to him by the State as worth while and the loyalty he is prepared to show to his employer.

While the State has every right to determine the extent of its own activities in respect of Veterinary Services, it should at all times be mindful of the fact that veterinarians form a part of its people and that they are entitled to receive consideration in regard to all aspects of their preservation, well-being and advancement.

In respect of the Union of South Africa.

Here I wish to expose the subject more materially.

It would seem that a National Veterinary Service can consist of a full-scale one in which the State provides every Veterinary Service connected with the keeping of livestock which are concerned with the economy of the country. In such a service the practitioner would only concern himself with such veterinary matters as the State considers have no bearing on the country's economy. Alternatively a National Veterinary Service may arrange to employ private veterinarians either on a part-time basis or intermittently or in both ways.

Moreover the State can decide on a policy where the private veterinarian enjoys a fair measure of State work, but that such private veterinarian stands under the direct control of the full salaried organization. In respect of the actual organization of the various types of State Services I have outlined to you, I feel that the one we pursue in South Africa must give the best results. In our service the Director has full control over his staff and the application of State policy. Should the future State Veterinary Service of South Africa allow private practitioners to enjoy a fair measure of state work, it would be comparatively easy to lay down rules to which the private veterinarian would have to comply.

We are different from most countries in the matter of the number of Stock Inspectors we employ. As you know, we propose to train

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these Inspectors very specially. Moreover we grade the Inspectors into Supervising Stock Inspectors, Stock Inspectors and Assistant Stock Inspectors.

Any deviation from the accepted set-up of our State Service would have to take account of the way this Inspectorate staff fits into our organization. It has been said that the field section of our National Service alone could very easily be expanded to incorporate 200 full-time veterinarians right away. While it is a fact that there is a very definite trend to nationalise services, one sees in Britain the formation of a Veterinary Trust, designed to expand the usefulness of the practitioner in particular. In New Zealand we see the formation of Veterinary Clubs. Even in South Africa we have two veterinarians engaged by Farmers' Co-operative Organizations.

It is our duty as veterinarians belonging to this Association to explore all ways and means to advance the usefulness of our profession and in particular to attend to the interests of its members.

I propose to say no more, but leave the matter now for your further consideration.

Discussion

Opening the discussion Dr. Hofmeyr said he could not subscribe to the idea of a completely State Veterinary Service for the following reasons:—

(1) A free State clinical service is not justifiable on economic grounds.

(2) Placing the profession under State control is tantamount to handing it over gagged and bound. Full professional freedom cannot exist in the State Service.

(3) Efficient clinical service demands willingness to hold oneself at the disposal of the public at all hours and every day of the week. The State cannot compel its employees to work continuously in excess of official hours.

(4) The only promotion in the service is to administrative posts.

(5) A State clinician would be at the beck and call of all stock owners within his area and the even distribution of his available time would be impossible. This would inevitably lead to constant complaints and friction.

(6) Up to the present the State has not shown itself willing to supply the instruments, drugs and facilities necessary for satisfactory clinical work. It is very doubtful whether it could supply them in the future.

Dr. Hofmeyr suggested that the State should maintain a full-time staff of epizoötologists whose function would be the control of scheduled diseases. In the greater number of areas the State should employ veterinarians on a part-time basis and with the right to private practice. Such employees would not be subject to transfer but vacant posts would be advertised throughout the profession. Neglect of State duties would result in dismissal and the appointment of another practitioner. The delinquent would then have to compete with subsidised opposition.

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SUBMISSION OF SPECIMENS FOR ANTHRAX DIAGNOSIS

G. D. SUTTON,
Onderstepoort

(Read at the 43rd Annual General Meeting)

This paper has been prompted by the condition in which potentially dangerous specimens are received at Onderstepoort. Occasions have occurred where members of the public have brought in spleen specimens loosely wrapped up in blood-stained pieces of paper or in leaky containers. Such specimens have sometimes been found positive for anthrax. Skin specimens have been received by post with only a single layer of paper wrapped round them. Other specimens have arrived in a decomposed state and have been useless for diagnostic purposes.

The problem of diagnosis is encountered in living animals, dead animals and subsequent to complaints about biological products. To minimise the danger to those who have to handle the specimens and to keep down the bulk of the packages only essential specimens should be submitted.

In living animals the specimens required are blood smears mainly for the exclusion of other diseases, smears and fluid or material from any swellings or local lesions, faeces in suspected intestinal cases and sputum where a pulmonary form of the disease may be present.

In dead animals the necessary specimens are blood smears, smears and fluid from local lesions or swellings. When, for any reason, these specimens are unobtainable, pieces of skin can be submitted. Two pieces, each about six inches square are sufficient. If there was any swelling, the skin specimens should be taken from over the swollen area. Otherwise, the part of the skin from which the specimens are taken is of no consequence. Internal organs should not be submitted, as, by the time they reach Onderstepoort they are too decomposed to be of any use for diagnosis. In some cases anthrax does not take a septicaemic course. Here all that may be seen is inflammatory lesions in the intestine if a post-mortem examination is made. Smears from the mucosa of the affected area would reveal the anthrax organism.

If a complaint against a biological product is being investigated any used, half-used or unused containers of the product in questoin are required in addition to the specimens listed above from living or dead animals. It is essential to provide as detailed a description as possible of the circumstances and history of the case. The main points to describe are the innoculation technique, the procedure adopted for the sterilization of the syringe and needles, the period between the time of symptoms or death and the exact size and extent of any swellings.

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Finally an appeal must be made for the satisfactory packing of specimens. They should be placed in non-breakable, leak-proof containers. No preservative should be added. The containers should next be wrapped in paper and then packed in sawdust or other absorbent material in stout boxes. Lastly enclose the package in a strong paper wrapping and mark the wrapper clearly on the outside " Suspected Anthrax. Dangerous."

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A RAPID RING TEST FOR BRUCELLOSIS IN FRESH MILK

G. C. v. DRIMMELEN,
Onderstepoort

(Read at the 43rd Annual General Meeting)

Hermann's (1937) article on the coloured antigen test for bulk milk samples in the diagnosis of bovine brucellosis has caused little comment in the literature. Hoflund (1943) stated that in Sweden bulk milk samples are subjected to the Abortus Bang Ring-test which will give a positive reaction if only one cow in fifty is infected. Dr. Ake Olson of Stockholm informed us that the test had proved a very valuable help in the control of brucellosis in Sweden. A little work on this test has been done in South Africa and I believe that this simple test can be of great help to us.

TECHNIQUE

The antigen used in performing the test is stained with haematoxylin. The bulk milk is mixed well and a sample of roughly one millilitre is put in a small test tube of the size used for the agglutination test. One drop of the antigen suspension is added to the sample and this is then thoroughly shaken and incubated at 37°C for 50 minutes. A positive result is indicated by a ring of violet coloured bacilli in the cream layer over a pure white layer of milk below. When no ring is formed and a white cream layer covers milk with a slight violet tinge the result is negative. The milk of negative samples retains the colour seen before incubation. The ring in the positive samples is formed by the coloured bacilli being carried up with the rising cream which leaves the milk as white as before the antigen suspension was added.

The *stain* is prepared by dissolving 4 grams of Delafield's haematoxylin in 25 ml. of 100% ethyl alcohol. When dissolved this is added to 400 ml. saturated aqueous solution of ammoniated alum (10%). This is allowed to stand open and exposed to light. After four days it is filtered and 100 ml. glycerine and 100 ml. methyl alcohol are added. The container is then allowed to stand for a fortnight on the laboratory table in order to let the solution mature. For use, the stain is diluted with about five times its volume of ammoniated alum solution. The optimum degree of dilution required has to be determined by testing small quantities of different dilutions from 1:4 to 1:10 and selecting the best dilution for preparation of the bulk antigen.

The *antigen* is produced from a three- to five-day potato agar culture of Brucella abortus bovis, washed off with a little physiological saline. The bacteria are filtered and washed by alternate centrifuging and suspension in saline. The sediment is eventually suspended in about double its quantity of distilled water and this suspension is added

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to twice its volume of freshly diluted stain. Hermann states that great care has to be exercised in selecting the correct degree of dilution for the stain. If dilution is insufficient a flaky appearance may be produced and auto-agglutination or agglutination with saline may be caused. If the dilution is too high the colouring of the bacteria will be incomplete and a stained deposit may be formed which can interfere with the clarity of the results. A five times dilution has invariably been found completely satisfactory here.

The suspension is thoroughly stirred and allowed to stand in the refrigerator overnight. The next day the bacilli are repeatedly washed with distilled water until no trace of colour is found in the supernatant fluid. The bacilli must have a dark bluish violet colour. The bacterial deposit is weighed and then suspended in five times its weight of physiological saline. This is mixed very well. Herman states that any product which shows a flaky appearance visible to the naked eye is discarded. The antigen should remain good for several weeks and not give off any stain into solution. At Onderstepoort it has actually been kept in excellent condition in the refrigerator for a few months.

Von Fleischhauer (1937) believes that the Ring-test phenomenon depends mainly on the presence of agglutinins. According to Hermann (1937) the agglutination process is markedly speeded up by the effect of the staining process on the bacilli.

The adsorption of the Brucella to the fat globules under the influence of the milk serum antibodies has been mentioned. The Schern-Gorli-Reaction apparently accounts for some of the factors responsible for the Ring-test reaction and von Fleischhauer believes that only results fully positive in 20 to 40 minutes can be used in practice. A strong Ring-test reaction is complete in 15 to 20 minutes but weaker results can only be recognized after 50 minutes. Samples with whey agglutination titres of less than 1 : 10 may show a positive reaction only after two hours. After shaking a sample in which the ring has formed it is re-established again on standing.

Although the Ring-test appears to be a specific reaction of Brucella, because no similar technique for coli bacilli could be evolved, one must keep in mind the experiences with the Schern-Gorli Reaction. This is a serological test for pasteurization, in which animal charcoal or guinea-pig red cells are used. Pasteurization destroys the absorption capacity of the fat globules as does any process which damages their thin protein surface films or Haptogen membranes. The S.G.R. is only suitable for cows' milk, it could not be produced with goats' milk according to Schern (1936). Kern (1931) found it weakened by 2% salt solution.

Both von Fleischhauer and Hermann found the Ring- test superior to the slow, whey *tube-agglutination test.* Hermann obtained respectively 13.1% and 12.3% positives, but many of the positive Ring-tests were not confirmed by a positive whey test and many of the positive whey tests were not fully positive by the Ring-test. He does not state if he re-examined the Ring-test results later. Olson finds that mastitis

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milk and colostrum or milk from drying cows tends to give slightly positive results.

Norell and Olson (1943) state that out of 323 blood-sample negative animals 11 reacted to the Ring-test and out of 129 blood-sample positive animals 19 showed no reaction. Out of 2,920 bulk samples tested 649 were positive (i.e. 20%). In 225 of these herds controls by blood test were carried out and concordant results were found in 213. Eight blood test negatives were Ring-test positive and 4 blood test positives were Ring-test negative. This shows the remarkable agreement between the two tests.

Results

(a) A few small batches and two large batches prepared at Onderstepoort gave very clear-cut positive results with fresh milk from infected cows. All milk from a number of cows negative to the blood agglutination test was completely negative to the Ring-test and only negative results were obtained with sour milk samples. Soured milk, whether from reacting or non-reacitng cows, never gave distinct positive results after standing 24 to 72 hours on the laboratory table. Three cows immunized during lactation showed that the positive reaction to the Ring-test developed just as fast or faster than the positive reaction to the blood-serum agglutination test.

(b) Refrigerated milk samples from positive cows gave positive results up to 45 days after milking.

Milk kept at room temperature with the addition of crystal violet preservative in the form of a small pill as recommended by McLachlan and Pullinger (1944) gave clear violet rings in the cream of cows reacting positively to the blood test. The milk below the cream was however not white on account of staining with the crystal violet. This milk remained suitable for testing for at least 72 hours. Negative samples showed a pure white layer of cream above the tinted milk.

(c) The milk of two drying cows, one immunized and one infected with virulent Br. abortus, gave positive results when sufficient cream was present. Samples deficient in cream showed agglutination and sedimentation of the antigen. A little cream from a negative milk added to this udder secretion produced a positive Ring-test reaction.

(d) Milk from a strongly positive reacting cow when diluted with negative milk showed clear positive results when diluted twenty to fifty times, but only suspicious results when diluted a 100 to 200 times.

Negative milk gave highly suspicious and positive results after two or three drops of blood serum from a positive reactor had been added to the one ml. of milk used for the test.

(e) Bulk milk samples of about one hundred herds were tested at intervals of one to two weeks and the results compared with the Breed clump count and streptococcal content of the fresh samples. The results of this pilot investigation are summarized as follows:—

Two-hundred-and-fifty-seven tests were carried out on the milk sent from 114 herds to a large S.A. township. Approximately

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half (59) of the suppliers were tested three times in succession with the following results:— 28 or 47% were positive in all three tests, and 16 were positive in some of them. *Within the space of a few weeks 75% of these herds thus showed evidence of brucellosis.* Four of the herds gave suspicious results regularly or occasionally and only eleven consistently proved negative.

The effect of contaminants in the milk and mastitis in the herds was examined as far as possible in order to make sure that no false positives were being included. This could be shown by a constant incidence of high Breed counts and long chain streptococci in the different groups. The 28 herds showed evidence of mastitis in eleven, gave high Breed counts in one and had both in another one. The 16 herds showed both mastitis and high counts in two herds and high counts only in one. The remaining fifteen herds which were never positive to the Ring-test showed mastitis in six and high counts in two. Thus mastitis or contamination was not found more often in positive than in negative tests. One herd, the only herd that was suspicious by the Ring-test three times in succession, also consistently showed mastitis.

The herds from which no regular samples were obtained, presumably the smaller herds which could be expected to be kept free from brucellosis with greater ease, did not show up any better. Of 25 herds tested twice eleven gave positive and eleven negative reactions. Three were suspicious. Seven of the thirty herds tested once only were positive.

The results obtained by other veterinarians in South Africa have not been analysed but a cursory examination of the reports shows that they are in agreement with ours. This evidence indicates that well over 50% of the milk put up for consumption shows Brucella antibodies.

Here may be added that the haematoxylin stained antigen is ideal for the rapid plate serum agglutination test.

Discussion

As regards application of the test, it could be used in the first place for survey purposes. Secondly, as in Sweden, it could be used as an indicator for serological work in the control of brucellosis. Dr. Olson states that bulk milk samples from all herds in Sweden are tested two or three times per year and the herds giving consistently negative results are considered free from brucellosis. Animals from herds with positive results are examined individually by serological methods. The advantages mentioned are speed, simplicity and ease. The method is recommended for survey purposes and for controlling Brucella free areas, districts or herds. I notice in Denmark this test is also in regular use.

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THE DIAGNOSIS AND TREATMENT OF RICKETTSIOSIS IN DOGS

W. D. MALHERBE,
Onderstepoort

(Read at 43rd Annual General Meeting)

Just about 2½ years ago we discovered an infection with Rickettsia canis (Donatien & Lestoquard, 1935) in a dog in the small animal clinic at Onderstepoort. The only previous report in the Union had been that of Neitz and Thomas in 1938. This animal had a while earlier been infected with a mild experimental strain of B. canis, and had recovered. One morning, quite unexpectedly, it was found dead. Our curiosity as to the cause of death was aroused and a careful autopsy was performed. Eventually, in bone-marrow smears, the characteristic " elementary bodies " of the genus Rickettsia were seen in the cytoplasm of the free histiocytic cells. Babesias were not found even with exhaustive examination. The next step was to determine the source of infection and a special lookout was kept for cases from round about Onderstepoort, the area from which most of our clinical material is derived. Within a month Rickettsiosis was diagnosed in about a dozen cases.

