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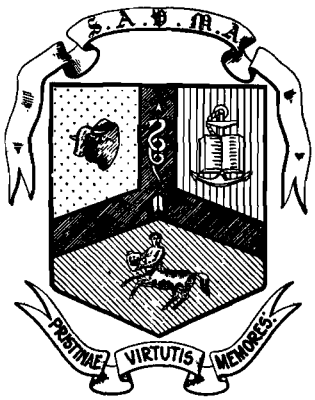

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FOOT AND MOUTH DISEASE PROBLEMS IN SOUTHERN AFRICA

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Since the outbreak of Foot and Mouth Disease in *Southern Rhodesia* in March, 1931, the disease has spread over a large part of Southern Africa, and since then recrudescences or new outbreaks have occurred in various centres. In the map attached, the first infection in an outbreak is recorded and not the subsequent spread to other centres. From the map it will be seen that in the south-eastern part of Southern Rhodesia there have been outbreaks in 1931, 1934, 1935, 1936, 1937, 1938, 1943, 1945 and 1947. There was a break of five years between the outbreaks in 1938 and 1943. A very interesting isolated outbreak occurred at Wankie, Southern Rhodesia, in 1940, where, on account of its isolation by means of a fly belt, infection could not have been introduced by cattle.

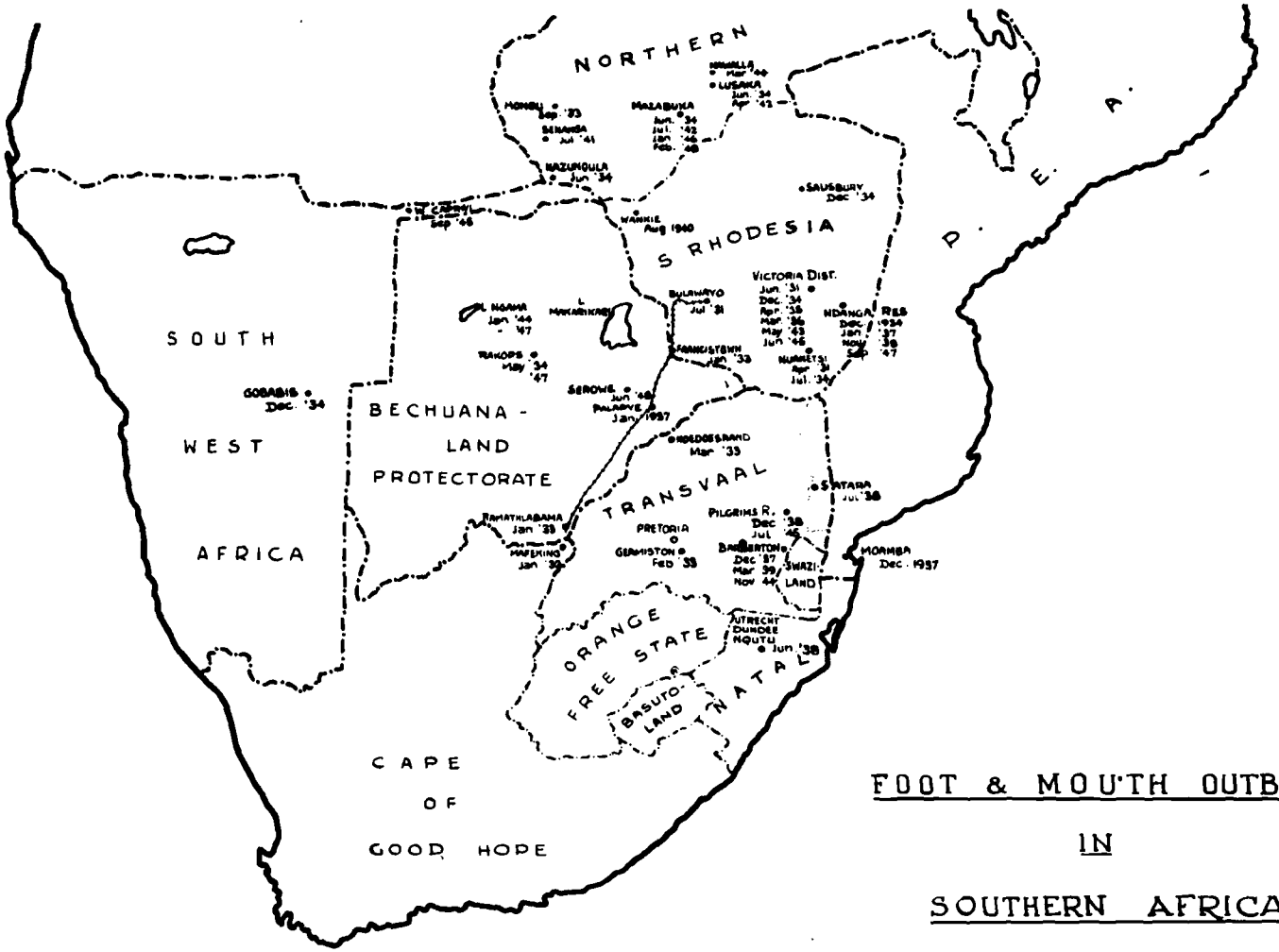
It would appear that the Tati area in *Bechuanaland*, most likely became infected from Southern Rhodesia. In Bechuanaland the disease broke out in January, 1933, occurring again in 1934, with an isolated outbreak at Palapye in 1937. Since then new outbreaks have been recorded on a very large scale in the Northern parts of Bechuanaland, namely in 1944, 1947 and 1948. Here there was a definite break between 1937 and 1944. In the 1937 outbreak the disease was completely isolated and the affected cattle were subsequently destroyed.

In *Northern Rhodesia* outbreaks occurred in the Mazabuka-Lusaka area in 1934, 1942 and 1946 and as recently as 1948.

In *Barotseland* the disease was identified at Mongue in 1933 and at Senanga in 1941. The outbreak at Kazangula in 1934 may be regarded as an extension from the 1934 outbreak in Bechuanaland.

The disease was identified in *South West Africa* in 1934 at Gobabis, undoubtedly an extension of infection from the Ghanzi area in Bechuanaland. A further infection occurred in the western portion of the Caprivi Strip in 1945, and it is not known whether this infection came from Angola or from Bechuanaland.

The outbreaks in the *Union of South Africa* at Mafeking in 1933 and in the Koedoesrand in 1933 can be regarded as extensions of foot and mouth disease from the 1933 outbreaks in Bechuanaland. The outbreaks in the Barberton district in December, 1937, were probably associated with an extension of the disease from Moambo in *Portuguese East Africa.* The Portuguese were, however, of the opinion that the



FOOT & MOUTH OUTBREAKS

IN

SOUTHERN AFRICA

Moambo infection most probably came from the *Kruger National Park* via Uanetsi, east of Satara. In 1938 the disease was widespread in Portuguese East Africa and in 1939 the disease still occurred in the Lourenco Marques district.

The outbreaks in the *Pilgrimsrest area* in December, 1938, and early in 1945 and in the *Barberton district* in 1939 and 1944 may probably be regarded as infections spread by game from the Kruger National Park. In the *Kruger National Park* the disease was diagnosed at Satara in July, 1938, amongst nine head owned by a Ranger. In September, 1938, a suspected outbreak of foot and mouth disease occurred at Gudzana in the Kruger National Park, where 13 head were involved. In December, 1938, the disease occurred among 8 head owned by Colonel Stevenson-Hamilton. All the stock in the Kruger National Park, including those belonging to natives living in the Park, were subsequently destroyed. This involved 1,322 cattle, 321 small stock and 6 pigs. It was difficult to suggest how the cattle at Satara, Gudzana and Skukuza became affected. Was this due to game or was infection introduced from outside by illegal movement of stock? If it was brought in by game, did this infection come direct from Southern Rhodesia or via Portuguese East Africa ?

In analysing these new outbreaks or recrudescences, it is extremely difficult to say where the first infection actually came from. Was this first infection in *March,* 1931, at Nuanetsi in Southern Rhodesia associated with straw used as packing material emanating from the Continent, or was it due to infection carried by game ? At that time the disease was enzootic in Tanganyika and in Kenya. If it was due to game conveying the infection from these enzootic areas to Southern Rhodesia, why was infection not set up at intermediate centres where such game could easily have come in contact with susceptible cattle ?