We then sent out a circular letter to all veterinarians in the Union, giving a general description of the disease and offering to examine smears from suspected cases. Up to the present we have received only a few smears, and no positive reports. We therefore still know very little of the distribution in the Union. Apart from about a fifteen mile radius of Onderstepoort, east, west and north, we have diagnosed it in only a few dogs from further afield, Thabazimbi and Brits.

That is the reason for this paper: we should like to have much more precise information about the distribution. I therefore propose to give some details about our method of diagnosis, one which we consider to be, for practical purposes, very efficient.

Method of Diagnosis

The previous workers with this disease (the bibliography is given more fully in an earlier and more comprehensive report, 1947) have relied on organ smears for diagnosis. This had been considered to be fairly easy from smears of lung, liver, and bone marrow. We tried these but found the biopsies to be more or less distressing to the animals.

One fact, which was clear from the literature and our own observations, was that there was a pronounced and regular monocytosis, and that it was in the cytoplasm of the monocytes that Rickettsia colonies were to be found. The essential then was to devise some means of " lining up " the monocytes so that one can examine a large number in a relatively short time ,thus increasing both facility and efficiency.

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We found that lung smears were more or less " dirty " on account of the " dust cells " and other large macrophages, and that one had to wade through many microscopic fields to see comparatively few monocytes. Similarly, in the liver the majority of the larger cells were hepatic cells, and in bone marrow there were the usual large number of immature leukocytes. We found the most satisfactory solution (in our hands) to be blood smears made as described below. There was nothing new or revolutionary about the method as it was just a good way of making a smear for the study of morphology or for Babesia diagnosis.

The principles are as follows:—

1. That the slides are scrupulously clean;

2. That only a small amount of the first drop of blood to emerge from a shallow cut (involving little more than the epidermis) be used, the idea being to obtain capillary blood;

3. That the smear be made by the " push " method and not by " pulling." By " pulling " you tend to damage the rather fragile enlarged monocytes, whereas by " pushing " the white cells *follow* the upper slide in the acute angle between the two slides, and very few are damaged;

4. The blood should be just about exhausted by the time the upper slide has travelled about $\frac{1}{2}$ - $\frac{3}{4}$ inch, and the film must be thin.

A little practice is needed to make good smears in which the majority of monocytes are grouped along the edges in the serrated " tail " or " tongue."

Symptoms

These are by no means clearcut. The owner usually complains of some loss of appetite, or a capricious appetite lasting for a week or two. Depression is not a marked or regular feature. It is in fact amazing to see the habitus of some infected dogs with a temperature of 106 or 107 degrees. Anaemia, which has usually been described in the literature, has, as a rule been absent in all our clinical cases, *except* in those with severe hookworm infestation, or with intercurrent babesiasis. Whether our strain is particularly mild, I do not know, but certainly in uncomplicated cases we do not see anaemia.

East African workers have differentiated between cutaneous, septicaemic and nervous forms, but since these forms tend to merge one cannot regard this as being a rigid classification. We regard it as being essentially septicaemic with some degree of somnolence if the animal is left quietly and in some cases a tendency for the skin to develop flat red erosions up to about 2 cm. in diameter. These are always aggravated by licking. In French Congo Malbrant (1939) described convulsions, hyperaesthesia and blindness, but in some hundreds of cases we have seen none of these.

The incubation period varies from 1 - 3 weeks. Fever can be very high, with more or less inappetance and dejection, small hard thready pulse, spleen sometimes palpable, superficial lymph glands

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possibly enlarged. The kidneys are usually more or less severely affected and death is often due to uraemia. In a few cases secondary hepatic damage has been indicated by icterus. The temperature drops to below normal and stays very low for a day or two before death, with the animal more or less in coma towards the end.

The temperature curve we have found in most cases to be very typical, with remissions and exacerbations on alternate days, building up to a peak and then coming gradually down to normal. After a few days of normal temperature the process starts all over again. Often one's suspicion of the disease is aroused by such a temperature curve. In an early case it is usually not possible to find Rickettsias till about the fourth day.

Therapy

Workers in North Africa tried out trypan blue, gonacrin, acaprin, and recovered serum but found them useless. In West Africa intravenous formalin was used but the results were not regarded as conclusive. Malbrant found arsenicals to be of some use but did not regard them as specific. Carmichael & Fiennes (1942) described good results in Kenya with sulphapyridine (0.25 G/kilo). We tried uleron at first with fair results.

Seeing that sulphonamides showed promise, we soon selected one which was relatively nontoxic, was quickly absorbed and slowly excreted. This was sulphamezathine (I.C. Pharmaceuticals). We used intravenous injection of the solution at a dosage of 0.125 G/kilo and had good results with immediate temperature response with two injections at 24-hour interval. A tendency however remained for the temperature to start coming up again after 5 or 6 days, so that treatment had to be repeated. More recently 4 injections at daily intervals have been used with definitely better results, and at present a series of dogs is being treated with an initial intravenous dose followed by per os administration of sulphamezathine tablets for a total of four days ($\frac{1}{2}$ of 0.125G/kilo b.i.d.). This gives promise of being satisfactory.

We have tried penicillin on a few cases and have found it to be quite useless.

Thomas and Neitz (1938) described Rickettsiosis as a fatal disease with about 100% mortality but with sulphonamide therapy as described above we have had practically no mortality in uncomplicated cases. Strain differences should however be borne in mind as a possibility.

In conclusion I wish to emphasize that when you have made a diagnosis of Rickettsiosis you have only gone part of the way. It cannot be too strongly stressed that thorough clinical examinaton of the dog is necessary for conditions such as babesiasis and Ankylostomiasis, as these are highly prejudicial to recovery if not treated. Prognosis is moreover conditioned largely by the state of function of kidneys and liver. A watchful eye should thus be kept on these for indications for such supportive treatment as may be required.

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EXAMINATION OF THE BULL FOR FERTILITY

N. C. STARKE

(Read at the 43rd Annual General Meeting)

Infertility in animals is a big subject and all its aspects cannot be dealt with in one paper. I shall, therefore, in this paper confine myself to the examination of the bull.

I want to emphasize that sterility may be due to one or more of many factors and unless the cause can readily be determined a systematic examination must be carried out. This is especially necessary at the first examination. The breeding history of the herd should also be inquired into.

The subject usually resolves itself into three main forms of sterility, viz.:—

1. Lack or absence of sexual desire (libido)
2. Inability to copulate.
3. Inability to fertilize.

1. The reason why a particular bull refuses to serve must be carefully investigated. Lobido and fertility are not related. It should be remembered that animals are creatures of habit, so that if the cause of the lack of interest in the cows is not removed it may become a permament defect. In young bulls it may be due to ignorance of what is required of them. Rough or impatient handling only aggravates matters. Bulls of all ages may refuse to mate when removed to strange surroundings, such as a change of ownership or even moving them from a paddock where they are accustomed to serve to a new place. On the other hand, good results are sometimes obtained by deliberately creating a change of scene and attendants. Another trick is to allow a normal bull (or an ox) to mount a cow within full view of the disinterested one. Such cases of lack of sexual desire are usually temporary and patience and good handling are all that are required. In more obstinate cases a change of food, exercise, the addition of vitamines and if necessary hormone injections may have to be resorted to (P.M.S. 3,000 units intramuscularly or Prolan-in-oil; 10 c.c. repeated at 7-day intervals. Two or three injections if necessary).

Acute and chronic diseases reduce a bull's desire to mate. Therefore, inquire into his state of health. Observe his condition: very fat bulls are slow to serve or libido may be absent. Morbid affections of the joints and feet cause pain when mounting and the bull refuses to copulate. Over-exertion and exhaustion are potent factors in bringing about decreased sexual desire, e.g., a bull running with the cows and worried by a number of cows in oestrus at the same time. After repeated unsuccessful attempts to copulate the bull loses interest. A bull will sometimes refuse to serve a cow of a particular colour.

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2. *Inability to copulate.* — Here the bull is keen to serve and mounts the cow, but is unable to accomplish the act of coitus. If the affections mentioned above that cause pain when rising onto the hind limbs do not stop him from mounting they may prevent him from giving that characteristic thrust which is essential for proper ejaculation. Furthermore, inflammatory changes in the penis and prepuce and irritation of the penis by hair stubble when the prepucial hairs have been clipped short may prevent copulation. Pot-bellies are a mechanical interference.

When the penis cannot be protruded far enough to effect coitus the causes may be arthritis of the iliosacral joint, contraction of the retractor penis muscle (an hereditary factor) or adhesions in the sheath. Nervousness in young bulls may be responsible for imperfect erection. Under these circumstances the bull's semen may be normal, but he is functionally infertile. It is, therefore, sound practice when examining a bull for fertility for the first time to allow him to mount a cow so that the act of copulation can be observed. Endocrine disfunction should be borne in mind.

3. *Inability to Fertilize.* — For fertilization to take place spermatozoa must be actively motile, there must be a sufficient number of sperms of which about 80 per cent. must be normal.

The male gonad is extremely sensitive to endogenous and exogenous influences which may cause a "break" in spermatogenesis at various levels. Good semen can change to *bad* within 8 - 14 days, but recovery is slow.

Again, spermatogenesis may be normal, but functional and morbid disturbances in the accessory sex organs may result in their secretions being detrimental to the vitality of spermatogea; so that even though the number of morphologically abnormal cells is within normal limits, motility is adversely affected and their fertilizing capacity is reduced or is absent. An examination of a bull for fertility should, therefore, include a clinical examination of the scrotum, testes, epididymis, penis, prepuce and the accessary sex organs:— vesiculae seminales, ampullae of the vasa differentia and prostate as well as the semen.

The *scrotum* should be symmetrical, free from deformaties, and the skin soft and pliable.

Testes — are best examined when they are well descended, i.e., under warm conditions. The size may vary between old and young bulls and also btween bulls of the same age. There is frequently a difference between the left and the right. The consistence of normal testes is firmly elastic and it should be approximately the same in both. Age increases the consistence somewhat, but in *fibrosis testis* it is markedly increased while in *hypoplasia* or *degeneration* the testicle is softer and less elastic. Normally, palpation should evince no pain. *In acute orchitis,* e.g. B. abortus, Lumpy Skin Disease, etc., the affected testicle or testicles is very painful and swollen. If the condition becomes chronic the testicle is enlarged and firm, but the size may

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gradually decrease leaving a hard testicle. The number of abnormal spermatozoa is greatly increased.

Epididymis. In the epididymis spermatozoa undergo a ripening process which takes about 9 days. Sperm are stored in the cauda epididymis and in the ampullae of vasa differentia. The caput epididymis can be palpated on the top of testicle, the cauda at the bottom and the body along the posterior border. In *epididymitis* the organ is enlarged and lumps may be felt .

Vesiculae Seminales. — These are *lobulated* glands lying on the bottom of the pelvis, on either side of the ampullae of the ductus deferens. Professor van der Kaay gives their length as 12 - 15 cms., width 3 - 4 cms. and thickness 2 - 3 cms. In young bulls the measurements are 6 - 8 x 1 - 2 x 1 - 2 cms.

These glands do not store semen. — Their secretion is yellowish and makes up the volume of the semen. When filled, as when ejaculation has not taken place for some time, they feel tense. These glands should not be painful on palpation. In vesiculitis one finds a marked difference in the size of the two glands, the *lobulated* character disappears due to abnormal stretching and the surface feels ***smooth.***

Vesiculitis. — May be caused by B. abortus, corynebacterium pyogenes or streptococci. The glands are then painful and there may be an oedema of the floor of the pelvis. In infection with corynebacterium the inflammatory process may extend to the surrounding tissues and even to the wall of the rectum. Massage helps to evacuate the gland.

Ampullae ductes deferentia. — They lie between the seminal vesicles. Consistence and size should be noted. Inflammatory processes may exist due to B. abortus.

Examination of Semen. — A single examination of a bull's semen is not sufficient to draw conclusions from unless the first examination is satisfactory. Two or three samples of semen at intervals of 14 days to a month are usually necessary in order to determine whether the position is static, has improved or is getting worse.

The *Average* volume is 4 - 8 c.c. After long sexual rest collection should be made from the second ejaculation or by not allowing the bull to mount immediately he comes to the cow.

Concentration: 300,000 to 2,000,000 per c.m.m. (av. 800,000). (Good semen — 500 million to 2,000 million per c.c.).

The concentration is reduced in hypolasia and in degeneration of the testes and in orchitis and in excessive use. According to Lagerlof the border line between adequate and inadequate sperm numbers is 200 million per c.c., while some English workers consider 500 million to be the limit. Dutch authorities agree with Lagerlof. It would appear, that the *quality* and not the *quantity* (within limits, of course) is the important factor, because in artificial insemination high dilutions are used. However, if very few sperm are ejaculated a morbid condition is no doubt responsible.

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Colour. Milky-white to cream-coloured. A pinkish or reddish colour is due to fresh blood in the semen, e.g., injury to the penis or vaginal mucosa. A brown or reddish-brown is due to products of degeneration of blood or tissues indicating a degenerative process in the genitalia. A greenish or distinctly yellow colour indicates the presence of pus.

Smell: Practically none. P.H. 6.5 - 6.8.

Motility: The ideal is a strong, progressive forward movement of individual spermatozoa as opposed to a sluggish, rotary or brownian type of movement. In semen of good concentration, in a hanging drop, or under a coverslip on a flat slide, movement of individual sperm is not seen except at the edges of drop. One only sees *mass movement.* In good quality semen this is shown by dense waves which change direction rapidly (in good but less dense semen wave movement is less marked. Such semen is rated at 90 - 100% = 5. In semen rated at 75 - 90%, i.e., 4, the waves are less forceful, but still distinct.. In a 60 - 75%, i.e., 3, semen, a few weak faint waves are seen and movement is altogether slower. Such semen is considered to be fairly good. Below this i.e., 45 - 60%,i.e., 2, there are no waves and most spermatozoa have lost the forward progressive movement the majority moving in circles or oscillating with many non-motile sperm being pushed about by the few active ones. Such semen is of poor quality. In semen rated as " 1 " i.e., below 40%, only a few spermatozoa are active, the majority being non-motile or show an oscillating movement. When rated *as O* there is no movement. Owing to the tenaceus mucus no waves are seen in semen removed from the vagina.

Morphological Abnormalities: In semen of bulls of good fertility some abnormal spermatozoa will be found. The question is, " How many abnormal spermatozoa can be allowed without affecting fertility?"

In general, abnormalities of the head are of more importance than those of the tail. Pyriform heads are of greater significance than heads which are evenly narrowed. The percentage of abnormal sperm are remarkably constant for individual bulls. Lagerlof considers that in bulls of good fertility the percentage of abnormal sperms do not exceed 17 - 18%. Herman & Swanson think that 30% abnormals is the limit for good and fair fertility. Others again think that 20% abnormals should lead one to suspect that spermatogenesis has been adversely affected.

It is, however, most important that *all* the semen characteristics should be considered in assessing the value of a semen sample i.e., motility, density, volume and abnormals, and whether subsequent examinations show any marked changes in the picture.

In *bulls of reduced fertility* the number of abnormal cells is high, e.g., in hypoplasia of the testicles the abnormal count may reach over 40% (esp. loose and deformed heads) and in *degeneration* the count is about 37% — esp. pyriform heads, loose heads, defectively stained sperm and microsperm.

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Unripe sperm i.e., sperm with a protoplasmic drop at the junction of the head and neck or at the junction of the middle-piece and tail. This latter abnormality is quite common even in good semen (32%) and indicates that the bull is being used very frequently or that masturbation is taking place. In such cases their presence is not of great importance if the matter is corrected. If however, the bull is not being used much, and masturbation can be excluded, the presence of middle-piece heads in relatively large numbers should arouse a strong suspicion that the bull is recovering from a condition which has affected spermatogenesis or that a sinister affection of the genitalia will shortly become apparent.

A low sperm density with a high percentage of unripe and abnormal sperm in a young bull indicates hypoplasia. In older bulls the same findings denote a degenerative process and the animal should be re-examined in about a month's time.

About 3% of loose heads are usually found in normal semen; a large number of loose heads are found in cases of rapid degeneration. In this connection it must be remembered that loose heads can easily be created unless the smear is made very carefully.

(Dr. Starke illustrated his lecture with moving pictures of sperm movements and slides of the abnormal forms.)

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CLINICAL EXPERIENCES WITH PREGNANT MARE SERUM (P.M.S.) IN FUNCTIONAL STERILITY IN COWS

C. F. B. HOFMEYR

(Read at the 43rd Annual General Meeting)

Dr. Hofmeyr commenced by reminding his audience that P.M.S. contained not only the follicle stimulating fraction but also small amounts of luteinising hormone.

The first condition mentioned was anoestrus. This could be divided into two main types viz.:—

1. That associated with retained *corpus luteum*. Here the use of P.M.S. was definitely contra-indicated as it produced cystic ovaries. Expression of the corpus luteum resulted in ovulation within 3 to 4 days.
2. Anoestrus associated with small, smooth, non-functioning ovaries. The diagnosis of this condition required care as the ovary at the end of the oestrus cycle normally presents a smooth and even surface. In the absence of a reliable history of anoestrus a second examination would be carried out about 10 days later.

This condition was found in two types of animals viz.:—

(a) Heifers which had failed to reach sexual maturity (infantilism).

(b) Cows that had previously calved.

The heifer with genital infantilism presented a small tight vulva, ovaries often no larger than peas and *cornua uteri* the thickness of a lead pencil.

In the cow the vulva and vagina were normal but the uterus was reduced in size and the cervix was also small and tightly closed. The uterus showed no erection on being handled.

Some anoestrus cows show genitalia of normal size but the ovaries are smooth. The uterus becomes turgid when massaged. Such cows frequently come into oestrus shortly after examination apparantly as a result of the mechanical stimulation.

Causes of Anoestrus

Dr. Hofmeyr stated that the causes of anoestrus were still obscure. Nutrition and bad management probably played a role and if obviously defective these matters should be rectified before hormones were resorted to. Hormones should also never be used in the presence of infection, either acute or chronic.

Anoestrus was most common during the winter which might point to a nutritional factor being involved. High producers and cows in

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poor condition were also proved to develop static ovaries possibly for the same reason.

A large number of anoestrus heifers had been encountered in a herd in which there had been insufficient bulls. This raised the question as to whether delayed breeding might cause genital infantilism, under certain conditions.

Treatment

The use of P.M.S. in the treatment of anoestrus had given satisfactory results in many cases. The dose had to be gauged on the state of the genital organs as well as on the size of the cow. Up to 5,000 i.u. could be used on a large cow in profound anoestrus.

Some animals came into oestrum as soon as the second day after the first injection. In such cases it would appear that the original cause of the anoestrus was lack of F.S.H. from the anterior pituitary as the ovaries responded promptly when this hormone was introduced artificially. Dr. Hofmeyr warned against serving such animals on the first period for fear of superovulation. Two cases of triplicate and one of quadruplicate pregnancy had resulted in his experience.

The response to a single dose of P.M.S. was sometimes delayed for up to four weeks. This suggested that the hormone had acted not directly on the ovaries but on the pituitary.

Repeated smaller injections were usually preferably to a single massive dose.

Failure to Conceive Despite Regular Oestrus

Dr. Hofmeyr also referred to the use of P.M.S. in cows that were clinically normal and showed regular cycles yet repeatedly returned to the bull. These cases might either be due to failure of ovulation or implantation. The use of P.M.S. in a small number of such cases had given encouraging results although no definite conclusions could be drawn.

The speaker also referred to the use of P.M.S. in the treatment of cystic ovaries but said he had not had sufficient experience to express any opinion on the matter.

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SOME VETERINARY PROBLEMS OF THE CAPE WESTERN AREA

V. COOPER

(Read at the 43rd Annual General Meeting)

This Area covering 170,000 square miles, a third of the Union, is one in which we have wide variations not only in climatic but also in physical conditions. Conditions in the winter rainfall area are different to any found in any other part of the Union, giving us the rank vegetation in the winter and the dry almost drought conditions throughout the hot summer months. We have the fertile western province with its heavy cattle population and the Karroo and North Western Cape with the dry arid stretches carrying the greater portion of the Union's small stock population. Over 50 per cent. of the Union's equines and half the Union's poultry is to be found in this vast area.

In this area we have at present only seven field officers, each one controlling a very large stretch of country. Calvinia, 46,000 square miles, an area as great as the Orange Free State ; Upington and De Aar, over 30,000 square miles, areas as big as the Province of Natal and Zululand.

Very little is known of this area from a stock disease point of view. We should remember, however, that in the past Glanders was very prevalent, Foot and Mouth Disease was introduced from overseas. At one time the Western Province was a quarantine area for Tuberculosis.

To-day we are thought of as the fortunate province in which stock are healthy and free from any dangerous scheduled diseases and that purely for appearances sake a skeleton veterinary staff is maintained.

I shall first of all give you a summary of disease conditions during the past twelve months and then give you some idea of what remains to be done.

Lumpy Skin Disease: Lumpy Skin Disease made its first appearance at Paarl in June, 1946. We were never able to trace the origin of the infection. It spread rapidly through the Western Province and by the end of October the districts of Cape Town, Wynberg, Stellenbosch, Bellville, Paarl, Somerset West, Wellington and Malmesbury were all heavily infected. In the summer of 1946-47, the disease spread to Worcester, Caledon, Tulbagh, Ceres and Piquetberg. In this area, however, there were what I shall call islands free from infection. The disease died down in the Winter of 1947 but flared up again in the spring and practically all the areas which had remained free now became infected.

During the Summer of 1947 and 1948, the disease spread to Clanwilliam and Van Rhynsdorp and Calvinia Districts and also to

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Montague, Robertson, Swellendam, Heidelberg and Riversdale. Why it has not spread into the Mossel Bay-Knysna Areas I do not know.

In the North along the Orange River we have had isolated outbreaks in the Kenhardt, Prieska and Hopetown Districts. In no instance was there any spread of infection from the initial focus of infection. To-day the disease is very active in the Olifants River Settlement and the Van Rhynsdorp District.

Uitpeuloog: At the end of September, farmers along the Kuruman River in Gordonia, reported a new disease in sheep with a relatively high mortality in infected stock. Dr. Muller proceeded to this area and early in October I received the first reports on Uitpeuloog, or Blouwildebeesoog. The symptoms of this disease for the benefit of those who did not see the condition were as follows:—

(1) Nervous symptoms. The animal had a staggering gait, falling down and rising with difficulty. The eyes appeared to be quite normal but on closer examination it was found that the majority were already blind. In a fair percentage of cases animals died during this stage of the disease.

(2) A pronounced exophthalmia developed in one or both eyes. The blood vessels of the sclera were injected and there was rolling and twitching of the eyeball often apparently accompanied by intense pain. The pupillary reflex was absent. Very soon opacity of the cornea developed with oedema of the eyelids. Torticollis was a very common symptom, more prevalent when only one eye was affected.

Rhinitis was fairly common.

As the condition progressed inco-ordination of movements became more pronounced and animals appeared to have fits. This passed over to a stage where the animal was no longer able to rise and it lay on the ground making paddling movements as in Heartwater.

The eye lesions also became more pronounced and the eyeball eventually ruptured leaving a dark red clot protruding.

In cases which recovered it was noticed that improvement set in more or less immediately after the rupture of the eyeball took place. As soon as the acute symptoms passed off animals began to feed. When both eyes were affected, however, the animals, unless they were kept on good grazing died as a result of starvation.

The progress of the disease was very rapid.

Dr. Adelaar was sent down to collect material and to assist in the investigations. Unfortunately laboratory investigations were not successful and we are still unable to give any satisfactory information regarding the nature of the disease, its cause and mode of transmission.

This condition was very prevalent in South-West Africa and in the Kuruman Districts and in all cases was associated with the trekking of the Blue Wildebeest during the severe drought. The Wildebeest were spread far and wide after the shooting took place in the Kuruman and Vryburg Districts. This is another illustration of the damage which can be caused by permiting uncontrolled and indiscriminate slaughter of game.

Infection in flocks amounted to approximately 20 per cent. and of

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the infected stock approximately 25 per cent. died (mortality and morbidity 25 per cent.).

Fowl Cholera: In February, 1948, Dr. Stephan of Malmesbury, reported suspected Fowl Cholera on the farm Boesmansfontein in the Malmesbury District. This diagnosis was confirmed by Allerton.

Fowl Cholera has been diagnosed in the Hopefield District by Spreull in 1926. In his report he stated that he had also noted outbreaks in the Umzimkulu District in 1909, and in the Elliotdale District in 1910.

In the course of his investigations Dr. Stephan found infection on the farms Klipfontein and Kanolfontein adjoining Boesmansfontein, and on the property of a speculator in Malmesbury. Dr. Coles came down from Onderstepoort and it was decided that all the birds on these properties should be slaughtered. This clearance was carried out on the 1st March. All healthy birds were conveyed to Cape Town, slaughtered and carcases were placed in cold storage.

On the 13th March, an outbreak was diagnosed on the farm Schoonspruit, and on the 18th, further cases were found on the Railway Reserve. As these cases were on the immediate boundary of the Malmesbury townlands I decided to postpone further action until we had ascertained that the townlands itself were not actively infected. Movements of poultry through Malmesbury Station were stopped however.

On the 31st March, Fowl Cholera was diagnosed on a property at Steenberg Station, near Muizenburg. No connection could be found between the outbreaks in the Malmesbury District and this new outbreak sixty miles away.

New outbreaks were discovered on the farms Nooitgedacht, Weltevrede and Constantia in May. Deaths had apparently taken place on Weltevrede since the end of March. As this farm was on the railway and as labourers were employed on the line moving between Malmesbury and Cannonhead, it would appear that infection had been spread by movements of fowls by these labourers.

With the exception of the farm Schoonspruit all poultry has been slaughtered out. On Schoonspruit there were six ducks and approximately 200 fowls. Three ducks died suddenly and the owner promptly destroyed the remaining three. Only one fowl died. This property is on the border of the townlands and is literally surrounded by small flocks of birds. I was of the opinion that if we slaughtered out this flock we would be obliged to slaughter out all contacts which would have meant all poultry on Malmesbury townlands. It is interesting to note that there has been no further mortality in this area.

I am satisfied that fowl cholera has been present in the Western Province for many years now. Heavy mortality has occurred in farm poultry flocks but as these flocks have been run purely for domestic and not for commercial purposes owners have not bothered to report and have taken no steps to ascertain the cause of death. It would also be of interest to know what quantities of fowl typhoid vaccine have been sold to poultry owners in the Western Province as I am

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of the opinion that owners might have assumed that the mortality was due to this disease and acting on their own initiative have inoculated. From the behaviour of the disease they would be justified in thinking that the inoculation had been a success.

At this point I wish to criticise the practice of dispensing of vaccines for use against scheduled disease from Onderstepoort without notifying the Senior Veterinary Officer of the Province of such issues. In the annual reports we note that so many millions of doses of Anthrax vaccine and so many hundred thousand doses of Fowl Typhoid vaccine have been issued. How many doses are issued to farmers without the knowledge of the Veterinary Officers concerned? I maintain that unless these vaccines are ordered by an officer of the department the laboratory must notify the Senior Veterinary Officer of the issue. It is essential that we ascertain why inoculation is being carried out.

Tuberculosis: We have at present only 36 herds under test, an increase of 5 over last year. As you all know we have a large number of Friesland and Jersey Breeders in the Western Province and many hundreds if not thousands of cows are sold to the dairymen throughout the Union every year. With the growth of the cattle breeding activities in this area it is a great pity that active steps cannot be taken immediately to clean up our stock. The longer we delay the more serious will the position become. Tuberculosis is prevalent and in delaying we are aggravating the position.

Verminoses: In the past little or no notice was taken of worm infestations in sheep in the North Western Cape. During the past three years, however, we have come to realize that these parasites are responsible for enormous losses in these dry areas and the staff under the very active leadership of Dr. Meeser of Calvinia, have been carrying out excellent propaganda work and also assisting the farmers to undertake dosing of stock. In the Garies area alone Stock Inspector Burke has been instrumental in persuading the farmers to dose over 50,000 head of stock. The stock inspectors are encouraged to take an interest in this campaign and some are doing very good work.

This is a problem which should be tackled in a big way and a comprehensive survey of the whole area is long overdue.

Trace Elements and Deficiency Diseases: Here is another problem which has really not been touched upon yet. Preliminary investigations have been carried out into a Copper Deficiency in the Saldanha Bay Area. There are obviously deficiencies in our grazing in the coastal areas right down to Mossel Bay, and we could be very busily employed in these areas.

The question of Regional Laboratories has been discussed and approved of in principle but the old stumbling bock staff is once again delaying any action being taken. The testing for B.W.D. must be carried out in Cape Town and a well-equipped laboratory for investigations into poultry diseases should be placed on the priority list. I am becoming more and more convinced that veterinary officers should be employed on field research duties and that the control of scheduled

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diseases and the supervision of operations which can be carried out by the farmers themselves should be in the hands of well trained stock inspectors.

We must not waste our professional veterinary staff on routine duties. We are gravely short of veterinary manpower and it is our duty to see that what little we have is not wasted on unproductive routine duties.

Other conditions mentioned in this discussion :—

Geeldikkop ; Ovine dystokea ; Infertility in Rams and Thoroughbred mares; Tick-borne Diseases.

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DIE GEBRUIK VAN BRUCELLA ABORTUS (STAM 19). ENTSTOF IN SUID-AFRIKA

G. C. VAN DRIMMELEN,
Onderstepoort

(Voorgedra op die 43e Algemene Vergadering)

Kalwerenting, soos deur Robinson(17) in sy oorsig gemeld is in Suid-Afrika uitgetoets as gevolg van 'n dringende behoefte vir meer praktiese bestrydingsmetodes teen besmetlike misgeboorte. Voorheen was daar vir dié beesboere, wat die toets en uitslag van reageerders nie kon toepas nie, geen ander uitweg as om die entingsmetode van Stockman(18) uit te voer nie. Die nadele hieraan verbonde, byvoorbeeld verspreiding van virulente smetstof en bedreiging van die vrugbaarheid van geënte diere, het nogal swaar opgeweeg teen die onweerlegbare voordeel van misgeboorte-beperking. Boonop het veeartse, beesboere en huisdiere gevaar geloop van besmetting.