From the investigations carried out with the Southern Rhodesian virus at Pirbright, it was stated that the virus collected at Nuanetsi did not conform antigenically to the recognised European types, namely A, O and C. Did this mutation take place in the game or in the cattle under Southern African conditions before the virus was submitted for typing ? Where did the infection at the Nuanetsi Ranch in 1934 come from and what happened to the virus in the interval between 1931 and 1934, because the 1934 virus did not conform entirely to the virus of 1931 ? How was this virus maintained and kept alive in the south eastern region of Southern Rhodesia to give rise to the frequent outbreaks in that area ?

* " Concerning all of the strains received from Southern Rhodesia and the Bechuanaland Protectorate, it may be said that they appear to be foot and mouth disease viruses with no unusual characteristics.

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* Summary from the 5th Report of the F. and M. Disease Res. Committee, Great Britain, 1937.

Any peculiar or unusual features associated with the incidence of the disease in Rhodesia or Bechuanaland should be ascribed not to any peculiarities of the virus itself, but rather to the operation of local factors. It is noteworthy that all of the strains in this group, R...V1, H...V7 and B...V1, that have been tested in pigs, sheep and goats have shown only a comparatively low virulence for these animals.

The work recently published by Daubney suggests the occurrence of a change of type in the virus during the Rhodesian outbreak of 1932, but our own observations, carried out on material derived from the same or similar sources, have revealed no change of that kind. The work described in parts A and B of this Section appear to indicate that the antigenic type of virus remained unchanged during the widespread invasion of Southern Rhodesia in 1931-32 and the subsequent extension of the infection to the Bechuanaland Protectorate in 1933. The only change in the virus we could detect from the various specimens sent to us, was an increase in its pathogenicity for the guinea-pig. The virus strains of this series could not be assigned to any one of the three standard types, but in the guinea-pig they had some affinity with the O type and might easily have been described as O variants.

The strains received in 1934 from both Rhodesia and Bechuanaland were very different from the first series ; they were equally difficult to classify, but might provisionally be called A variants. We cannot at present express any confident opinion concerning the relations of these later strains but R/V7 and B/V1 appear to be closely related though not identical, and R/V8 to be more definitely separated from them.

Our studies of the strains are still incomplete and in connection with all strains of foot and mouth disease, the interpretation of results obtained in guinea-pigs is still a matter of some uncertainty."

The Southern Rhodesian authorities resorted to the vaccination of all infected and contact herds with virulent virus. They obtained 99 per cent infection and in a comparatively short time all infection was eliminated from the herds naturally and artificially infected. They are of the opinion that infection in the new outbreaks was not conveyed by cattle virus carriers. By the careful and frequent inspection of cattle treated they always satisfied themselves that in each of these outbreaks the disease had disappeared after vaccination with virulent virus.

In March, 1944, the Director of Veterinary Services, Northern Rhodesia, reported an outbreak of Foot and Mouth Disease at Bahamwazi, Namwala district, in Northern Rhodesia. Eight herds of cattle, totalling 526 head confined to an area of approximately three square miles, separated by several miles of swamp and tsetse, became infected. No infection could have been introduced by cattle and the original infection involved over 75 per cent of the cattle examined.

In August, 1944, the Director of Veterinary Services reported that no further Foot and Mouth Disease had been discovered. During the last week in October Foot and Mouth Disease was again diagnosed in some of the susceptible cattle placed in contact with the original infected herds, in spite of the fact that repeated inspections of the herd over four months revealed no symptoms of the disease. The cattle were then vaccinated with virulent virus and according to the Director of Veterinary Services the susceptible cattle reacted to the extent of 94 per cent whilst the original infected herd only to the extent of 44 per cent. In January, 1945, a further 110 susceptible cattle were introduced and this was not followed by the appearance of Foot and Mouth Disease. It was then assumed that infection had apparently died out after the vaccination of all the stock.

In the Union of South Africa the outbreaks at Mafeking and in the Koedoesrand in 1933 were probably due to the introduction of infected stock from Bechuanaland. In the former, slaughter of the infected stock was resorted to, whereas in the latter the infection was " starved out " by suitable measures of quarantine, fencing, cordons and strict control.

In the Koedoesrand area in 1933 two fences were erected, one more or less 85 miles long around the whole infected area, and the other more or less 20 miles long adjacent to the Protectorate border. All herds, as soon as they became infected, were immediately removed to the inner fenced area on the border. About 9,000 head were eventually confined in the infected camp. The position of the Union of South Africa was rendered difficult by the action taken in Bechuanaland to inoculate all cattle near the Transvaal border with virulent virus, to ensure that the disease spread as rapidly as possible through the herds. It naturally increased the danger of spread of the disease to the Union along a border of approximately 800 miles. To prevent introduction of the disease, cattle were evacuated from the border farms, and where this was not possible, a bush fence was built to prevent contact with inoculated cattle straying across the border. In all, about 80 miles of bush fence was constructed. Quarantine measures in the Koedoesrand area were lifted twelve months after the last active case of foot and mouth disease.

The origin of the two infections, namely in 1933 at *Germiston, Transvaal,* and in 1938 at *Utrecht* and *Nqutu, Natal,* is difficult to explain. At the time there was no infection in the Union of South Africa. The nearest known infection in 1937 was in Bechuanaland, and in 1938 in Southern Rhodesia. Cattle were moved from a farm Klipspruit in the Utrecht district and from there the infection was spread to Dundee and Helpmekaar districts. It would appear that the cattle moved from the farm Klipspruit must have been infected. The opinion is held that the disease at Klipspruit could probably be traced to cattle smuggled from Bechuanaland and purchased at the

Britten sale. These Bechuanaland cattle introduced on to Klipspruit were probably virus carriers. All the infected and in contanct stock associated with the Utrecht-Nqutu outbreak (14,600 cattle and 19,364 head of small stock) were slaughtered.

The 1938 and 1944 infection in the vicinity of the Kruger National Park can probably be associated with spread by infected game. A number of game were actually destroyed in these areas and changes seen could not be differentiated from those of Foot and Mouth Disease in cattle. The 1944-45 infected herds around the Kruger National Park were not slaughtered out due to shortage of meat, and again steps were taken to starve out the infection. A large area became infected and approximately 85,000 head were involved. In order to minimize the spread of the disease by game from the Kruger National Park, a buffer zone has been created between the Kruger National Park and the cattle areas by the erection of fences which are frequently patrolled. The fencing near the Kruger National Park is about 120 miles in extent. Along the Portuguese-Union border a double fence has been erected about 50 miles long.

These outbreaks in the Transvaal could easily be defined in view of the permit system operating under the old East Coast Fever regulations. In that way the spread of the disease, when once diagnosed, was easily traced and effective cordons placed around the periphery of these outbreaks.

In the Union of South Africa where no inoculation with virulent material was resorted to, the virus apparently was " starved out " in the infected herds and no recrudescences of this disease followed any of the outbreaks in the Union of South Africa. It may, however, be stressed that in those areas where the slaughter policy was not resorted to, the infected cattle under quarantine did not have free contact with game on account of the scarcity of game in those areas.

A feature of the outbreak in the Pilgrimsrest area in December, 1938, was that it was of a particularly virulent nature, causing large sores at the division of the hoofs. Another feature of the infection was that while cases of the disease had not been seen in *small stock* in previous outbreaks in the Union, sheep and goats were quite commonly affected, showing the same type of lesion as cattle.

Foot and Mouth disease has been diagnosed in game in Southern Africa. At the Divuli ranch, Southern Rhodesia, the virus was isolated from infected kudu, and I believe, subsequently typed at Pirbright. The extensive use of virulent virus for the vaccination of stock since 1931 may have been responsible for the dissemination of the disease in certain species of game, in this way probably creating enzootic areas. In 1931 more than half a million cattle were inoculated with virulent virus in Southern Rhodesia, and over large areas these infected cattle were in close contact with game of various species. As recently as 1947, approximately 140,000 head of cattle were inoculated with

virulent virus in the Ngamiland area, Bechuanaland Protectorate. Here the inter-mingling of infected stock and game had even greater opportunities of contact than in Southern Rhodesia. It is believed that the extensive outbreak of Foot and Mouth Disease in the vicinity of Serowe, west of the Mafeking railway line in June, 1948, was probably due to the contact of susceptible cattle with infected game in the Makalakari area.