Stockman se metode het bestaan uit die inspuiting van lewendige, virulente Brucella abortus-kiema in volwasse, nie-dragtige verse en koeie, minstens twee maande voordat hulle gedek sou word. Behalwe 'n ligte algemene reaksie en 'n tydelike melkvermindering, was daar geen onmiddellike skadelike gevolge nie, maar 'n kans het bestaan dat 'n latente besmetting kon volg en dat die kieme in die uier gevestig en in die melk uitgeskei kon word. Die uier is 'n orgaan waarin die Brucella by voorkeur permanente foci vorm. Geënte diere het dus min of meer dieselfde status as natuurlik besmette koeie verkry, veral wat betref die moontlikheid van onvrugbaarheid en gevaarlikheid vir openbare gesondheid.

Die verhoogde weerstand wat besmette en geënte diere teen misgeboorte kan opbou, is deur baie werkers as 'n gevolg van 'n toestand van premunisie beskou. Huddleson(13) het egter in 'n samevattende oorsig aangetoon, dat 'n werklike immuniteit teen brucellose ook voorkom.

Dit is duidelik dat enige proses van immunisasie hier slegs 'n betreklike klein verhoging in weerstand teen besmetting kan bewerkstellig. Laat ons ter verduidelikking 'n baie dodelike siekte voorstel, 'n siekte wat besmetlik is vir 99 persent van diere, wat siekte veroorsaak by 95 persent en wat dodelik is vir 80 persent. Brucellose in kontras hiermee is slegs besmetlik vir enkele beeste tensy hulle dragtig is. In sommige eksperimente het selfs 18 persent van die koeie wat verskeie jare aaneen deeglik blootgestel is aan swaar besmetting, glad nie besmet geraak nie. Die siekte, te oordeel na die verskynsel van misgeboorte, ontwikkel egter in baie van die besmette diere, maar daar is geen sterfte nie behalwe die van die foetus of te-vroeggebore kalfie.

Geënte beeste en diere wat van Brucella-*misgeboorte* herstel het, is nog taamlik vatbaar vir virulente *besmetting*, (5) (20) en kan selfs verspreiers word van Brucella-kieme uit 'n besmetting opgedoen nadat

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'n goeie weerstand teen misgeboorte bereik was (1) (2). Birch en sy medewerkers het byvoorbeeld aangetoon, dat van geënte koeie wat oor ses dragtigheidsperiodes blootgestel en bestudeer is, 58 persent besmet geraak het, terwyl slegs 66 persent van die kontrole-diere die besmetting gewys het(2).

Dikwels is aanspraak gemaak op goeie resultate van enting met verswakte of avirulente stamme. Dis waarskynlik grotendeels te wyte aan die feit dat by enige uitbreking van die siekte in 'n kudde, enige aandag aan die bestryding dikwels saamval met die natuurlike afname in misgeboortes as gevolg van die vinnige vermindering van vatbare dragtige diere. Hierdie siekte is in 'n groot mate selfbeperkend van die epizootologiese standpunt.

Stam 19

Buck(3) het 'n stam Brucella (Stam 19) uitgesoek met die oog op kulturele stabiliteit en vaste immuniserende eienskappe. Dis gevind dat 'n graad van immuniteit in kalwers verwek kon word as hul geënt is met hierdie stam op 'n ouderdom van ses maande. Die agglutinasie-reaksie van diere wat geënt is het in dié geval by omtrent 96 persent van hulle verdwyn, voorda thul twee jaar oud geword het(16) (21). Die immuniteit was genoegsaam om weerstand teen *misgeboorte* vir omtrent ses jaar te handhaaf as hul aan natuurlike besmetting blootgestel sou wees(6). Birch en sy medewerkers(2) het gevind dat by geënte kalwers, wat gedurig aan besmetting blootgestel is, die hoogtepunt van misgeboorte op die vierde dragtigheidsperiode val in plaas van op die eerste soos by kontrole-diere.

Die kalwerentingsmetode is oorspronklik ingestel as 'n maatreël wat ingepas het by die bestaande skema's vir uitroei van die siekte, baseer op die uiteindelike verwydering van alle reageerders uit die aanteel-kuddes. Minder as drie persent van die geënte kalwers word permanente reageerders. Op kalwers het die entstof geen nadelige uitwerking nie, daar is slegs 'n temperatuur-reaksie onmiddellik na die inspuiting.

Grootbeesenting

By Buck(3) se oorspronklike eksperimente is aanduidings gevind dat Stam 19 baie goed toegepas kan word in geval van uitbrekings in Brucella-vry-kuddes met min weerstand. Die immuniteit verwek in volwasse beeste skyn aanmerklik sterker te wees, as dié wat in kalwers verkry word. Die enigste nadeel is, dat die positiewe agglutinasie-reaksie, wat veroorsaak word *ook* baie meer standhouedend is. Dis gelukkig van geen belang in swaarbesmette kuddes en in streke, waar geen uitroeiskema in werking is nie. Die waarheid, is, dat die nuutste inligting uit die Verenigde State(8) nadruk lê op die wenslikheid van inenting by 'n ouderdom van tien maande. Die probleem is om die hoogsmoontlike ontwikkeling van voortplantingsorgane te verkry, sonder om die gewenste verlies van die agglutinasie-reaksie voordat die teel-ouderdom bereik is, prys te gee. Klaarblyklik moet 'n mens versigtig wees in Suid-Afrika, om by hierdie oorwegings byvoorbeeld nie Afrikaner-beeste en Jersey-beeste oor dieselfde kam

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te skeer nie. Geslagsrypheid word by laasgenoemde op 'n baie laer ouderdom bereik.

Eksperimente beplan om te wys of koeie wat geënt is, die entstofkiem so kan uitskei dat kontakdiere besmet raak, het totnogtoe 'n negatiewe antwoord opgelewer. As 'n dragtige koei ingespuit word kan die Brucella Stam 19 egter in onveranderde toestand van die foetus teruggekry word(6). Dragtige diere wat geënt word met Stam 19 aborteer partymaal. In sommige eksperimente is 5 persent tot 10 persent misgeboortes ondervind(11). Onlangs is die Amerikaanse ondervinding egter saamgevat in 'n stelling, dat slegs omtrent 1 persent van dragtige koeie aborteer. In Suid-Afrika is heelparty vleisbeeskuddes en onlangs ook een besonder goedbeheerde kudde van 340 inheemse beests geënt, sonder dat 'n enkele geval van misgeboorte na die enting waargeneem is.

Herenting van volwasse koeie wat as kalwers ingespuit is, word aanbeveel op swaarbesmette plase. 'n Massa-besmetting kan die weerstand teen misgeboorte in geënte diere oorweldig en vir hierdie rede is 'n tweede inenting aanbeveel by verse, om die immuniteit te verhoog voordat hulle gedek word. So 'n tweede enting voor dekking word veral wenslik beskou in swaarbesmette kuddes. In Engeland(10) word weer baie waarde geheg aan 'n tweede inenting na die eerste kalf, maar hier word ook 'n tydelike onvrugbaarheid na enting opgemerk. Dis nog nie vasgestel of embryomortaliteit, of verlies van eierstokfunksie, hieraan ten grondslag lê, en nog niks is hieroor gepubliseer nie.

By al hierdie besondere maatreëls word die agglutinasie-reaksie op die agtergrond gestoot. Gevolglik het die status van Brucella-vrybeeste effens gedaal vanweë die insluiting van reagerende koeie en verse bo die ouderdom van 24 maande waar gesertifiseer word dat hulle geënt was binne 14 dae nadat hul 'n negatiewe toets gewys het. As die voorwaarde, dat hul nie na die tyd met ongeënte reageerders of ongetoetste beeste in aanraking was nie, daarby neergelê was, sou daar geen noemenswaardige verandering wees nie.

Suid-Afrikaanse Toestande

Beesbrucellose is algemeen verspreid in Suid-Afrika(17) en op die oopplaas-beesboerderye is afsondering onmoontlik. Kalwerenting is 'n baie doeltreffende hulp in die bestryding van hierdie siekte, maar dis ver van afdoende. Dit word gesê dat dit die verliese aan Brucella-misgeboortes voorkom, versag en vertraag en dat 'n gróot voordeel lê in die vermindering van blootstelling wat daarop volg.

Grootbeesenting word gewoonlik toegepas onder een van die volgende omstandighede:—

(1) By 'n verwoestende uitbreking onder vee met min weerstand teen die besmetting.
(2) In 'n kudde waarin onvrugbaarheid en misgeborte baie voorkom en waar die siekte reeds lang gevestig is.
(3) Waar vee verplaas word na 'n eiendom waarop al die vroulike diere geënt is.

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Alhoewel grootbeesenting nie in areas met 'n voorgenome uitroeiingsprogram gewild is nie, het dit uitstekende voordele vir sommige beesboerdery-areas van hierdie land. Daar is min beheer oor verlore en verdwaalde beeste en die nagaan van verskuiwings van naturellevee is hier dikwels onmoontlik. Ondervinding met ander entstowwe het gewys, dat 'n jaarlikse entingsplan met goedkoop entstowwe onder hierdie omstandighede taamlik maklik opgestoot kan word na 'n peil, waarby omtrent twee-derdes van die beeste geënt word. Met kalwerenting alleen sal min streke ooit, onder teenwoordige omstandighede, 'n beestestapel met 20 persent geëntes in stand hou.

Aangesien die teelseisone nogal beperk is tot die laat somer, word aan die hand gegee dat in hierdie beesboerderyareas groot vooruitgang gemaak kan word deur jaarliks in die voorjaar na die kalfseisoen al die verse en koeie te ent. Die kalwers wat nie pasgebore is nie sal dan grotendeels 10 maande oud wees en die volwassenes sal na 'n paar maande gedek word. Indien ses-maande kalwers en pasgedekte koeie voorkom hoef geen nomenswaardige skade gevrees te word nie. Mingle([15]) getuig dat teenswoordig gemiddeld nie meer as 1 persent dragtige koeie van die enting aborteer en dat die middel derde van die dragtigheidsperiode in die opsig die mins veilige is.

Die onmiddellike voordele van hierdie plan is:—

(1) 'n Groot styging in die algemene peil van weerstand teen Brucella-besmetting by beeste. Die probleme van litontsteking, seningskede-ontsteking ens., ens., kan hier ook genoem word.
(2) 'n Vermindering in die aantal verspreiers van Brucella-kieme en in die totale massa van beskikbare besmetlike materiaal.
(3) 'n Duidelike en besliste doel vir vee-eienaars. 'n Plan wat die minimum voorligting vereis deur die ooreenkoms met ander entstowwe; maar terselfdertyd met die bepaalde voordeel, dat daaruit vermeerderde bate vir boere wat dit deeglik toepas, sal voortspruit.
(4) 'n Uiteindelike afname in onvrugbaarheid en bespoediging van die verhoging van produksie.
(5) Waar die sisteem toegepas word, kry die diere outomaties 'n enting voor en na die eerste periode van dragtigheid.

Dis wenslik om 'n toestand van volkome bevryding van siekte in die toekoms in vooruitsig te stel. Die beleid van toets en verwydering van reageerders in behoorlik afgebakende kuddes of groepe van kuddes, behoort die ideale metode vir bestryding van brucellose te bly. Hier moet reageerders afgesonder word en kalwerenting kan toegelaat word as 'n waardevolle hulp vir kuddes wat bedreig word. Dis moontlik om alle kuddes ten opsigte van brucellose van 'n besondere aanwysing te voorsien:— B.v.

A. Getoetste kuddes:—
A. 1. Geakkrediteerde brucellose-vry kuddes.
A. 2. Kuddes met afgesonderde reageerders.
B. Geënte kuddes:—
B. 1. Kuddes met vroulike beeste almal as kalwers geënt.

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B. 2. Kuddes met jaarlikse geënte vroulike beeste.
C. Onbeskermde kuddes:—
C. 1. Kuddes skynbaar skoon, maar nie deur toetse bewys as vry van Brucella-besmetting nie.
C. 2. Besmette kuddes.

Selfs met die beste organisasie vir entstofverspreiding, sal Suid-Afrikaanse toestande nooit heeltemal geskik wees nie vir die aanwending van 'n lewendige, uiters tere entstof sonder bederfwerende middels. Die temperatuur, afstande en vervoermetodes, span saam teen die bedoeling, dat die produk ingespuit word wanneer dit nog in 'n volkome lewensvatbare toestand verkeer. Die aanwending van verkoelde houers vir vervoer, was baie doeltreffend in Amerika en is herhaaldelik by ons aanbeveel. Dit word gehoop dat 'n paar proefpakkies binnekort vanhier sal uitgestuur word.

Anders as in die Verenigde State, waar die entstof vir drie maande vanaf uitreiking geskik geag word, hou ons nooit entstof langer as tien dae op Onderstepoort nie en al die bottels word dateer vir gebruik voor die 15de dag nadat hul met vars entstof gevul is. Voorts word dit alleen onmiddellik by aankoms gebruik. Nieteenstaande hierdie baie nougesette voorsorge, is daar aanduidings, dat party besendings ongeskik geword het, voordat dit aan die dier toegedien is. Die jaarlikse inenting-veldtog sal die gevolge van sulke ongelukke verminder, deurdat tenminste twee inspuitings in die reël plaasvind voor die eerste dragtigheidsperiode.

Dis geen nuus dat misgeboortes die onderwerp is van ontelbare navrae en klagtes([6]) wat aanhoudend behandel moet word. As 'n deel van die energie daaraan verbruik oorgeplaas kon word op 'n veldtog vir aktiewe immunisering van ons beesstapel, sal dit baie help. Dit word gehoop dat jaarlikse enting iets in hierdie rigting sal bereik. Intussen word nougesette aandag en studie gewy aan die navorsing insake bederfwerende prossesse soos uitdroging van die entstof en immuniserende ekstrakte. Fasiliteite om eksperimentele werk te doen behoort geskep te word.

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SUMMARY

In this paper the differences between live virulent Brucella vaccines and the Strain 19 (Buck) Brucella vaccine used for the control of contagious abortion in South Africa are briefly reviewed. The advantages of calfhood vaccination and the distinction between resistance to abortion from brucellosis and immunity against infection by Brucella organisms is stressed. Both vaccinated reactors and injected reactors are discussed and attention is drawn to the danger of infection in vaccinated animals. A warning is issued against carlessness in accepting reactors with a certificate of inoculation without proof that no exposure to infection took place after the animal was tested prior to vaccination, or vaccinated during calfhood. Such vaccinates are still liable to become infected carriers and spreaders of Brucella organisms.

In the description of the practice of adult inoculation it is pointed out that the objections thereto do not operate in some South African ranching and dairy-ranching areas. The annual inoculation of females forms a useful basis from which an anti-brucellosis campaign could be launched. This might eventually lead to a proper control programme and to ultimate eradication of the disease. It is visualized that this would come about by degrees. A classification of the farms according to the methods adopted for the control of brucellosis is suggested.

Some information is given on the delicate nature of the live vaccine suspension and the difficulties that attend its production and application under South African climatic conditions.

DISCUSSION

The discussion on this paper was opened by *Dr. Fourie,* who referred to the problem of brucellosis as one having numerous aspects. In view of the immunity conferred by calfhood vaccination having been reported overseas to last about six years, he advocated two inoculations for every female — the first when four to eight or six to ten months old and the second after the second calving.

He agreed that the differences of age at sexual maturity in the different breeds made the selection of a universal optimum age for calfhood vaccination difficult. Bull calves should, however, be inoculated at six months.

A temporary sterility in adult females after vaccination would not seriously interfere with breeding if the cows were inoculated at calving and served only three months later.

Dr. Robinson, emphasized the aspect of active infection in vaccinated animals and mentioned the failure of numerous attempts at devis-

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ing a test for distinguishing actively infected from non-infected reactors. He mentioned the work done at Onderstepoort on the bactericidal test which was at present being hampered by the lack of space and facilities for producing media. Very irregular results had been obtained.

A delay of service for two to three months after inoculation of cows was in his opinion no obstacle to adult vaccination on ranches. He commented on recent innovations at Onderstepoort which permitted an increase in the vaccine output in spite of the inadequate facilities. The amount of vaccine produced in this country was, however, still a very serious limitation to any anti-brucellosis campaign.

Dr. Quin pointed out that the tremendous losses incurred as the result of uncontrolled spread of brucellosis in Southern Africa warranted a great and practical effort from all parties interested in the livestock industry and public health. He mentioned the beneficial results obtainable from the strain 19 vaccine, its non-virulence and small risk of producing abortion in pregnant animals. Dr. Quin gave figures of the potential requirements of vaccine. He deplored the delay in launching a scheme and advised against the undue stress of bacteriological considerations of lesser importance.

Dr. Jansen related the results from adult inoculation on a dairy-farm. A wholesale inoculation of all females had resulted in a spectacular improvement in the fertility and productive output. So much so that a second-rate herd had within a short while become one of the leading herds in the district.

Dr. Diesel asked if the repeated reinfection of vaccinates was required to boost immunity in order to maintain sufficient resistance to prevent abortion. He felt that positive reactors if certified as negative fourteen days prior to vaccination could be considered fairly safe for introduction into clean herds. If large-scale vaccination was resorted to the control of infected reactors should receive attention. The agglutination test would not be of much use for testing such catle prior to introduction into abortion-free herds.

Dr. Diesel thought that the inoculation of eight to ten month-old calves would require more labour than younger animals. He asked for more information on the statement made by Dr. van Drimmelen that vaccination of pregnant females was less dangerous during the first and last thrids of pregnancy.

Dr. Turner supported the views of Dr. Quin and advocated whole herd vaccination. No abortions had been experienced by him and though he could not supply any figures he was able to give the asurance that the results were very satisfactory.

Dr. Snyman advised against a policy of undue caution. Losses should if necessary be compensated, but experience with other vaccines had shown the dangers of being over-conservative. The greater benefits to be expected from wholesale vaccination in his opinion far outweighed the risks which had to be taken.

Dr. de Kock pleaded for caution in the application of a live vaccine. Bacteriological considerations had to be taken into account

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Dr. de Villiers inquired whether the danger to infection from outside justified calfhood inoculation in the stud Friesland herd at Elsenburg which had been free from brucellosis for many years.

The President, Dr. Mason gave details of some of the difficulties in connection with production of a live, unpreserved vaccine. He mentioned the problems of contamination and reversion in particular and recommended intensified research in the direction of isolating antigenic fractions. He saw a great future for work in this field. Dr. Mason also referred to the serious limitation imposed on brucellosis work by the absence of a rapid small animal test and of a technique for protective titration.

Dr. Osrin asked whether it was possible to prolong the period of usefulness of the vaccine by keeping it in a refrigerator.

Replying to the discussion Dr. van Drimmelen voiced a doubt as regards the practicability of relying on a six-year resistance to abortion after vaccination. Annual inoculation was regular practice for many diseases and would tend to reduce the risk of serious consequences following the use of a consignment of vaccine which had been exposed to heat during transit.

The active infection in reactors could be proved in most cases, but this entailed a considerable amount of work. If weekly agglutination tests were carried out and the animals revaccinated when the titre had begun to recede or remained stationary a response to vaccination by a rise in the itre before the seventeenth day following the inoculation would indicate freedom from virulent infection. This was based on the asumption that animals injected with virulent organisms could not after having attained the maximum anti-body response develop additional antibodies to the same antigen. He felt a lack of sufficient data in the literature on this phenomena and regretted not having any useful results on the bactericidal test.

Dr. van Drimmelen expressed full agreement with the sentiments voiced by Dr. Quin, though bacteriological expreimental work was, in his opinion, the only sound basis for any vaccination scheme. More vaccine meant more space, staff and equipment and this in turn would increase the number of specimens returned for checking, which again would require accommodation.

Re-vaccination was desirable and was to be preferred to reinfection for boosting immunity. An appeal for data on whole herd inoculation was the only comment made and it was suggested that short " Letters to the Editor " should serve the purpose when the composition of an article was too arduous. In principle Dr. van Drimmelen agreed with mass inoculation as long as the essential laboratory work, to back up production of a high-class product, was carried out.

He felt no justification for calf vaccination in a properly isolated stud herd which had been successfully maintained free of infection.

He could satisfy Dr. Mason that the highest degree of purity and fredom from dissociation was being maintained and that the stringent

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tests rather accentuated than prevented the fluctuation in available supplies. One could never be certain of the amount of vaccine that would be ready for distribution the next day.

Continuation of the work on isolating the immunizing antigen by means of sonic vibrations, which had been commenced in consultation with the C.S.I.R. had to be postponed on account of the departure of Dr. Lochner and pending the construction of more suitable apparatus.

The vaccine could retain its usefulness for three months under optimum conditions. Such conditions were, however, not commonly found in South Africa and the immediate inoculation on receipt was a very strong recommendation.

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"THE HEALTH TRIANGLE"

By

F. A. DONNOLLY, O.B.E., M.B., Ch.B., D.P.H.

(Medical Director of the National War Memorial Health Foundation)

(Presented at the 43rd Annual General Meeting)

Mr. Chairman, Ladies and Gentlemen, I first wish to express my appreciation for the invitation extended to me to speak at this, the 43rd General Meeting of your Association. The existing close liaison between the Veterinary and Medical Associations is an important factor in the integration of services of which I will speak presently. To be playing my small part in this is an honour of which I am deeply conscious.

One of the most important basic needs apparent to me in regard to health and sickness services in South Africa is an effective plan for the integration at the periphery of services connected with what I term the "Health Triangle." It is not claimed that there is any originality in this remark, or that the matter has not received a considerable amount of attention to date. The question, as I see it, is whether, in fact, such an adequate plan does exist now or not.

The "Health Triangle" may be described as having:—

(i) A Base of sound environmental hygiene services, such as a clean and pure water supply, milk supply, adequate refuse and night soil services, and so on;
and

(ii) Another leg of the Triangle consisting of good "doctoring" and all that that term implies;
and

(iii) The other leg of the Triangle consisting of community and promotive health services which can be listed under the following seven heads:—
(a) Economic Security;
(b) Satisfactory Cover (Housing and Clothing);
(c) Correct Use of the Land;
(d) Adequate Nutrition;
(e) Beneficial Use of Leisure;
(f) Education of the Literate and Illiterate in basic health matters;
(g) Knowledge, and the Will to Apply this Knowledge.

Some of the items comprising the various sections of the "Health Triangle" overlap from one section into another. "Milk Supply," for instance, is not only part and parcel of any sound environmental service but is, of course, an important and vital factor in Nutrition. Other items, it might be argued, could preferably be listed in some other section to the one they appear in. Housing, as an example, might rather be classed in the basic environmental group, and so on

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These are, however, not matters of much import. What is important to my mind is that *all* these factors must be considered adequately in *any* health plan. Your profession is vitally concerned with many aspects of this Health Triangle — Nutrition, and all the complex problems associated with it, being one important example. Stock improvement is itself a fundamental issue in this regard. Overgrazing, especially in an area like the Ciskei, another — Veterinary education, possibly even the development of facilities for the training of non-European veterinary surgeons, yet another, and so on.

An enormous amount of planning and survey has been carried out in South Africa, together with a large measure of actual application of many of the factors concerned with the "Health Triangle." Nevertheless, it is submitted that an adequate plan for the real integration and application of these services is still missing.

A few of the plans and surveys, etc., are quoted for easy reference. These are not placed in any set order and do not claim to be complete by any manner of means:—

(i) The excellent efforts of a number of local authorities in the country in regard to environmental hygiene services and certain aspects of the "doctoring" services.

(ii) The many facets connected with the doctoring services of the country: hospitals, clinics, health centres (here the important principles of Health Centre practice as laid down by the Department of Health refer); general practitioners of both medicine and dentistry, district nurses, midwifery services, etc., etc.

(iii) The work in the promotive health field of the Department of Social Welfare and the many concerned voluntary organizations of the country and the possibilities of co-operation under Section 5(4) of Act No. 40 of 1947 (The Social Welfare Organizations Act).

(iv) The intended co-ordination of a National Health Education programme partly through the Education Committee of the National Health Council.

(v) The efforts of the National Veld Trust and Government Departments concerned with the care of the soil.

(vi) The work of the National Nutrition Council and others concerned with this vital subject, including the Departments of Health, Social Welfare, Agriculture, Lands, and Native Affairs.

(vii) The plans of all those concerned with the beneficial use of leisure and with the education of the population, including schemes to improve and increase the training of health and social welfare personnel.

(viii) The valuable reports of the Social and Economic Planning Council.

(ix) Attempts at Regional development, for instance, the Cape Northern and Adjoining Areas Regional Development Association, and the North West Free State Development and

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Planning Scheme under the Natural Resources Development Act No. 51 of 1947.

(x) The scheme of the Industrial Development Corporation at Zwelitsha (near King William's Town) where a fine industry is to be established in the Ciskei.

(xi) The comprehensive plans of the National War Memorial Health Foundation.

From the above incomplete list, it will be readily appreciated that the facets and the authorities and others concerned in the "Health Triangle" are legion. It is submitted that a true integration between these is not possible at the periphery other than through some effective system of regional planning and development.

As I see it, Regional Planning Councils should be established for all areas in South Africa based, wherever practicable, on a population of approximately 500,000 each region. Each Regional Council should concern itself with the *whole* planning of the region it is concerned with and not only with the so-called direct health or sickness objectives. Each Council should have more than purely advisory power and it should be able to have an effective voice in the gradual but systematic establishment throughout its region of a practical integrated scheme based on the "Health Triangle." It should in fact be a unit of Local Administration.

A few instances of how such a Council could work are given.

It could help local authorities to plan their environmental hygiene services on the most economic and co-operative basis.

It could help with all the multitudinous authorities concerned with the doctoring services and could plan for the best placement and development of these within the limits of the financial ability of the country.

It could look into the economic conditions of the inhabitants of its area, pointing out where an industry or industries of certain types could be, and should be, developed, so that economic security could in effect be attained. As a result of this, and other necessary planning, "zoning" of the whole country would be achieved to ensure the equitable distribution of developing industries, etc.

The Council could obtain the co-operation of all voluntary organizations in the region to meet the various needs of the community and promotive health side which could be better met by a voluntary organization, or voluntary organizations.

It is obvious that any such Regional Council will have to be composed of members elected in the region concerned and have at its disposal technical advice of the highest order, through existing Government and other experts.

The National Health Services Commission in discussing and recommending Regional Health Councils as *advisory* bodies says that these Councils will thus constitute a forum for discussion between representatives of the various local authorities. They will get to know each other and each other's difficulties, and will gradually come to take a regional rather than a local view of health problems. Moreover,

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under the tutelage of the National Health Service Administration, they will come to realize how closely health is bound up with environmental conditions generally. All these things will lead naturally towards an ultimate desire for a constituted regional authority, instead of resistance to an attempt to impose prematurely upon an unready and perhaps unwilling public a system of regional government, for which there is no widespread demand, and which would bring about a sharp conflict with some, if not all, of the Provinces ,and probably with some of the local authorities as well. Until the movement towards the establishment of general-purpose regional units of government has reached its spontaneous culmination, it would be unwise to force the immediate establishment of democratically-elected regional councils.

Of course, it would be unwise to attempt to force this issue, but I submit that it is just as wrong not to keep its possibilities and difficulties clearly before us at all times. It is for this reason, and to lead up to a development of this magnitude, that I suggest that a nation-wide "educational" campaign should be instituted, probably at this stage (through suitable non-Governmental channels) to provide the necessary STIMULUS. Such a campaign would concern itself largely with the development of a sound public opinion and a resultant creation of public demand. The mechanics of such a campaign would be based on accurate evidence and facts suitably put before the public of the country.

To summarize then, it is submitted:—

That Regional Councils with more than advisory powers and with expert advisers need to be established for all regions of South Africa on, say, a population basis of 500,000 per region.

That these Councils should plan for their region an integrated "Health Triangle" starting with absolute essentials and, naturally, building on existing institutions, facilities, etc.

That there should be an adequate publicity campaign to stimulate and educate the public in this regard.

That without such, or a similar, scheme at the periphery, real integration and application of the principles concerned with the "Health Triangle" will not be achieved.

Before I go on to the part of the National War Memorial Health Foundation in such an integrated development of the "Health Triangle," I would like to quote to you the following extract from "Adventure in Planning" by Julian Huxley:—

> "It is one thing to have a good plan, another to put it into practice. For this, popular interest, popular backing and enthusiasm and popular participation are needed. Careful attention to these requirements is especially necessary in all advanced democratic countries for here the adjustment of the individualist traditions of private enterprise to the needs of central planning is apt to generate friction; but the friction can be minimized by understanding. In other words he (the planner) must not think of the people in his region as his subject plannees but as participating

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co-planners. The living plan itself must evolve and grow and can only do so on the basis of co-operative participation.

"Of this there are two distinct aspects. One is co-operation with other governmental bodies and official and unofficial agencies; the other is co-operation with the people at large, through arousing their sense of participation and making them feel that it is their plan and that they have a real share in bringing it to fruition."

How true these wise words are. I hope to show in the second part of my talk to you this afternoon how seriously we in the Foundation regard this advice.

Our own South African forces conceived the idea of this *Living* Memorial for the 1939-45 war. In consultation with, and on the advice of, leading civilians in South Africa, including members of the Government at the time, it was decided that the work of the Foundation would be developed in the field of promotive health. It is designed to help all races and does in fact do so, irrespective of race, religion or politics. It was also agreed that there should be an actual visible memorial which might incorporate the Headquarters building. This Shrine of Memory is regarded as essential and its basis will be a simple and dignified Roll of Honour.

The Health Foundation aspect represents a break with tradition, in keeping with similar developments all over the world. Individuals, towns, regiments, etc., are in the 20th century drawn to the idea of "living memorials."

The uniqueness of the South African scheme lies in the *National* acceptance of the idea. It is common to all sections of the population and meets the wishes of those members of the forces who conceived the idea.