Conclusions

In view of the very inconclusive information about the occurrence and spread of Foot and Mouth Disease in Southern Africa, the following were submitted for consideration at the Bulawayo Conference in July, 1948:—

1. The Veterinary authorities in Southern Africa are faced with a very great responsibility in advising their respective Governments as to the best policy to be adopted to counteract the frequent recrudescences or outbreaks of Foot and Mouth Disease in Southern Africa and the continual threats to the stock industry. With every outbreak a great deal of expenditure to the respective Governments is involved.

2. Formerly it was believed that the virus of Foot and Mouth Disease could remain viable for a considerable time outside the body. As a result of recent investigation it is believed that this is only true in a small number of outbreaks (B. Flückiger, "Combating Foot and Mouth Disease by Modern Scientific Methods," page 135, "Veterinary Journal," Vol. 104, No. 5, May, 1948). Some authorities are of the opinion that some of the recovered animals may harbour the virus for long periods.

3. It is appreciated that the ideal method of eradicating the disease during outbreaks is by the "slaughter out policy" and wherever possible this method should be adopted. Failing that, it is recommended that consideration should be given to the application of a vaccine prepared according to the method of Schmidt-Waldmann or by the use of the crystal violet vaccine.

4. The use of virulent virus for the immunisation of stock in outbreaks in Southern Africa should be discontinued. Apart from the fact that large numbers of stock become infected with a virulent virus and the possibility of creating carriers, there is a danger that by this means Foot and Mouth Disease virus may be transmitted to various species of game. In this way the "smouldering of the disease" may ensue not only in game but also in stock.

5. The Union authorities believe that by a system of cordoning

off outbreaks and applying vaccination to all in-contacts in such outbreaks, that is, adopting a method of zoning, the disease should finally be eradicated.

6. The respective Governments should place at the disposal of their veterinary authorities sufficient staff and transport to deal as expeditiously as possible with the diagnosis and the extent of the spread of Foot and Mouth Disease in any new outbreak and to cordon off such outbreaks as early and as effectively as possible.

7. Consideration should be given to the erection of a *Foot and Mouth Disease Research Institute in Southern Africa,* with adequate facilities for the preparation of vaccine for use in Southern Africa and for research into :—

   (a) The extent to which the different species of game become infected.

   (b) The problem of the virus carrier in game and/or in stock, in Southern Africa.

   (c) Types of viruses implicated in the various outbreaks in Southern Africa. Is this a " mutation " or " reversion " of the European types A, O and C under Southern African conditions, or in passage through game ?

(A paper dealing with the Problem of Foot and Mouth Disease, especially in relation to South Africa, will in due course appear in the " Onderstepoort Journal.")

INFECTIOUS OR EPIZOOTIC INFERTILITY OF CATTLE *

Infectious bovine cervico-vaginitis and epididymitis

This is an insidious, infectious disease of the genital organs of breeding-cattle, characterized by a thick, tenacious, muco-purulent discharge from the vagina, or fibrosis and induration of the epididymis and testis. It is transmitted naturally during the act of coitus and frequently results in complete sterility. It is believed to be one of the most serious diseases of breeding-stock known to veterinary science. The etiological agent is unknown.

According to Purchase*, epizootic infertility was first observed as a disease of breeding-stock in Kenya approimately 22 years ago, when several herds composed of grade cattle and imported stock were reported to have failed to breed. An investigation revealed that the bulls of the affected herds remained active and avid for service for some time before complete sterility and impotence supervened, and that many of the females exhibited normal oestrus but failed to conceive, whereas others showed irregular oestrus. The records of many of the affected animals were almost identical.

When the disease first made its appearance in 1927-1928 Hudson (1949), in attempting to combine the words epididymitis and vaginitis, coined the term " epivag " which is at present used universally in Kenya. He admits that this is an ugly word which is liable to be converted into the ridiculous term " epivaginitis." The word " epivaginitis " is meaningless and should not be employed. Purchase* has suggested the name " cervico-vaginitis and epididymitis." The writer, however, prefers the term " sterility in cattle " first used by Daubney, Hudson and Anderson (1938) and has, therefore, adopted the name " infectious or epizootic infertility of cattle " in his description of the disease. According to Daubney, Hudson and Anderson (1938) the disease is well-known to the Masai who use the same name for it as they use for gonorrhoea.

Distribution

Infectious infertility is very widespread in Kenya where it is by far the most serious disease of breeding-stock. The prevalence of the disease is one of the reasons for the great deal of attention that is given in the colony to artificial insemination. The disease also exists in other parts of East Africa and has even extended as far south as Southern

* From *Animal Diseases in South Africa,* by M. W. Henning. Published by Central News Agency. Printed by kind permission of the publishers.

Rhodesia. Huston (1948) has reported it on seven farms in the Salisbury district where it has seriously threatened some of the dairy herds supplying milk to Salisbury. But the disease is apparently much more widespread in Southern Rhodesia than is generally realised, as a number of outbreaks have recently been diagnosed in Bulawayo. Infectious infertility has so far not yet been diagnosed in the Union, but its extension to this country appears to be only a matter of time.

Etiology

According to Daubney, Hudson and Anderson (1938), Daubney (1939), Purchase*, and Bennett* there is no doubt that an infective agent is the cause of the disease. But the nature of the etiological agent has not yet been elucidated. Attempts to cultivate material from the lesions and discharges in ordinary laboratory culture media have consistently yielded negative results. A microscopical examination of the male and female discharges has invariably revealed large numbers of white cells embedded in a mucous material, but micro-organisms have been very rarely found. Although a virus is believed to be the most likely cause, there is at present no experimental evidence to implicate a virus. Daubney (1939) and Hudson (1949) reported that preliminary tests with Seitz, Berkefield, and Chamberland L.3 filtrates failed to reveal the presence of the infecting agent in the discharges. But Hudson (1949) pointed out that, owing to the tenacious consistency of the infective material, filtration was slow and only small amounts of filtrates were obtained for testing. These workers were unable to demonstrate protozoa in the infective discharges.

Transmission

Under natural conditions the disease is spread solely by coitus. When the yellowish, muco-purulent vaginal discharge or the minced testicular tissue of an affected animal is introduced deeply into the vagina of a cow or heifer the disease is readily produced. Purchase* states that it is not easy to transmit the disease experimentally to the bull unless the inoculum is deposited high up in the urethra of a sexually mature animal. The sigmoid flexure should first be straightened under spinal anaesthesia so that a long catheter can be inserted deeply into the urethra. According to Daubney (1939) an easy way to set up infection is to introduce a swab of cotton wool, soaked in vaginal exudate, into the vagina of a heifer and leave it for 24 hours. He has reported the transmission of the disease from bulls to heifers, from heifers to bulls and from heifers to heifers. Hudson (1949) has pointed out that unless care is taken in herd examinations the infection is liable to be transmitted with the speculum.

Pathogenicity

Infectious infertility has so far been reported only in bovines. In Kenya it is confined exclusively to imported breeds and grades. Native breeds never seem to show definite clinical symptoms, but they

are believed to act as subclinical carriers of the infection. According to Daubney (1939) and Hudson (1949) sheep, wild buck, and rabbits are not susceptible.

Symptoms

The incubation period after artificial infection is only a few days. After natural exposure the period is also short in the cow, but clinical evidence in the bull may be delayed for 4 to 10 weeks after service of an infected female.

In the *bull* the first sign is a slight, palpable enlargement of the spermatic cord and a puffiness of the epididymitis. The enlargement spreads down the epididymitis in front of the testicle, eventually involving the testis as well as the epididymis. The disease usually commences in one testicle, but later it may involve both organs.

During the early stages the sexual desire in the bull remains unimpaired; but its fertility may be lost before there is any clinical evidence of the disease. Sometimes a bull may actively continue to serve in spite of advanced lesions in the testes and epididymis Eventually, however, its desire to serve is lost and the bull becomes completely impotent.

At first semen is ejaculated which contains active spermatozoa and an excess of leucocytes ; but, as the disease extends, the tubules of the epididymis become so much inflamed and swollen that their lumina are blocked ; the flow of seminal fluid is retarded or completely dammed. Eventually no spermatozoa can leave the affected testicle, and the testicular tissues atrophy. A large amount of hard, firm fibrous tissue is found in the peri-tubular tissue of the epididymis ; the tail of the epididymis become so much inflamed and swollen that their lumina are changed into a hard spherical mass with an irregular lobulated surface, giving rise to the so-called " golf-ball lesions." If the disease is allowed to run its course a second " golf-ball " develops in the head of the epididymis.