The Foundation, having spent two years in planning, research and investigation is now convinced that it has established a truly rational and objective basis of approach to health problems.

The development is on such firm ground that our projects are likely to become self-supporting in the course of time because:—

(a) people who use the facilities will pay something towards their maintenance;

(b) the projects and objects are of permanent scientific value to the nation as a whole and likely, when established, to receive bequests and larger donations.

Donations received to date, both by public subscription (including original collections from the troops themselves) and by financial assistance from Government sources, represent a considerable measure of public support, particularly when it is realized that there has, as yet, been no national advertising, and no nation-wide appeal in anyway comparable with the Governor-General's War Fund, the Food for Britain Fund, or the present U.N.A.C. Appeal.

Donations are being received *now* at an average rate of £3,000 per month(last 3 months); over the past 7 months the average is £2,273.

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The support given to the Foundation cannot be measured solely in terms of money. Others and myself have addressed hundreds of meetings representative of all sections of the community and in every single case there has been general approval of the Foundation's aims.

The Foundation enjoys very extensive support by the Press of the country, and has been widely acclaimed overseas, enhancing our national prestige.

Much more money is, however, needed if we are to succeed in our objectives and all possible steps to this end are being taken.

The Foundation works through the following channels:—

(i) Stimulus;
(ii) Training of Health and Social Welfare personnel;
(iii) Specific Schemes in Promotive Health;
(iv) Commemoration.

(i) *Stimulus*:

The Foundation is actively assisting in —

(a) The development of a *sound* public opinion on health, ill-health and disease.
(b) The creation of a public demand that the problems involved be dealt with adequately.
(c) The education of the literate and illiterate in basic health matters.
(d) The development of the Will to apply our considerable knowledge to the problems which confront us as a nation.

It is submitted that much of the distress of our day could be alleviated if public opinion were more properly informed. Many of the ill-health and disease problems which are such a severe drain on the national wealth and so constant a threat to our manpower could be overcome by simple health education.

The Foundation regards the Stimulus aspect of its work as its most important contribution to the positive promotion of health in South Africa. It has developed and carried out specific plans in this field, certain aspects of which will be referred to later.

Fundamentally, the task of informing public opinion rests upon the collection and dissemination of accurate scientific information on health and social conditions.

This aspect of our work will, it is hoped, continue and expand.

(ii) *Training of Health and Social Welfare Personnel*:

The Foundation, having investigated the need, is assisting in increasing the supply of trained personnel. Initially it has established 113 bursaries to the total value of £8,206. These cover:—

Europeans — (Mothercraft, Dieticians, Social Workers).
Coloureds — (Doctors, Nursery Nurses).
Bantu — (Agricultural Workers, Social Workers, Literacy Workers).
Indians — (Simple Promotive Health Course).

A continuing bursary policy is contemplated.

(iii) *Specific Schemes in Promotive Health*:

(a) The Foundation is establishing a minimum of its own projects,

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and plans are *complete* now for the establishment of two pilot centres at —

(1) Goodwood (Cape Town), for Coloureds.

(2) Moroka (Johannesburg), for Bantu.

Seven further centres are contemplated making nine in all. Plans for these are well advanced. In four places, the nucleus of the centres will be established very shortly. All are planned in the closest co-operation with the communities to be served.

The function of these Health Promotive Centres is:—

to assist in bringing health and happiness to the community in which each is established;

to work as social service units in close co-operation with local health services, Government Health Centres and available "doctoring";

to demonstrate practically that human misery, crime and malnutrition with its attendant ills can be substantially reduced by the application of the basic principles of social medicine in distressed areas;

to serve the nation as pilot demonstration centres or experimental "laboratories" in a field of health work as yet largely untouched in South Africa;

and to serve as training establishments for health and social workers.

(a) The Foundation is helping and hopes to continue helping to the maximum, certain selected projects launched by other organizations. Such projects are selected on the basis of their value to promotive health or allied social welfare work.

(iv) *Commemoration*:

The Roll of Honour of those who gave their lives in the 1939-45 War in the service of South Africa will comprise the sacred aspect of the Foundation's work.

Stimulus: There has been widespread publicity to impress on the public the need for real *co-operation* of all authorities and agencies if a true improvement in health is, in fact, to be atained in South Africa. The Foundation has assisted very fully in this, and has recently launched successfully a monthly printed journal *at no cost whatever* to the organization in respect of printing and publishing. 10,000 copies are disposed of each month. This journal is not merely a house magazine but capable of expansion to supply a medium for the distribution of reliable Socio-medical information of value to industry and to the professional classes.

Field Investigation: The Foundation has conducted simple surveys of local areas to ascertain certain facts about the health and social conditions of the people in these areas. The survey form we use is very simple but comprehensive.

The surveys reveal:—

(a) The gaps which exist locally and so prevent proper health service integration;

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(b) Whether there are Social Centres or nuclei thereof (e.g. crêches, clubs, adult education activity, nutritional services, recreation facilities, guidance in home management, etc.).

The complete survey enables us to assist in meeting needs in the health field by:—

(a) " Pressure-group " action.

(b) Supporting other organizations.

(c) Direct action by ourselves in the Promotive Field *only*.

Thus a simple medico-socio-economic *field* survey of most of the towns and villages in South Africa is being slowly built up.

The work is done in close co-operation with others conducting similar investigations and with Medical Officers of Health, so avoiding overlapping and waste.

Scientific Investigation: The Foundation has also begun to collect and investigate accurately *scientific* information on health and social conditions in the Union through:—

(a) liaison with the universities;

(b) liaison with all other authorities and organizations concerned;

(c) its own technical staff.

Training Facilities: The Foundation has conducted a survey of existing training institutions in the Union, the bursaries available and the types of workers most needed. This survey is being maintained so that it is always up-to-date. The initial bursary policy was based upon it. Twenty-four categories of health and social workers were involved. The work was carried out in the closest liaison with all relevant authorities.

Health Education: The Foundation strongly supports the intention of the Education Committee of the National Health Council to bring about a proper co-ordination of health-education activities in the Union. We have already reported on this matter to that Committee.

Specific Projects: The Foundation will not:—

(a) establish a project of its own, or

(b) give financial assistance to the projects of others,

unless

as a result of a proper field survey, it is quite clearly established that the projects in question are necessary, and will not overlap with other work in the area.

This, it is submitted, is another important contribution towards integration. Further we hope that our projects and similar projects established by others will develop as an integrated health service on a voluntary basis, with adequate technical direction. Thus they will form the *essential* complement of the " doctoring " services so that real health is attained by the general application of the principles of Social Medicine.

We visualize that *within* our own promotive health projects, certain other authorities and organizations will contribute their services. This, for example, is to be attained at our Moroka Health Foundation.

The Health Triangle: The Foundation's field surveys and its general collection of information are closely linked with the need to

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plan and gradually develop the health work of the country in terms of an integrated "Health Triangle," in which it is only *directly* concerned with (d), (e), (f) and (g) of the promotive health services.

Integration Within Our Constitution: Our Constitution permits other Organizations, both National and Provincial to be members of the Foundation. Eighty National voluntary organizations are to-day members and so have a voice in the management and direction of the Foundation.

This is also an important contribution towards proper integration.

Integration with Government Departments:

(a) The Government Departments of:—
Health, Social Welfare, Education, Native Affairs, and Agriculture have seats on the Foundation's National Technical Advisory Committee. This is the technical policy-making committee.

(b) Similar representation on the Regional Technical Advisory Committee of the Foundation is available to these departments.

(c) All reports, agenda and minutes of these committees are sent to these representatives.

(d) Reports from the National Technical Advisory Committee are also sent to:—
(i) The Honourable the Minister of Education, of Health and of Social Welfare.
(ii) The four Provincial Secretaries.
(iii) The Council for Scientific and Industrial Research.
(iv) To other Government Departments who ask for these.

(e) Still further integration of the Foundation's activities with those of Government is implicit through the financial supervision exercised in certain respects by the Union Departments of Health and of Social Welfare.

Foundation Representation on Other Organizations:

(a) The Foundation is directly represented on several other bodies:
e.g. The National Health Council itself,
The Social Welfare Organizations Board,
The Nursery School Association of South Africa,
The recently formed National Association of non-European Boys' Clubs,
The Johannesburg Committee for Adult Education,
The S.A. National Council for Child Welfare.

(b) Representatives of the Foundation attend many meetings of national and local bodies and enjoy reciprocal membership of a number of bodies which are organization members of the Foundation.

The Foundation co-operates in all ex-service Remembrance Days and maintains close liaison with all ex-service organizations.

I trust Mr. Chairman, Ladies and Gentlemen, that my remarks have in some measure convinced you of the need in South Africa of an integrated Health Triangle and of the part that the Foundation can play in this important and vital team effort.

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F.A.O. NAIROBI MEETING ON RINDERPEST HELD AT NAIROBI, KENYA

28th October to 1st November, 1948.

(Kindly supplied by the Food and Agriculture Organization of the United Nations)

Conclusions

1. It is the considered opinion of this Meeting that, with the prophylactics now available being effective and cheap to produce, the eradication of rinderpest is a practical possibility and should be carried out without further delay.

2. *Vaccines*: The Meeting has discussed at some length the current methods of immunization and is of the opinion in reference to the various vaccines available as follows:—

(a) *Serum Virus Simultaneous Immunization*: Serum virus simultaneous immunization cannot be supported in view of the danger of disseminating virulent infection.

(b) *Inactivated Virus Tissue Vaccine*: This vaccine is not recommended for general use because of:—

(i) Short term immunity conferred.

(ii) High cost of production in finance and animals.

(iii) Danger of spreading the disease due to the occurrence of atypical and therefore unrecognized cases which occur during the waning period of immunity which results from the use of this vaccine.

(iv) Bulkniess of the product for transportation and administration.

(c) *Goat Virus Vaccine*: This vaccine has been used with great success on a large scale for certain types of stock. The following points are noted:—

(i) It is too virulent to be used with certain types of animals unless administered with anti-serum and this procedure is costly, unwieldy and at times untrustworthy.

(ii) This vaccine causes a slight mortality when administered to animals not in good health, or moved immediately after immunization, despite their normal natural resistance to rinderpest and this vaccine. Also it is unsafe to use this vaccine on animals advanced in pregnancy in that abortions may result.

(iii) With our present knowledge of the living virus vaccines this virus appears to be the most stable and suitable for stock with a degree of natural resistance.

(d) *Lapinized Virus Vaccine*: While this vaccine has proved to be of greater value than any of the preceding ones in China, it is still in the experimental stages elsewhere. The Meeting recommends that work should be carried out to test the value

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of this vaccine in other areas as soon as possible. Indications from the work done in China are:—

(i) It is less virulent than Goat Virus vaccine, and can be used on highly susceptible animals without ill effects and with a minimum of reaction.

(ii) A few cases of abortion have been reported following the use of this vaccine in the field; proof that the abortions have been caused by the use of this vaccine is not available and investigation of similar cases is recommended.

(iii) Dissemination of information on rabbit husbandry in the laboratory is desirable.

(e) *Avianized Virus Vaccine*: This vaccine has been used with great success in China, causing less reaction than any other attenuated virus vaccine, and no deaths. The following points are noted in relation to this vaccine:—

(i) Difficulty of adaptation of the virus to egg embryos has occasionally been experienced and the Meeting recommends further research on this aspect.

(ii) This vaccine may be appropriately attenuated to a point where it becomes an effective and safe vaccine for use on hypersusceptible animals.

(iii) Passage of the virus in eggs may be continued to a point where the effective attacking power of the virus is lost and it is no longer of value as an immunizing agent. This risk may be obviated by careful preservation of material for seed virus production when the correct stage of attenuation is reached.

(iv) Under present methods of production, the keeping qualities of this vaccine are variable. It is recommended by the Meeting that further work be done with a view to the production of a more stable product for the workers in the field.

(v) An essential feature is the necessity for a constant supply of disease-free fertile eggs.

(f) *Keeping Qualities of Living Virus Vaccines*: At the present time there is a great variation in the keeping qualities of this vaccine. As vaccines which are more attenuated are used in the field causing little or no reaction in the vaccinated animals, the necessity to deliver to the field a vaccine of dependable potency and high keeping qualities is essential. The Meeting, therefore, recommends that immediate research work be carried out to improve the keeping qualities of these vaccines and that modern equipment be made available to all production centres to make this possible.

(g) *Hypersusceptible Animals*: The present knowledge indicates that the avianized virus vaccine is the most suitable and safe immunizing agent for the protection of hypersusceptible animals.

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(h) *Duration of Immunity*: Living attenuated virus vaccines confer a long-term immunity and therefore as they become available, should be the only vaccines used in any eradication programme.

(i) *Cost of Vaccines*: There is no doubt that the living attenuated virus vaccines are the cheapest form of prophylactic. The cost of each of these will vary according to local conditions, but it is considered that when fully developed, the bulk production of avianized vaccine would be the cheapest, but further investigation is required to determine the place of lapinized virus vaccine.

(j) *Stability of Attenuation*: In connection with any rinderpest eradication programme proposing the use of one of the attenuated viruses, it is important that the attenuated virus used be certifiable as non-contagious in any of the bovines to which its administration is proposed. Further research should be conducted with the attenuated rinderpest virus vaccines to establish beyond doubt their lack of contagiousness in bovines and their degree of reversibility in virulence on serial back passage through bovines.

3. *Dissemination of Information*: The Meeting is of the opinion that much time and effort would be saved by the immediate dissemination of information on new developments in technique and the results of research work carried out at the various laboratories. It is therefore recommended that such channels as the ommonwealth Bureau of Animal Health, the contemplated African Rinderpest Organization, the International Office of Epizootics and the Food and Agriculture Organization of the United Nations be utilized to ensure that all laboratories concerned are kept informed of the latest developments It is left to the individual countries to decide which Organization they inform and the Organizations to pass the information to each other.

The Meeting also recommends that the papers presented at this meeting and a precis of the proceedings be published and given the widest distribution. It is felt that the material would be of great value, not only to the laboratories, but also to the man in the field.

4. *Field Control*: Effective control and eradication in the field can only be attained by the closest international co-operation, particularly in regard to boundaries. This Meeting endorses the principles laid down by the African Rinderpest Conference and recommends that a meeting be held in the near future in Asia and the Far East as suggested at the FAO Conference held at Baguio, to consider in particular the field aspects of the problem of eradication in Asia and the Far East.

5. *Maintenance of Reserve of Vaccines*: The Meeting welcomes the offer of the National Research Bureau of Animal Industry, China, to hold in reserve a quantity of avianized vaccine for use in the event of an outbreak occuring in a country not at present afflicted with rinderpest. It is recommended that when other laboratories are in a position to maintain a reserve of this vaccine, the information be passed to the Organizations already referred to in paragraph 3.

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6. *General*: The African Rinderpest Conference, examining the question of eradication of rinderpest in Africa, has drawn attention to the special problems which exist in certain territories, namely, the Anglo-Egyptian Sudan, Eritrea, Ethiopia and Somalia, and envisaged that assistance might be required in the spheres of finance, provision of personnel and provision of prophylactics. Further, attention was directed to the existing overstocking of certain areas in these territories. This overstocking will become accentuated as control of rinderpest progresses. In view of these dangers, the marketing and utilization of surplus stock is imperative. ' The African Rinderpest Conference considered that FAO would be the most suitable organization to consider the solution of these problems.