The internal pressure caused by the damaging of the testicular fluid in the tubules, as well as the external pressure exerted by the scar tissues in the peri-tubular areas, cause marked atrophy and degeneration of the seminiferous tubules, with the formation of more fibrous tissue. Palpation through the rectum may also reveal enlargement and induration of the vesiculae seminales.

In the *cow* the course of the disease is more varied. The first changes appear in the anterior part of the vagina in the region of the cervix. For the detection of these changes a vaginal speculum should be used. A variable number of diffuse, reddish-purple, inflammatory patches or streaks will be found on the anterior part of the vaginal mucosa and on the cervix. But after death it may no longer be possible to find these reddened areas. In experimental cases the red patches may be detectable within 2 to 4 days. About 7 to 10 days after service

by an infected bull, a thick, tenacious, yellow, muco-purulent, odourless discharge, resembling Jersey cream, collects in the vagina, adhering to the mucous membrane. This excretion is discharged periodically from the vagina, and, when the vagina is examined with a dilating speculum, the mucus easily slides down the arm of the instrument. As the discharge is expelled from the vagina it soils the tail opposite the lower commisure of the vulva, and is smeared over the buttocks by the tail, giving a characteristic slimy or glistening coat to the buttocks, resembling the trail left by a snail. A good idea of the extent of the infection in a herd can often be obtained by noting the number of animals that exhibit the slimy flakes on their buttocks. The amount of discharge in individual animals may vary considerably from day to day. Sometimes hardly any can be detected, but at other times it is very copious, and as much as 500 c.c. may accumulate in the vagina in the course of two or three weeks. A microscopical examination of the discharge reveals the presence of large numbers of neutrophiles embedded in mucus ; micro-organisms are rarely found. According to Purchase* the discharge can be readily differentiated from that found in trichomoniasis. In trichomoniasis the discharge is less tenacious than that in infectious infertility, and it readily separates into an upper clear layer and a lower curdled mass.

Course

The disease runs a chronic course which extends over several months or years. Complete recovery is extremely rare. Apart from the involvement of the reproductive organs the animal does not suffer much. The loss resulting from this disease, is, therefore, due entirely to the loss of the breeding powers of the animal. In the bull the atrophy and fibrosis of the testis result in complete and permanent sterility, and absolute impotency. In the cow the severity of the disease depends on the extent of the involvement. If the lesions are confined to the vagina, and treatment is instituted early, the ability of the animal to breed may be retained, but the infection may persist in a sub-clinical form, and the animal may thus serve as a carrier. If the infection extends into the uterus and fallopian tubes permanent sterility is an inevitable sequel. About 25 per cent of the affected cows become sterile.

Lesions

The lesions are confined to the genital organs. In the *bull* adhesions are found between the tunica vaginalis propria and tunica vaginalis communis. During the early stages the tubules of the epididymis are widely distended with a yellow, muco-purulent exudate. When the epididymis is incised pale whorls of fibrous tissue and small locular dams of very tenacious, yellow fluid will be revealed. There is marked proliferation of connective tissue in the walls of the tubules and in the intertubular tissue. Eventually the normal structure of the epididymis is completely replaced by fibrous tissue.

At first there is no apparent alteration in the testicular tissue but in due course its normal bright carrot-colour is converted into a dull substance by the fibrotic replacement of the normal tissues. This can probably be ascribed to proliferation of the interstitial fibrous tissue. Even the walls of the blood vessels of the testicle show evidence of marked fibrotic thickening.

The most important changes in the testicle are due to proliferation of the fibrous tissue associated with atrophy of the seminiferous tubules and the interstitial tissue. The enlargement and induration of the visiculae seminales are also due to an increase in fibrous tissue.

In the *cow* the lesions presented depend on the extent of the involvement of the reproductive organs. Unlike other vaginal infections the lesions usually spread from the vagina to the cervix and uterus, producing a catarrhal metritis. But the tenacious pus formed is less than in the vagina. Chronic salpingitis is present in about 25 per cent of the infected females ; the tubes are contracted in parts and the lumina are occluded; for the rest, the tubes are distended with a clear, thin fluid. Owing to the occlusion of the tubes spermatozoa are unable to reach the pavilion for the fertilization of ova ; and, if impregnation should take place, the fertilized ova will be prevented from travelling down the tube. In a certain percentage of the cases the fimbriae of the fallopian tubes are affected ; the rim of the funnel becomes attached to the ovary, forming a tent-like peri-ovarian cyst filled with fluid. This pavilion-cyst is difficult to burst. If the rim of the pavilion is not completely attached to the ovary to form an enclosed cyst the infection extends into the abdominal cavity to produce a dry, painless peritonitis, confined mainly to the pelvic region. A layer of fibrous tissue forms around the ovary, prevents ovulation, and favours the development of ovarian cysts. The oestrous cycle is disturbed ; oestrus is erratic, or is completely suppressed, or in other cases oestrus becomes more or less continuous.

Diagnosis

As the etiological agent is not known a diagnosis must be based entirely on the clinical symptoms, the lesions and on the history of the cases. The presence of the characteristic testicular lesions in the bull, and of a thick tenacious, yellow, muco-purulent, odourless discharge from the vagina, involving a number of animals in a herd with a high incidence of sterility, should be regarded with grave suspicion. For purposes of diagnosis, however, the breeding records of the bulls employed in a herd are of far greater value than the clinical symptoms presented by the cows. In East Africa, and other countries where the disease occurs enzootically, any muco-purulent vaginitis or epididymitis, associated with widespread infertility, is most likely to be due to infectious infertility. During the early stages, when only a few cows have developed a vaginal infection, and when the bull has not yet developed lesions, a diagnosis may not be easy ; and the breeding records

of the animals should be investigated. In doubtful cases, therefore, a susceptible animal should be exposed to artificial or natural infection, and the development of the disease observed. Meanwhile, however, it may be advisable to slaughter a suspected bull and examine the testicles and epididymis histologically.

Infection due to trichomonas and corynebacteria must be ruled out.

Treatment

The changes produced in the testicle are permanent so that treatment of the bull is useless. The immediate slaughter of the infected bull is, therefore, recommended. When a clean bull is introduced it must not be allowed to serve suspected cows, and, in order to prevent the disease from spreading further, artificial insemination should be practised. In Kenya artificial insemination from clean bulls is the official policy, but many farmers have reported disappointing results in the control of the disease even after years of artificial insemination.

All the exposed cows should be carefully examined for clinical evidence of the disease, and those that show active symptoms may have to be slaughtered, especially in recently infected countries. Recently infected females can be treated by irrigating the vagina and uterus with mild antiseptic lotions, like Lugol's iodine, potassium permanganate and flavine preparations. Any animal that has been exposed to infection should not be served by a bull, but it should be bred solely by means of artificial insemination.

Some improvement and even apparent cures have been reported when the treatment has been persistently carried out, but it is possible that clinically recovered cows may remain carriers. Most untreated females probably retain the infection indefinitely.

Prevention

A complete embargo should be placed on the importation of breeding-stock from countries where the disease has been diagnosed. If the disease is introduced into clean countries, the safest procedure would be to slaughter all the bovines that have been in contact with infected or suspected ones. Treatment is not advised in otherwise clean countries, as the treated animals may serve as reservoirs of infection. A further precaution should be to breed exclusively by means of artificial insemination in areas where infectious infertility is suspected to have occurred. But in countries where the disease occurs enzootically early treatment of all suspected females is advised, and artificial insemination should be universally practised. Treatment of bulls is not advised and all infected bulls should be slaughtered. Purchase* agrees with the author that treatment should be confined to enzootic countries, and that the slaughtering of all infected animals should be practised in countries where the disease has been freshly introduced.

It was pointed out above that infectious infertility has already

spread to different parts of Southern Rhodesia, and it is possible that the disease has a much wider distribution than is generally believed. In spite of the active measures adopted by the Rhodesian authorities the disease is likely to spread further, and its eventual extension into the Union seems inevitable. When it eventually reaches the cattle areas of an otherwise clean country like South Africa, breeders will be confronted with one of the most serious veterinary problems that has ever threatened their industry.

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* As very little published information about infectious infertility was available for consultation, Drs. H. S. Purchase and S. F. Barnett kindly furnished the author with descriptions of the disease which formed the basis of this chapter. To them the author wishes to express his grateful thanks.

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(Note. — Since this article was written Infectious or Epizootic Infertility of Cattle has been diagnosed in the Union of South Africa. — Editor.)

THE COMBINED USE OF THE HOTIS AND MICROSCOPIC TESTS FOR MASTITIS SAMPLES

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Identification of Streptococcus agalactiae in milk samples by means of specialised culture media such as blood agar and Edward's medium is a laboratory procedure which requires technical skill and training, expensive equipment and time. These requirements place this method beyond the scope of the average Veterinarian. He is therefore compelled to utilise the more direct method of examining milk samples, viz., the microscopical examination of stained films of incubated milk.

The microscopic test was first suggested by *Baker and Breed* (1920) and is to-day regarded as a rapid and acurate means of detecting even small numbers of Streptococci in milk. (*See Hucker, Trudell and Jennings,* 1923.) These workers however stress the necessity of more data on the identity of these Streptococci.

Everyone who has done microscopical work on milk samples knows only too well how true this (Hucker's statement) is. When the milk sample is not contaminated and contains large numbers of cellular elements the presence of *Streptococcus agalactiae* can usually be readily recognised (e.g. by the shape of the cocci and the long chains). It is however not always easy to differentiate between the chains of cocci found in cultures of agalactiae, uberis, dysgalactiae or other Streptococci. *Minett (quoted by Tompkins, Plastridge and Bryan,* 1946) reports that " all samples of milk containing Streptococcus agalactiae cannot be detected by the microscopic test ; the cells of some strains of this pathogen occur in milk in pairs that are difficult to distinguish from udder micrococci, or may form chains of less than 10 cells. Moreover, not all Streptococci that form long chains in incubated milk are *Streptococcus agalactiae. Some are Streptococcus dysgalactiae, Streptococcus uberis* or some harmless species of streptococcus."

The success or failure of any herd mastitis eradication programme depends primarily on the accuracy (or otherwise) of the test employed for detecting the presence of pathogenic organisms, in particular Streptococcus agalactiae. For this reason it was felt that some other test, simple to execute and easily performed in the field, might be used with advantage in conjunction with the microscopical test.

Baker and Van Slyke (1919) reported on the use of Bromcresol-purple for the demonstration of alterations in the pH value of milk.

They found that abnormally alkaline milk produced a deep purple colour, whereas normal milk gave a greyish-blue column of milk in the tube.

The Hotis Test : *Hotis and Miller* (1936) described another test for the detection of mastitis streptococci in milk. They added 0.5 c.c. of a sterile aqueous 0.5% solution of bromocresolpurple to 9.5 c.c. of milk in a sterile tube and incubated this for 24 hours at 37° C. In this report they state " If streptococci are present, the colour changes from purple to a yellow shade during incubation as a result of the production of acid from lactose by these organisms. In addition to this change, if Streptococcus agalactiae is present, small flakes or balls of growth from 0.5 m.m. to 4 m.m. in diameter usually form on the sides of the tube." According to *Tompkins, Plastridge and Bryan* (1946) " The flakes appear as canary yellow spots attached to the sides of the tube. Various shades of colour ranging from blue-gray through yellowish green and greenish yellow to a pronounced yellow are obtained with the test. Regardless of colour, the occurrence of yellow flakes on the sides of the tube is regarded as positive. Tubes with no flakes may be incubated for an additional 24 hours."

Interpretation of Reactions : Alkaline milk is indicative of an udder traumatism or of mastitis in an advanced degree, in which the milk is obviously thin and watery, or it may be an indication that the sample is either from a cow which has freshly calved, or from one approaching the end of her lactation period. Such milk shows up as a deep purple column.

After 24 hours incubation little or no change in the colour and the absence of flakes should be regarded as negative. Hotis and Miller considered a distinctly yellow column of milk as positive, although plating on blood agar confirmed this in only 81.2% of samples.

Murphy (1939) feels that " regardless of the colour of the column of milk after incubation at 37° C. for 24 hours, only a thick yellow deposit in the bottom of the tube, or yellow colonies (flakes) adhering to the sides of the tube, could be considered positive."

Miller and Heishman's (1943), recent publication also gives data on the other colour changes found. They state that brown flakes are produced by a double beta-zone streptococcus of group B. Rust coloured flakes are produced by Staph. Aureus. A bright yellow granular sediment in an unchanged or only slightly yellow column of milk is not regarded as a positive reaction, as it is usually associated with non-haemolytic streptococci or streptococci other than streptococcus agalactiae.

Accuracy Test : Comparing the accuracy of the test with the blood agar plating method, *Hotis and Miller* (1938) report the following :—

TABLE I.

No. of Samples	Hotis Test	Blood agar plates
550	Flakes and typical colour change	All + Str. agalactiae
133	No flakes but typical colour change	108 + Str. agalactiae
60	No flakes and no typical colour change	13 + Str. agalactiae

The two methods were thus in agreement in 95% of the 753 samples tested.

For the detection of Streptococcus agalactiae in 15,000 samples of milk *Miller and Heishman* (1943) found the Hotis test approximately 85-90% as effective as the blood agar culture method.

Influence of Preservatives : In our country, where hot weather often prevails and where there are often long distances between the farm and the laboratory, this subject is of considerable importance.

According to *Bryan, Devereux, Hirchey and Corbett* (1939), the use of preservatives such as sodium azide and brilliant green increased the efficiency of the 24 hour reading from 60 to 81%, and reduced the number of negative cows giving positive reactions from 7.3% to 2.6%. Greater efficiency, however, was obtained when the reading was made at 48 hours.

Little and Jones (1933) found the efficiency of the test greatly improved by the addition of sodium azide, but the number of flakes was reduced, appearing in many cases only in the cream line or in the bottom of the tube.

Schalm (1945) has worked out a classification for samples according to which the cows in a herd programme should be grouped for milking :—

TABLE II.

Groups	Hotis Test	Microscopic Test
A. *Mastitis Negative*	Negative or suspicious	No Streps. found. Staphs may be found, with no increase in leucocytes.
B. *Mastitis Suspects*	Negative or suspicious	Streps. found, with or without an increase in leucocytes. Staphs may be present with increased leucocytes.
C. *Mastitis Positive*	I. Positive II. Non granular yellow sediment	Unnecessary. Streptococci present.

Little and Jones (1933) emphasize the need for further examination of herd samples, and express the opinion that the Hotis test, with subsequent examination under the microscope, is of infinitely more value than the microscopic test alone.

All workers stress the importance of taking every possible precaution against the contamination of milk samples. Accurate results cannot be obtained with any test when contaminated samples are used, as the contaminating organisms readily outgrow pathogenic ones and inhibit their multiplication. Alcohol or a suitable chlorine solution should be used to cleanse each teat before drawing a sample.

Over 400 samples were examined by both methods, and the Hotis test was found extremely useful in augmenting the information obtained from microscopic examination. In many cases where a doubtful reaction was obtained with the microscopical test, a diagnosis was possible when the Hotis test was employed.

As smaller tubes were in use, quantities had to be halved, and 0.25 c.c. of a sterile 0.5% aqueous solution was introduced into sterile tubes (marked at 5 c.c.) by means of a sterile graduated syringe and a long needle. Milk was introduced directly into the tubes, after suitable preparation and cleansing of the teats. The foremilk was never used.

As the tubes were stoppered with cotton wool, the indicator would evaporate after a few days, leaving only a small amount of powder in the tube. This did not interfere with the test, as after a few minutes a vigorous shake of the tube would cause the powder to dissolve in the milk.

The following is an analysis of the results obtained with the two methods :—

Altogether 404 samples were examined. *Of* 41 *samples positive microscopically,* 25 were positive, 4 negative and 12 suspicious by the Hotis test. *Of* 36 *samples suspicious microscopically,* 12 were positive, 10 negative and 14 were suspicious by the Hotis test. *Of* 327 *samples negative microscopically,* 3 were positive, 310 were negative and 14 were suspicious by the Hotis test.

It will be seen that negative findings were in agreement in 94.5% of samples. Of 36 samples which gave a doubtful microscopic reading, 12 or 33⅓% were positive to the Hotis test.

It should be pointed out that initially many samples were found to be contaminated, and this to some considerable degree increased the Hotis suspicious samples which could not be confirmed microscopically. In only one case was a typical streptococcus agalactiae found in the presence of contaminating organisms.

Furthermore, one should not confuse the small greyish white flecks seen in otherwise normal milk with the typical canary yellow balls found in mastitis milk.