This Meeting strongly endorses these recommendations and draws attention to the existence of similar problems in areas in Asia and the Far East which will also require solution.

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CORRESPONDENCE

The following letters are published for general information:

Department of Agriculture,
P.O. Box 806,
Pretoria.
2nd November, 1948.

The Hon. Secretary,
S.A.V.M.A.,
P.O. Onderstepoort.

Sir,

Advertising by Boarding Kennels.

I have the honour to inform you that the Veterinary Board has had under consideration the matter of the use in advertisements, letter-heads, etc., by kennel owners and managers, of the words "medical" or "surgical," or both, and phrases incorporating those words, which are calculated to lead the public to infer that such owners or managers are qualified or registered Veterinarians when in fact such is not the case.

The use of the words "medical" and "surgical" in the sense indicated is, in the opinion of the Board, a contravention of section 17 of the Veterinary Act, 1933 (Act No. 16 of 1933), and offending owners and managers will be advised accordingly.

The Board has no objection to the use in kennel advertisements, letter-heads, etc., of the phrase "under veterinary supervision," provided no reference is made by name or otherwise, to the particular Veterinarian under whose veterinary supervision the kennel is.

It would be appreciated if you will kindly arrange for the publication in the S.A.V.M.A. Journal of a statement to the above effect.

Such statement would, it is thought, obviate complaints by Veterinarians regarding the use of the term "under Veterinary supervision" which would otherwise be lodged with you and the Board.

I have the honour to be,
Sir,
Your obedient servant,
N. J. CLOETE,
Registrar of Veterinarians.

Royal College of Veterinary Surgeons,
9 & 10 Red Lion Square, London, W.C.1.
14th October, 1948.

The Hon. Sec.-Treasurer,
S.A.V.M.A.,
P.O. Onderstepoort,
Pretoria, South Africa.

Dear Sir,

With reference to previous correspondence between your Association and this Royal College, and specifically with reference to a letter of the

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8th March, 1947, written by your Association to this Royal College, I have to inform you that at a recent meeting of the Council of this Royal College it was resolved that the veterinary graduates of the University of Pretoria, after having made due application and paid the appropriate fee, be placed on the Colonial List of the Register of Veterinary Surgeons, and that this be continued until further notice and only so long as Members of the Royal College of Veterinary Surgeons be registered without examination on the Statutory Register of the Union of South Africa.

I would add by way of explanation that this means that a veterinary graduate of Pretoria may be placed on the Statutory Register of Veterinary Surgeons in Great Britain and Northern Ireland, and shall enjoy all the privileges of a registered Veterinary Surgeon including the use of the Library of this Royal College, the right to vote at an election for the Council of this Royal College, as well as the privileges granted to a registered Veterinary Surgeon under the various acts of the United Kingdom governing practice, animal welfare, etc.

Whilst a veterinary graduate who has complied with section 13 of the Veterinary Surgeons Act, 1881, will be, to all intents and purposes, a Member of the Royal College of Veterinary Surgeons, he will not be entitled to use the letters M.R.C.V.S. which indicate that the holder has obtained the academic diploma of this Royal College.

The equivalent position in South Africa is where a M.R.C.V.S. diploma holder is placed on the Statutory Register of the Union, but that does not entitle him to describe himself as a graduate of the University of Pretoria.

I have to point out that the use of the words "Colonial Register" is solely because this is the term used in the Act of 1881, and it is, of course, inapplicable now to the self-governing Dominions.

I would further state for your information that a Resolution of this Royal College was passed, similar to that regarding the University of Pretoria, in favour of the University of Sydney and the University of Melbourne so far as concerns the veterinary degrees of those Universities.

As a result of the above Resolution of this Royal College I am happy to state that the first graduate of the University of Pretoria to be placed on the Colonial List of the Register of Veterinary Surgeons, has been enabled to commence a course at the Royal (Dick) Veterinary College, Edinburgh, for the Diploma in Veterinary State Medicine which hitherto has not been possible.

If there is any information arising out of the above which I can give you I shall be very happy to do so, and I would take this opportunity on behalf of this Royal College and of the veterinary profession in this country to extend the most cordial greetings to all the veterinary profession in the Union.

Yours faithfully,
W. G. R. OATES,
Registrar.

An extract of a further letter, dated January 21, 1949, and addressed to the Registrar of Veterinarians by the Registrar R.C.V.S., is appended for the information of members :—

"With reference to my previous letters informing you that veterinary graduates of the University of Pretoria were now eligible for registration

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in the Commonwealth and Colonial List of the Register of Veterinary Surgeons, I am happy to inform you that the fee for such registration will be six guineas. This is the same fee as is charged to a British veterinarian on his admission to the Register.

You will observe, therefore, that South African veterinary graduates will be in identically the same position as a British veterinary graduates both as to admission to the Register of Veterinary Surgeons, and as to the privileges after such admission.

I trust that this will be to the satisfaction ot your Board."

FOR INFORMATION OF MEMBERS.

The Veterinary Board has ruled that in terms of Sections 3 and 4 of the rules of Professional Etiquette, veterinarians are not permitted to refer to their military or civil orders on their name plants and letterheads.

Die „Royal Commission for the Exhibition of 1851" stel jaarliks 'n studiebeurs beskikbaar vir 'n student uit Suid-Afrika. Die beurs het 'n waarde van £350 per jaar oor twee jaar, met bykomende toelaes, en is bedoel vir nagraadse studie in 'n wetenskaplike rigting. Applikante moet onder die 26 jaar wees.

Verdere besonderhede is verkrybaar op aanvraag by die Rektor, Universiteit van Pretoria. Applikasie moet voor 30 April gemaak word.

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THE EIGHTIETH ANNIVERSARY OF LADY THEILER'S BIRTHDAY AND THE FORTIETH ANNIVERSARY OF ONDERSTEPOORT

On November 21, 1948, Lady Theiler celebrated her eightieth birthday. This year also marks the fortieth anniversary of Onderstepoort.

The occasion was marked by a very pleasant function in the Library Hall at Onderstepoort.

Dr. de Kock welcomed the many distinguished guests. He recalled that Sir Arnold and Lady Theiler were married by Capt. von Brandis in Johannesburg in 1893. Throughout their life together Lady Theiler encouraged and assisted her husband, not only as wife, mother and secretary, but for many years even as technical assistant as well.

Dr. de Kock welcomed Lady Theiler's two daughters, Margaret and Gertrud, and regretted that Dr. Max Theiler could not be present. Among the numerous messages of goodwill and congratulations was one from our Association.

Wishing Lady Theiler and her family good health, prosperity and happiness in the future, Dr. de Kock then presented Lady Theiler with an arm chair and table as a token of esteem from his staff and the veterinary profession of South Africa.

The birthday cake, complete with 89 candles, was then cut to musical honours.

Dr. Orenstein spoke of his early association with Sir Arnold. He said: "We are celebrating the 40th anniversary of Onderstepoort. I would suggest that we are to-day entitled to celebrate the 50th anniversary of the establishment of veterinary research in South Africa, for Daspoort was the beginning, and there was only a move to the new buildings of what really matters — the spirit and purpose, and above all, the man."

Dr. Orenstein asked what constituted a research laboratory. It was not fine buildings or costly equipment, he said, but the men who work in it and the spirit which guides and inspires them.

The Minister for Agriculture, Mr. S. P. le Roux, paid tribute to the work of Sir Arnold and Lady Theiler and the world-wide reputation of Onderstepoort. He announced the authorization of an extended building programme, and, in conclusion, wished Lady Theiler "many happy returns of the day."

DINNER IN HONOUR OF NEW GRADUATES

An enjoyable dinner in honour of the new graduates was held at the Zwartkops Country Club on November 26, 1948.

A large number of Pretoria veterinarians were present but many of our Reef colleagues were unable to get through owing to the road being blocked by fallen trees. This was the night of the Roodepoort cyclone disaster. Showing great determination and courage in the face of the storm, some members returned almost to Johannesburg, and arrived late but triumphant.

Col. van Heerden presented the new graduates, who were, A. J. du Plessis, A. B. la Grange, J. M. W. le Roux, J. W. Pols, D. G. Steyn, H. J. J. Terblanche, P. W. Thorold, G. F. J. van Rensburg, A. J. Vlok and P. Wacher. Miss S. M. McLoughlin and V. E. Osborne were unfortunately unable to be present.

Dr. Pfaff presented Dr. le Roux with the "Clinical Medal" which is donated by the Johannesburg Branch.

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SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

THE 43rd ANNUAL GENERAL MEETING

Minutes of the 43rd General Meeting held at Onderstepoort on September 7th to 9th, 1948.

Present: J. H. Mason (President), A. M. Diesel (Vice-President), G. de Kock, G. M. McIntyre, J. R. Scheuber, R. B. Osrin, M. Sterne, J. G. Williams, J. I. Quin, M. Bergh, J. S. Watt, M. Zschokke, G. J. de Wet, A. C. Kirkpatrick, K. Dalzell, G. Pfaff, D. Coles, J. Zwarenstein, C. W. A. Belonje, G. C. van Drimmelen P. R. Mansvelt, M. C. Lambrechts, J. D. Smit, P. P. Hugo, C. H. Flight, R. Clark, J. L. Dickson, R. K. Loveday, J. L. Dore, L. von Maltitz, W. G. van Aswegen, F. W. Langbridge, L. W. van den Heever, T. Veenstra, L. L. Hansmeyer, A. L. Wessels, E. J. Ortlepp, L. R. Hurter, A. R. Doré, D. B. V. Barrow, H. Graf, D. J. Louw, M. de Lange, N. C. Starke, T. Threlkeld, R. du Toit, S. W. J. van Rensburg, H. O. Mönnig, P. J. J. Fourie, E. M. Robinson, G. Schmid, J. A. Badenhorst, W. J. B. de Villiers, J. F. Fick, S. G. Turner, A. F. Tarr, W. J. Ryksen, L. Stonier, T. F. Adelaar, O. T. de Villiers, S. W. de Villiers, G. D. Sutton, J. H. B. Viljoen, W. C. Viljoen, G. P. Bishop, E. C. Nelson, L. Daly, E. J. Wadley, F. W. Goodall, J. G. Boswell, P. S. Snyman, P. J. du Toit, V. Cooper, R. E. Hartig, C. v. E. Maré, S. L. Snyders, U. von Backström, R. K. Reinecke, A. I. Robertson, N. Barrie, A. A. L. Albertyn, M. J. S. Kropiwnicki, J. A. Schutte, J. W. A. Brookes, K. Schulz, E. de V. Erasmus, J. H. R. Bisschop, A. D. Thomas, B. C. Jansen, B. H. Pappin, C. F. B. Hofmeyr, I. P. Marais, W. D. Malherbe (Honorary Secretary-Treasurer).

Apologies: C. J. van Heerden, W. G. Barnard, J. J. G. Keppel, A. Ayres, N. J. G. de Cãmara, W. P. van Aardt.

SEPTEMBER 7, 1948.

At 8 p.m. on September 7 the Conference commenced its proceedings with an opening function. After some introductory remarks and words of welcome to members and guests by the President, the Mayor of Pretoria, Mrs. M. M. Curson, gave a short address in which she welcomed delegates from other parts of the Union to Pretoria. General J. J. Pienaar, retiring Administrator of the Transvaal then spoke to the meeting on the importance of veterinary services to the Union and some of the requirements for the future, concluding his remarks with good wishes for the success of the Conference and declaring it duly open.

After refreshments, Dr. Clark introduced two new films just completed by Onderstepoort in collaboration with the Film Unit of the Union Education Department. After the showing of the films, "Gifblaar" and "Heartwater," both of which were greatly appreciated, Dr. Quin made some general remarks about the present and future organization for the preparation of these scientific films.

SEPTEMBER 8, 1948.

The President in his opening remarks welcomed all members and guests to the Conference and thanked the Director of Veterinary Services for again providing the hospitality of Onderstepoort. A motion of con-

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dolence with the relatives of the following members who had died during the past year was passed:— M. Bales, F. J. Dunning, H. Franz, J. Spreull, S. T. A. Amos.

The following papers were presented and discussed:—

"A State Veterinary Service for South Africa," by Dr. A. M. Diesel. Discussion was opened by Dr. C. F. B. Hofmeyr and the subject was well debated, culminating in general agreement on all major views on the requirements of Veterinary services in South Africa. (See Resolution No. 3.)

"The Submission of Specimens for Anthrax Diagnosis," by Dr. G. D. Sutton.

"A Rapid Ring Test for Brucellosis in Fresh Milk": Dr. G. C. van Drimmelen.

"The Diagnosis and Treatment of Rickettsiosis in Dogs": Dr. W. D. Malherbe.

"The Examination of the Male Animal for Fertility": Dr. N. C. Starke.

"Clinical Experiences with Use of Pregnant Mare Serum in Functional Sterility": Dr. C. F. B. Hofmeyr.

Business Meeting at the Technical College, Pretoria, at 8 p.m.

1. *Minutes of General Meeting on September* 17 and 18, 1947, were adopted.

2. *Arising from these Minutes*: The resolutions of the previous General Meeting were read and the replies to them by the Secretary for Agricultur, noted.

3. *Election of New Members*: The following new members were elected: D. B. V. Barrow, D. Burgess, E. G. Carey, K. Dalzell, A. R. Doré, F. D. T. Good, J. R. Ferguson, F. W. Goodall, J. J. Hamman, W. L. Hindmarsh, P. N. Humphreys, L. R. Hurter, M. J. S. Kropiwnicki, A. R. J. McGregor, J. J. Oosthuizen, E. J. Ortlepp, A. I. Robertson, J. A. Schutte, G. K. Shaw, G. J. H. Stevens, W. P. van Aardt, H. E. Williams-Jones.

4. *Resignations*: M. Henry, G. K. Mager, A. H. Milne, S. G. Wilson.

5. *Notification of Election of Council*: The following were to be office-bearers for the year 1948-49:—

President: J. H. Mason.

Vice-President: A. M. Diesel.

Hon. Sec.-Treasurer: W. D. Malherbe.

Members: R. A. Alexander, J. G. Boswell, P. J. du Toit, A. C. Kirkpatrick, P. S. Snyman, H. P. Steyn, A. D. Thomas, S. W. J. van Rensburg.

6. *Hon. Life Vice-Presidents*: Drs. P. J. du Toit and A. C. Kirkpatrick were elected.

7. *Hon. Associate Member*: Dr. H. Nelson, M.O.H., Pretoria, was elected.

8. *Amendments of Constitution*: The Hon. Secretary on behalf of Council moved:—

(i) (a) that the word "Treasurer" be deleted wherever it appears in Rules 4, 5, 6, 9c, 9h, 10, 11, 14, 15 and 16 of the Constitution.

(b) that the word "Secretary" be deleted wherever it appears in Rules 7 and 13, and

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(c) that the words "Secretary-Treasurer" be replaced by "Secretary and Treasurer" in Rules 9a and 9b.

(ii) that the words "resides more than 50 miles from Pretoria" be replaced by "is unable to be present" in Rule 9f.

(iii) that the words "at a reduced subscription" be added at the end of Rule 8c.

The three amendments were seconded by Dr. Boswell and adopted unanimously.