Samples contaminated with a certain small (unidentified) bacillus

(probably of the colon type) usually show signs of proteolysis and gas formation, and are almost completely decolorised. Heavy contamination with micrococci causes a creamy yellow column of milk to be produced after incubation.

Conclusions

1. By employing the Hotis test in conjunction with the microscopic test a greater number of positive cases of mastitis will be detected than when the latter is used alone.

2. It assists materially in clarifying doubtful microscopic findings.

3. It involves no special equipment other than that used for the microscopical test.

4. It is comparatively cheap to perform, costing about $\frac{1}{8}$ pence per sample.

5. It's execution takes a minimum amount of time.

6. It can assist considerably in reducing the number of samples which have to be subjected to microscopical examination. Unchanged columns of milk can be incubated for a further 48 hours, and need not be examined if no change is then observed.

7. It's value has been recognised by many workers on mastitis.

8. It can readily be utilised by Veterinarians in the field, in private practice and in municipal service. Both composite and quarter samples lend themselves to examination in this way.

Summary

A review of work done by oversea authors on the Hotis test and its application and interpretation is given, together with a short description of findings and personal observations by the author.

In conclusion I wish to thank Prof. M. W. Henning, of Onderstepoort, for his valuable criticisms and suggestions.

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OBSERVATIONS ON REPRODUCTION IN THE THOROUGHBRED MARE

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This paper is intended to survey the more common breeding problems encountered in thoroughbred mares in the Colesberg and Middelburg areas.

On stud farms the filly is usually leased or sold as a yearling and she commences her track career, which may last for many years. The usual age for a "maiden" mare to return to stud is four to six years.

The breeding season in South Africa is from mid September to the end of December as the registration of foals is as from the 1st of August.

It is usual for the maiden mare to skip her first season. This may be due to several reasons, viz. :—

1. Anoestrus due to static ovaries;
2. Debility, characterised by a staring coat and patchy alopecia, probably due to the sudden withdrawal of arsenic given in the racing stables;
3. Sudden changes in nutrition and general environment.

The Non-Pregnant Mare

In the karroo the non-pregnant mare shows a definite cycle of ovarian activity in the summer (October to March or April) and a period of rest in the winter. This is doubtless due to climatic and nutritional factors.

Many barren mares are run on the veld, which rapidly deteriorates as the winter months approach. Should condition be lost additional feeding with dry lucerne hay is resorted to. The nutritional intake is hence unbalanced particularly in vitamins. With early rains and vigorous green vegetation it does not take long for oestrus to appear, a process analogous to flushing in ewes. It is evident that the intake of such young, vigorously growing green food supplies the necessary stimulus for the commencement of sexual activity and it must be a factor in this food that provides the trigger action for the pituitary to function. It is noteworthy that the first heat periods of such mares are usually prolonged, lasting often from 10 to 14 days, frequently considerably longer. As the season progresses the heat periods shorten and towards the end of the season they may only be from 2-4 days

* The original paper has been condensed.

in length. It seems as if the factor must accumulate in the body to a certain level before expeditious maturation of the Graafian Follicle can take place.

In addition it has been observed that pregnancy rarely follows these early heats and to my mind this is due to lack of receptivity of the uterine tissues to the slowly accumulating hormonal stimulation. The function of the uterus is dependent upon its three constituent factors : (1) endometrial, (2) neuromuscular, and (3) vascular, the full development of which depend entirely upon the secretions of the endocrine glands.

It is evident that the predominant factor in initiating ovarian activity lies in the food, especially in actively growing natural green pasture.

It is very problematical whether in the Karroo, with its ample sunshine, there is a lack of the light factor as observed in England. As mentioned, if the rains are absent — the warm weather with its abundance of sunshine will not bring mares into season.

The Foaling Mare

This animal receives the best of attention, obtains additional feeding and invariably runs on green grazing such as lucerne, oats, barley, etc. As a rule she comes on heat within 8-11 days after foaling. This heat period is short, lasting only two and at the most four days. Her subsequent heat periods, if not served, occur approximately the 15th, 20th, 30th or 40th day after foaling. They are normal heats when they occur and rarely exceed 4-6 days in duration.

Signs of Oestrum

On most studs an ordinary virile horse stallion is employed as a " teaser " for the detection of mares in oestrum. Mares are led every second day past a bar, gate, or barrier of padded boards over which the stallion is allowed to approach them. Oestrus is indicated by the mare standing passively and allowing the stallion to nuzzle her in the flanks, thighs and neck.

If not on heat she will resent the stallion's attentions intensely, flatten her ears, squeal and lash out with her hindfeet.

Oestrum and Ovulation

These do not always coincide. It is now generally accepted that ovulation occurs only within the last 48 hours of the heat period and the difficulty has always been to correlate service with ovulation. The time of ovulation may be determined by rectal palpation but this procedure is impracticable for all but trained veterinarians. Although no exact data are available as to the viability of the semen in the genital tract of mares, experience indicates that it probably does not exceed 48 hours and servicing should therefore be performed at that interval.

For practical purposes mares that have foaled are served every second day of heat, and those that have not every alternate day from the 3rd day of the commencement of heat.

In well regulated studs the introduction of the vaginal speculum has proved an invaluable aid in conserving the stallions vitality and in raising the percentage conception, as there is a definite correlation between the cervical appearance and ovulation.

The cervix in the mare normally is tightly closed, firm and projects like a finger into the vaginal passage. It allows the passage of the forefinger only with difficulty and is usually covered with a thick, sticky mucus. The vaginal mucuous membrane and the os are quiescent, pale in colour and dry.

During oestrum the appearance undergoes a radical change. The mucuous membrane becomes pink to hyperaemic ; there is a clear, slippery, lubricating mucus in the anterior vagina, but it is on the cervix that the greatest change is observed. At full heat and near ovulation it is in " full bloom," being a healthy pink colour, greatly enlarged, swollen, soft, relaxed and showing gentle contractile movements. The cervical passage is completely open. The vaginal walls are relaxed and lie collapsed in folds, the whole passage having a congested and glistening appearance.

In young and shy mares the external symptoms of heat are often suppressed and cannot be detected so that cervical inspection is the only method of determining the time for service.

Servicing in these studs is only undertaken during the time of the greatest cervical dilatation and in the great majority of cases only one service is required to settle the mare.

Servicing

This is invariably performed at a fixed place to accustom the stallion to his duties. It is usually done on a flat hard piece of ground with plenty of space to avoid accidents. The mare is haltered with a groom at her head and service hobbles applied and a twitch if necessary. A tail bandage is an advantage as the loose hairs often cause penile abrasions with consequent swellings or haemorrhage. The perineal region is cleaned with warm water and the vulvar lips cleaned with absolute alcohol if prior inspection with the speculum is undertaken. The speculum should be cleansed with boiling water and a little liquid paraffin applied as lubricant for insertion. The use of other disinfectants is contra-indicated because of their spermatocidal properties.

After the mare has been prepared, the stallion is brought from his box. Usually he gets very excited when led to the place where he is accustomed to serve the mares and firm handling is often required to avoid startling the mare and causing accidents.

If service takes place at the correct time of cervical dilatation, copulation definitely appears to be intra-uterine and the entire ejaculate is released in the womb. Where deposition of the seminal pool takes place in the vagina, a large amount is spilt on the ground on withdrawal of the penis. The conception rate of such services is extremely low. The failure of intra-uterine semen deposition may thus occur by mating at the wrong time when the cervix has not relaxed or may be due to a congenital or acquired malformation.

That this cervical barrier to effective fertilisation is well-known is indicated by the fact that artificial insemination has been a custom in shy breeders for over two centuries. The procedure adopted varied but consisted in principle in the artificial introduction of the semen through the cervical canal into the womb, resulting in an improved fertility.

Interoestral Period

In a normal season the interoestral period is remarkably constant for most mares varying from 17 to 19 days, followed by a heat period of 3-6 days. Nevertheless many exceptions are known and the season often determines its periodicity. Many mares again have an individual cycle showing only two to three heat periods for each season with an extremely variable interoestral period.

Pregnancy

Most studs are situated far from competent Veterinary Surgeons and manual rectal palpation for pregnancy is usually impossible. The introduction of the pregnancy test has become of great assistance in determining whether the mare has settled or not. The test is performed at from the 45th to the 100th day after the last service but the best time is from the 60th to the 75th day. The mare is bled from the jugular vein into specially prepared bottles and the test performed at the Onderstepoort Laboratories. If the test is negative attempts can be made to induce oestrum before the season closes.

Most authorities agree that the ovum after fertilisation takes several days to traverse the Fallopian tube to reach the uterus. It is also agreed that the *Corpus Luteum Vera* prepares the womb for its reception, but there are several indications to show that some secretion or perhaps the metabolic excretion of the fertilised ovum itself, is required for the maintenance of the Corpus Luteum. It is suggested that where there are several follicles or an excess of follicle stimulating hormone (F.S.H.) in the system, the Corpus Luteum secretion may prove insufficient to maintain pregnancy and early foetal death results.

The receptivity of the uterus to the Corpus luteum hormone may also vary and the endometrium may be inadequately prepared. Nidation of the ovum fails to take place and the mare returns to service after a varying interval.

The maintenance of pregnancy depends upon the interplay between

genetic and environmental factors. A fault in either may result in impaired development or death of the foetus.

Many environmental causes of abortion are well-known such as Strangles, Horsesickness, poisonous feeds such as ergot, mouldy hay or wilted or frosted foods.

On the other hand it is not so generally realised that inadequate endometrial preparation for nidation must be regarded as forming an adverse environment for the growth of the embryo and constitutes a potent cause of early foetal death.

The suitability or otherwise of the endometrium for nidation is in the first instance dependent upon the secretions of the corpus luteum. After nidation, however, the continued activity of the embryo provides the stimulus for the maintained activity of the corpus luteum and this in turn influences the character of the endometrium. There is therefore a direct link between the genetical composition of the embryo and the continuation of the life of the corpus luteum. The intra-uterine environment is thus genetically determined and nature has in this manner imposed upon the embryo the necessity for providing for its own existence.

This brings into consideration the stallion's contribution and apportions to him part of the responsibility for the vitality of the embryo, because a weak embryo means a weak stimulus (chorionic hormone). The environment of the mammalian embryo is so advantageous that, were there no regulating mechanism, many abnormal and non-viable foetus would be born. In the human being in particular the artificial continuation of such pregnancies by means of ovarian hormones has resulted in the birth of abnormal babies with a low survival rate. Nature herself has thus determined that mammalian embryonic environment shall be genetically controlled and thus those embryos which fail to elaborate enough hormones for their own survival are discarded.

THE STALLION

The average stud keeps a number of stallions varying from 1 to 3 or even 4, depending upon the size of the establishment and to the extent it caters for visiting mares which come for service.

Semen Production

A. The ejaculated semen has a whitish opaque appearance consisting usually of two portions. The first is thin and watery containing the spermatozoa, the second is viscous and stringy and comes mainly from the seminal vesicles and Cowpers glands (vesicular fluid). The total volume varies considerably and ranges from 30 c.c. to 120 c.c. The vesicular fluid may form three-quarters of the total volume of the ejaculate, but it has been noticed that in older stallions and in some not very virile young stallions it may be totally absent.

The number of the spermatozoa varies greatly and a range of 30,000 to 800,000 per cubic millimetre is given. The density of the semen is dependent upon the addition of the diluting accessory fluids. The standards employed for the evaluation of bulls and rams semen cannot apply here. Judgment is made on the motility but the wavy appearance seen in the semen of bulls and rams is absent. The spermatozoa must show virility and strong movement as the degree of fertility is usually parallel to motility. The accent is on quality rather than quantity.

B. *Frequency of copulation and ejaculation.* Mating behaviour with which is implied the mating desire (libido) and the ability to copulate varies independently of sperm production. Excessive use of the stallion has been found to be a frequent cause of apparent infertility of mares in this area.

Marked individual differences in spermatogenetic capacities are noted, some stallions being able to produce sperms of high quality with two matings daily, while others need a day of rest at varying intervals. It is therefore extremely difficult to give an indication as to the frequency of copulation to be permitted. The stallion's potency can only be gauged by the results. Some studmasters use their stallions once a day, others twice a day — in the morning and evening — alternating a period of rest. Aged stallions are only used once at two to three day intervals.

Libido, or sex drive is influenced by endocrine factors secreted mainly by the pituitary and testis, although there are indications that the other endocrines play a role. Here as in the mare, although most probably to a lesser degree, nutritional factors are fundamental to optimum and efficient reproduction. It is stated that the dietary requirements for reproduction do not exceed those for maintaining mature animals in good health. In practice this has not proved a good guide. Lack of green feed, a deficiency in protein intake and exposure to adverse climatic conditions such as prolonged dry seasons in summer or very hot climates have definite detrimental effects on fertility.

It is absolutely necessary that the ration should be well balanced and provide ample protein, carbohydrates, minerals and vitamins. Some animal protein should be included during a heavy breeding programme, e.g., eggs, bone meal and skimmed milk improve the volume of the ejaculate and the concentration and resistance of the spermatozoa, in particular. A mineral mixture may be advised where required, depending upon the environment.

Green feed (green lucerne, carrots, etc.), will supply the highly necessary carotene, ascorbic acid and vitamin E. The latter is however so widely distributed that it is now generally accepted that a natural deficiency never occurs.

As breeding of the thoroughbred takes place during a restricted

period of approximately mid September to mid December, the feeding of the stallion should start several weeks before and continue throughout the breeding season after which it should be gradually reduced. The best condition for breeding is a hard one, produced by sufficient exercise to work off surplus fat. It is generally regarded that a rising condition is better for reproduction than a falling one and experience bears this out.

Artificial Insemination

Artificial insemination is not permitted in the thoroughbred except to re-inforce a natural service. Its use therefore becomes limited to those mares in which there is a distinct cervical abnormality and where it is desired to convey the seminal pool from the vagina into the womb. Although special syringes are available for the purpose the use of the gelatin capsule is perhaps the simplest. The mare is prepared in the usual manner except that the tail bandage is an absolute essential. To decrease the amount of mucus in the vagina it may be douched with a tablespoonful of salt and bicarbonate of soda in a pint of water some two hours before service. After service the semen is collected by aspiration into a dry sterile bottle. A quicker way is to scoop the seminal pool out with the hand into a sterile glass dish. If there is a great deal of seminal fluid characterised by its stringy viscous appearance it is best to separate the two sections immediately by pouring off the sperm water. Otherwise filter through sterile surgical gauze.

After the semen has been collected it is poured into $\frac{1}{2}$ or 1 ounce gelatin capsules depending upon the size of the cervical canal and these are inserted as far into the uterus as is possible. Insemination is undertaken every second day of the heat period.

PATHOLOGICAL CONDITIONS

The Mare

Anoestrum : Anoestrum is the normal state of the filly until at adolescence the primary sex organs begin to function. Puberty may be delayed by malnutrition or impaired physical development. Hard training condition may postpone ovarian development and the return of the maiden mare to stud just before the breeding season is usually accompanied by a total lack of oestrum. Should oestrum occur there is every likelihood that conception will not follow. To my mind it is clear that although ovulation in all probability does occur, the cervical and uterine development has not kept pace and there is no endometrial receptivity to the fertilized ovum. It does seem however that injection of chorionic gonadotropin in doses of 1,000 to 2,000 units may considerably speed up gonadal development and effect maturity in those cases where periodic heat does occur.

Where complete anoestrum is found in the maiden mare, and

rectal palpation reveals hard, flat ovaries, the condition is often completely unresponsive to treatment. Such cases have been given pregnant mare serum in doses of 1,000 units daily for 5 days, chorionic gonadotropin up to 2,000 units and even single or repeated doses of 25 mgm. Stilboestrol or combinations of the foregoing, without avail. The treatment in such cases lies definitely not in the hormonal approach but in the nutritional preparation of the mare. She should be put on a balanced ration and given grazing on young vigorous growing cereals such as green oats, for at least 2-3 months before the breeding season commences.

Failure of the barren mare to come into season has been discussed. Very often this too is the result of incorrect management and unbalanced nutritional intake, particularly when the early spring rains are delayed in this area. Nevertheless, even where correct feeding is undertaken oestrum is frequently delayed and a careful examination of the genitalia is required to determine the cause.

The causes advanced for this condition are (1) pregnancy, (2) pyometra, (3) retained dead foetus, (4) debilitating diseases and pyrexias, (5) ovarian senility and sclerosis, (6) obesity (in all probability the result of decreased Thyroid activity), (7) nutritional disturbances.

Most of these are self evident and their correction requires no elaboration. Usually however very little is found, the genitalia and the mare being in apparent good health.