9. *Election of Hon. Treasurer*: As this office was now vacant on acceptance of the first amendment above, the meeting proceeded immediately to elect the first incumbent. The President on behalf of Council proposed Dr. de Lange. The proposal was accepted and he was declared elected, the number of Council members thereby being increased by one.

10. *Presidential Address*: The President in his address gave a survey of the past year's working, and referred inter alia to the continued efforts of the Agricultural Unions in pressing for better conditions for State veterinarians, the students' "demonstration," the Leighton Committee of Inquiry into the Salaries and Service Conditions of Professional Officers, the number of members and their distribution in various services, artificial insemination, fees of Turf Clubs, the Jockey Club Scholarship, the National War Memorial Health Foundation, the proposed interim scheme for tuberculosis control and a suggestion for a correspondence column in the Journal.

11. *Reports of Standing Committees*: Reports were presented by Dr. van Rensburg on behalf of the Finance Committee, and Dr. Clark of the Editorial Committee.

12. *Arrear Subscriptions*: As these had been suitably dealt with by Council, there was no discussion.

13. *General*:

(a) On the suggestion of the President it was decided that Council should nominate a member to apply for membership of the Australian V.M.A., as a reciprocal gesture.

(b) Sale of dangerous drugs. Various members complained of the sale of dangerous drugs to the lay public. The President and Secretary explained that Council had appointed a committee to consider the names of such drugs and report to the Director of Veterinary Services (for control under the Registration Act).

((c) Dr. Nelson of Cape Town gave thanks on behalf of Municipal Veterinarians for the invitation that had been sent to their respective Town and City Councils.

(d) Registration Fees for General Meetings. This fee which had been decided upon by Council for the present General Meeting was, after some discussion, accepted in principle.

(e) A member complained about the recent late advertisement by the Association of a vacant post. It was explained that the Secretary has often to rely on pure chance to hear of vacant posts. It was decided that all members should inform the Secretary if they became aware of posts being offered, and further that the larger Municipalities be asked to submit particulars of posts that become vacant, so that they may be advertised in good time.

(f) Other matters discussed included entertainments for the wives of members during Conferences, and invitations to guests.

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The business meeting was adjourned at 10.20 p.m. and refreshments were served.

SEPTEMBER 9, 1948.

Two very interesting films were shown "Patent Ductus Arteriosus" by courtesy of the U.K. Information Office, and "Human Helminthiasis" by courtesy of Messrs. McDonald Adams.

The following papers were presented and discussed:—

"Some Veterinary Problems of the Cape West Area," by Dr. V. Cooper.

"The Brucella abortus (Strain 19) Vaccine in South Africa," by Dr. G. C. van Drimmelen.

"The Health Triangle," by Dr. F. Donnolly of the National War Memorial Health Foundation.

Dr. de Kock thanked the exhibitors of pharmaceutical preparations for their fine efforts in providing interesting displays to visitors to the Conference. Mr. Taylor of McDonald Adams, replied on behalf of the exhibitors.

The following resolutions were passed unanimously:—

1. Proposed by J. I. Quin, Seconded, L. W. van den Heever:—

This Congress of the S.A. Veterinary Medical Association in session at Onderstepoort in September, 1948, views with great concern:—

(a) The widespread occurrence of contagious abortion amongst livestock throughout South Africa and its attendant heavy animal losses to the country especially through sterility resulting from it.

(b) The danger of Brucella infection amongst the human population and increasing incidence amongst members of the veterinary profession, who in the execution of their duties, are unduly exposed to the infection from animals.

(c) That adequate facilities for the production of vaccine are not at the disposal of the Director of Veterinary Services.

In view of the above state of affairs, this Congress respectfully requests the Union Government through its Veterinary Services to ensure that the necessary steps be taken for the control of Brucellosis as one of the most important stock diseases of the country and therefore requiring urgent attention. In this connection this Congress particularly wishes to stress the necessity for widespread publicity in regard to this disease and the need for mass vaccination with Strain 19 in all areas heavily infected. To this end Congress urges that vaccine production be increased to an extent commensurate with the needs of the country.

2. Proposed: L. L. Daly, Seconded, V. Cooper:—

That this Congress of the S.A.V.M.A. is of opinion that the interests of the Livestock Industry of South Africa can best be served by the creation of a separate Department of State responsible to the Minister of Agriculture, and to be known as the Department of Animal Health.

3. Proposed: C. F. B. Hofmeyr, Seconded, J. G. Williams:—

This Congress of the S.A.V.M.A. is of the opinion:—

(a) That a strong, well-equipped State Veterinary Service, adequately remunerated and with improved conditions of service, is essential for the control of stock diseases in South Africa.

(b) That within the framework of this State Veterinary Service consideration should be given to the employment of privately practising veterinarians on a part-time or intermittently remunerated basis, as a necessary component of veterinary services.

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(c) Respectfully requests the Honourable, the Minister for Agriculture to receive at his convenience, representatives from this Association in order that the desirability of adopting these principles as a policy may more intimately be placed before him.

4. Proposed: S. W. J. van Rensburg, Seconded, N. Barrie:—

This Congress of the S.A.V.M.A. expresses its concern at the increasing indiscriminate use of various hormones by the lay public. In view of the dangers associated with the administration of hormones to both man and animals the meeting urges on the Department concerned the necessity for prohibiting the sale of hormones except on a prescription from a medical practitioner or a registered veterinary surgeon.

The meeting closed at 4.20 p.m. with a unanimous vote of thanks to the President.

6.30 to 12 p.m.: Dinner and Dance at Iscor Recreation Club.

W. D. MALHERBE,
Honorary Secretary, S.A.V.M.A.

J. H. MASON,
President, S.A.V.M.A.

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SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

Minutes of Council Meeting held at 2.15 p.m. on Thursday, November 18, 1948, at the Tilsim Hotel, Pretoria.

Present: J. H. Mason (President), A. M. Diesel (Vice-President), A. D. Thomas, G. C. van Drimmelen (Vice Editor), M. de Lange (Hon. Treasurer), P. S. Ssyman, R. Alexander, H. P. Steyn, J. G. Boswell, B. S. Parkin (vice S. W. J. van Rensburg), W. D. Malherbe (Hon. Secretary).

Apologies: R. Clark.

Absent from Union: S. W. J. van Rensburg.

The President opened the meeting by welcoming Dr. H. P. Steyn as a new member of Council and also the two proxies, Drs. Parkin and van Drimmelen.

1. *Minutes of Meeting on September 2, 1948*: As these had been circulated, they were taken as read and adopted.

2. *Matters arsing from these Minutes*:—

(a) *Building up Healthy Herds for Municipal Milk Supplies*: The Secretary had written to the M.O.H. for a copy of the new Dairy by-laws, but as these were not yet ready, they were not yet available to Council.

(b) *Tuberculosis Scheme*: Decided, after full discussion that a sub-committee, Dr. Thomas (convenor), Dr. I. P. Marais (alternate Dr. van Aswegen) and Dr. Alexander, with powers to co-opt, would study and collate copies of memoranda received from members. If necessary, further views on particular points would be asked for by circular. Dr. Diesel informed Council that the D.V.S. intended publishing a collated version of memoranda received in the Government Gazette early in 1949 for criticism and comments.

(c) *National Health Council*:

(i) Reports on meeting of interested bodies with Department of Health on September 15, were made available by Drs. M. C. Robinson and Snyman. They reported that it was decided that request for powers of condemnation of foodstuffs by health inspectors would fall away except where the written consent of the owner or his agent could be obtained.

(ii) Council approved emergency action taken in nominating Dr. Cooper of Cape Town as the Association's representative at the second annual meeting of the National Health Council (held in Cape Town in mid-November, 1948). Dr. Pullinger was proposed and accepted as the Association's representative on the National Health Council.

(d) *Registration and Restriction of the Sale of Drugs*: The matter of the indiscriminate sale of drugs was becoming a matter of grave concern to members. Three letters from members were read in which specific instances were given. After very full discussion it was decided that extracts from these letters would be submitted to the Veterinary Board for legal opinions to be obtained and for the necessary action to be taken. The terms of

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reference of the de Lange committee appointed on September 2, were extended to include examination of the position concerning the sale of remedies.

3. *Anniversary Lady Theiler, and Onderstepoort*: Council decided that a congratulatory message would be sent to the Director of Veterinary Services.

4. *New Members*: Dr. B. Moring, B.Sc., M.R.C.V.S., of Cowies Hill, was accepted for submission at the next General Meeting.

5. *Letter from Dr. H. Nelson* in appreciation of his election to Associate Membership was read and noted.

6. *S.W.A. Branch*: It was noted with appreciation that this Branch had indicated its preparedness to stand on its own feet financially.

7. *Election of Office Bearers*: Decided to adhere more closely to the letter of the Constitution in election of office-bearers of Council.

8. *Election of Hon. Office-Bearers*: Decided that in view of certain representations by members the election of honorary office-bearers would be by ballot in future, as laid down in Rule 4 (c) of the Constitution.

9. *Registration Fee Conferences*: This matter had to some extent proved controversial amongst members. Discussion was held over.

10. *Resolution No. 3 of General Meeting*: It was decided that no change could be made in the wording of this resolution, even if the sense was preserved.

11. *Council Vacancies*: Since Drs. P. J. du Toit and Kirkpatrick had been elected to Hon. Life Vice-Presidencies, Council (as empowered by Rule 9 (g) of the Constitution) filled the vacancies by appointing Drs. G. Pfaff and C. F. B. Hofmeyr to serve for the remainder of the terms of office of Drs. du Toit and Kirkpatrick (September, 1949), thereby representing the two near branches.

12. *Veterinary Board Rulings*: Council felt strongly that a most useful purpose would be served if the Veterinary Board ruling (in general terms) on matters of ethics and professional conduct could be made available for publication in the Journal. This request would be put to the Registrar of Veterinarians.

13. *Welfare Societies*: After full discussion it was decided that instances of an undesirable type of newspaper publicity (by which unregistered persons are represented as veterinarians) would be forwarded to the Veterinary Board for appropriate action, the suggested nature of which would be indicated.

14. Two letters from members, containing allegations of undemocratic actions by Council, were carefully examined, and considered to be unfounded. As elected representatives of the members of the Association, Council was empowered to make certain decisions as laid down in Rule 9 (a) of the Constitution.

15. *Reciprocity, R.C.V.S.*: A letter from the Registrar of the R.C.V.S. was read. Decided to publish *in extenso* in Journal for information of members. Decided also that the Veterinary Board be asked for information as to the full history of the reciprocal arrangement and for Council to be notified as to any contemplated action of a definite nature.

16. A complaint by a pharmaceutical firm (in general terms) about the actions of certain veterinarians led to a decision to ask the Registrar of Veterinarians for a copy of the proposed amendments of G.N. 925 of 6.7.1934, concerning conduct of which the Board may take cognisance under Section 14 of the Veterinary Act, for publication in the Journal.

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17. The use of the adjective "veterinary" to chemists ,laboratories, etc., was considered to be misleading in many instances. Decided to submit representations to the Veterinary Board for appropriate action.

18. *Membership Australian V.M.A.*: Held over.

19. *General*: A case of advertising by an unregistered person was brought to the attention of Council. Decided to refer to the Veterinary Board for legal action.

The Meeting was adjourned at 6.25 p.m.

W. D. MALHERBE,
Honorary Secretary, S.A.V.M.A.

J. H. MASON,
President, S.A.V.M.A.

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PERSONAL NOTICES

Dr. A. A. L. Albertyn of Onderstepoort and Dr. R. K. Loveday of Pinetown have both recently joined the Johannesburg Municipality.

We congratulate Drs. S. M. McLoughlin and J. W. Pols on obtaining their degree with honours.

Dr. S. W. J. van Rensburg is at present on a six months study trip to England and the Continent.

Dr. L. W. Rossiter is at the Royal (Dick) Veterinary College, Edinburgh, studying for the Diploma of Veterinary State Medicine.

Dr. M. H. V. Brown is in England on a short study visit.

Drs. A. L. Wessels and L. L. Hansmeyer have started practice in Brakpan.

Dr. D. A. Haig is at present in the United States on a year's study leave having been awarded a Commonwealth Fund Fellowship in 1948. Previous Commonwealth Fellows have been Drs. D. Coles, R. M. du Toit and C. C. Wessels.

Dr. C. C. Wessels has been appointed Director, Municipal Abattoir and Chief Veterinary Officer, Durban Municipality. The latter designation has been added as he is to retain full Veterinary control of all milk supplies to Durban.

STUDENTS' FUNDS

The House Committee of the Onderstepoort Hostel wishes to acknowledge with thanks the kind donations received from the following members in response to the appeal made some months ago by the Secretary:—

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XIV INTERNATIONAL VETERINARY CONGRESS

The XIV International Veterinary Congress will take place in London from August 8 — 13, 1949.

Members wishing to attend should write to the Hon. Secretary of the S.A.V.M.A. for further particulars.

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PERSONAL ADVERTISEMENTS

Jugoslavian veterinarian (not eligible for registration in South Africa), aged 29, single, requires post as technical assistant to veterinarian in South Africa. Clinical and laboratory experience. Apply for further particulars to the Hon. Secretary, S.A.V.M.A.

PRACTICES FOR SALE : 60 per cent. cattle practice in rapidly expanding semi-rural area. Excellent prospects. English-speaking clientele. Particulars on application from F. W. Langbridge, 128a Murchison Street, Ladysmith, Natal.

Extensive equine and mixed practice in one of the foremost racehorse breeding areas of South Africa. Income approximately £3,000 gross, £1,500 nett. Price £1,500. Modern house may be purchased with substantial bond if desired. Price £4,200. Price for house and practice £5,100. Apply H. E. Williams-Jones, P.O. Colesberg.

OBITUARY

W. A. DYKINS

William Alfred Dykins, died in Durban on the 21st November, 1948, at the age of 60. Born at Holywell, North Wales, youngest son of the late Mr. and Mrs. P. Llewellyn Dykins. Educated at Ruthven and qualified M.R.C.V.S. at Liverpool University. In 1910, Mr. Dykins was appointed to the Union Veterinary Service and arrived in South Africa that year. He was stationed at Umtata, Kokstad and various parts of the Transkei, where he rendered excellent service in the early days of the East Coast Fever invasion.

At the outbreak of the 1914-1818 was, he joined the Union Forces, as Captain, S.A.V.C. He served in the South-West and East African campaigns, and was mentioned in despatches.

Mr. Dykins married a daughter of the late Mr. Cannon, in 1920, a well-known Veterinary Practitioner in Johannesburg at that time. Soon afterwards he was transferred to Maritzburg and later to Durban, where he was responsible for a large district, and where his services were greatly appreciated for some years until he resigned from the Government Service. He was then appointed Director of the Durban Municipal Abattoir, and was also in charge of the Animal Transport Department, positions he filled with great ability and satisfaction ot all concerned for a period of 16 years. Mr. Dykins management and direction of the Abattoir was favourably referred to in the report of a Commission appointed to inquire into the workings of the Abattoir some years ago. He was very jealous of the good name and standing of his profession and could always be relied on to support any movement for its advancement.

The Veterinary Profession has lost a highly-esteemed and trusted colleague and a very dear friend.

To his widow and children, two daughters and two sons, we extend our heartfelt sympathy in their irreparable loss.

W.M.P.

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