Induction of Oestrum

To induce oestrum I have found uterine distention coupled with Stilboestrol administration highly effective. Propamidine Intra-uterine (May & Baker) is used instead of saline in order to avoid too rapid absorption and because of its mild antiseptic and mucilaginous properties. Using strict antiseptic precautions, 3-4 fluid ounces are introduced into the uterus. This is repeated after 48 hours. After the second injection 25 mgm. Stilboestrol is injected subcutaneously in the perineal region. This procedure is usually sufficient to start oestrum within a few weeks. The first heat is usually abnormal and prolonged but it starts ovarian rhythm. The great majority of mares are not bred from the first heat as it is not known whether it is fertile or whether multiple ovulation may not occur.

Curtailment of Oestrum

Oestrum in the mare is usually of 4-7 days duration although sometimes it is very much longer. It is stated that more rapid maturation of the follicle can be induced by the injection of a 1,000 units of chorionic gonadotrophin intravenously, the follicle maturing within 30 to 40 hours. This would be of great practical value as the mare would be served once during heat, and the injection made within one hour after service. In theory pregnancy should result.

My experience with about 20 normal healthy mares has shown extremely contradictory results. Many mares continued their normal period undisturbed and did not conceive. A few went off heat within 12 hours after injection and a few are in foal.

Foal Heat

Mating is usually allowed on the 8-11th day after foaling, i.e., during foal heat. In my experience this practice is highly successful in young and vigorous mares. In older mares, particularly those showing little vitality, this is not the case. It seems that with advancing years or continuous foal bearing, the genital organs lose tone and that involution becomes very retarded. The uterus is still in a relaxed state at foal heat and contains accumulated discharges. Servicing at this time is ineffectual. There may be a distinct correlation between age and vitality on the one hand and the percentage conception during foal heat on the other. If this is correct it follows that the general practice should be (1) either to skip foal heat, or (2) to hasten involution and to serve at foal heat. To test this out the foal-heat service was avoided at Grootfontein School of Agriculture in the Percheron stud during the past season and old mares received 5-6 c.c. Pituitrin by deep intramuscular injection within a few hours after foaling. The results have been very gratifying.

Pregnancy

Habitual abortion. This usually occurs at 6-8 months gestation. In four such cases treatment was commenced one month prior to the time of the expected abortion and 10 mgm. corpus luteum extract injected intramuscularly every third day. The first case aborted twins, but the other three carried their foals to full term.

Whether the foetus in these instances could not produce sufficient hormones for the continuation of the pregnancy or whether the fault lay within the ovary is not known. The dysfunction may be hereditary.

Early foetal death has been ascribed to insufficient endometrial preparation, the genetic constitution of the ovum itself, or to corpus luteum deficiency. The embryo is usually not recovered and there is the likelihood that it may become reabsorbed.

There is a possibility that in this area green feed, particularly green lucerne, wilted by the sun or frost, may contain sufficient prussic acid to cause death of the foal without affecting the mother. Adult horses appear very resistant to geilsiekte.

A case is known where, due to an abnormally retracted anus, faecal matter continuously entered the vagina at the upper commissure causing a most persistent vaginal discharge. Abortion eventually resulted.

Old mouldy lucerne stacks are a frequent cause of severe outbreaks of urticaria accompanied by a high abortion rate.

Galloping often causes abortion although it is felt that some lowgrade endometrial inflammation must also be present. The abortion usually takes place 3-4 days afterwards.

Where early symptoms of abortion are detected timely intramuscular injection of up to 60 mgm. lutein hormone (progesterone) may avert the danger. It is however recommended that small doses of 10 mgm. be given every third day for a week or so afterwards.

Iso-Immunisation

The work on iso-immunisation against the Rh factor in humans has raised the question as to whether a similar condition may occur in horses.

Several instances of abortion of icteric foals at 6-9 months have been reported in this area.

In other cases the foal is normal at birth but becomes ill on the second or third day. The symptoms consist of sever jaundice, loss of appetite, weakness and coma. Death usually occurs within 48 hours.

In one such case specimens were sent to Dr. de Boom of Onderstepoort for histo-pathological examination. His report was as follows :—

" (1) Almost complete aplasia and fibrosis of the bone marrow with a number of echymoses ; irregular calcification in the epiphyseal line.

(2) Almost complete disappearance of lymphoid tissue in the spleen, the Malpighian corpuscles forming disintegrating islands in the pulp spaces occupied practically solely by blood — one could term this unusual lesion lymphoidolytic splenopathy.

(3) Hepatic oedema and nuclear degeneration of hepatic parenchyma cells. Intense bile pigmentation.

(4) Acute nephrosis.

(5) Lymphgland oedema and lymphoid aplasia.

(6) In constrast to the clinical evidence of rapid red cell destruction there is microscopically a hyposiderosis of all organs examined.

(7) In sections there is some evidence of leucocytolysis and leucopenia.

(8) Very early pneumonia.

It appears as lesions (1) and (2) and probably (5) are primary and the others secondary."

A second case was encountered two days after it had been born. The foal showed severe icterus and weakness. Blood was tapped and replaced by citrated whole mothers blood. An injection of " campolon " (Bayer) was also given. The foal made a slow recovery.

(*Continued on page* 31.)

A third case was the foal of a dam known to have previously produced icteric foals which died soon after birth. The serum of the dam was shown to agglutinate the erythrocytes of the foal. The foal was separated from its mother for 18 hours during which time she was milked out hourly. The foal was then returned and recovered completely.

It is maintained that the blood of the dam frequently contains too little antigen to cause foetal death but that the blood antigens are concentrated in the colostrum, thus causing haemolysis in the foal after birth. The antigen titre of the milk often drops very rapidly and can be markedly reduced by hand milking the mare hourly for the first 6-8 hours. If possible a nursing mare can be used.

Prevention consists in avoiding mating between known incompatable parents. Suitable laboratory blood tests could doubtless be devised to predict incompatability.

Twin Foals

The thoroughbred is peculiar in that twins are rarely carried to full term. Where twin foals are born one is usually much stronger than the other and the general practice is to destroy the weaker one.

Uterine Disorders

Mares are frequently encountered which fail to conceive despite a normal oestrus cycle and the absence of frank pathological changes of the genitalia. In such cases the mucus of oestrum may be cloudy instead of clear and transparent.

The cause of the infertility may be either inadequate preparation of the uterus for the reception of the fertilised ovum or low grade chronic endometritis. It is often impossible clinically to make a diagnosis but the following treatment can be applied.

Treatment should preferably be undertaken in July and early August. Under strict antiseptic precautions 4-6 ounces Propamidine Intra-uterine (M. & B.) solution containing 50,000 to 100,000 units penicillin is injected through the cervix into the uterine cavity. Two injections are given at 48 hour intervals after which 25 mgm. Stilboestrol is injected subcutaneously in the perineal region. The mares should then be put to grazing on young vigorous growing green pasture. After a definite latent period they will come on heat. The mares behave abnormally during this heat as they frequently attempt to mount one another. The heat period is somewhat prolonged and they should not be served during this period. The ovarian rhythm establishes itself and servicing should commence as soon after the 15th of September as possible. Should a mare not settle after three normal heats with services it is advisable to repeat the treatment with a different uterine disinfectant.

Cervical Disorders

A. Cervical constrictions. The anatomical deformities encountered either as a result of congenital malformation or more usually of strictures following parturition injuries, have been discussed. Surgical intervention is not indicated, but artificial insemination is employed to produce conception after a preliminary period of balanced feeding. The use of chorionic gonadotropin may prove beneficial in those cases where the cervix shows no sign of dilatation during oestrum.

B. Cervical infection. According to the literature a Streptococcus has frequently been isolated from barren mares, particularly those suffering from aero-vagina. Cervical swabs were taken from nine barren mares with a view of finding the bacterial growth in the cervix. The examination was performed during August, 1948, by Dr. E. M. Robinson, bacteriologist of the Onderstepoort Laboratories and his report is as follows : " Cultures have been made from the swabs but growth was only obtained from 1, 2, 4, and 7. Quite a variety of bacteria were obtained, but it does not seem as if any are of special pathogenic significance. The chief organisms were staphylococci of the albus and aureus type. There were also bacilli of the subtilis type and a few organisms that are probably air contaminants as well."

The numbers of mares examined are far too small to permit a definite opinion, but so far no streptococcal organism has been isolated that could be incriminated. Very much more work will have to be done on this aspect of the matter.

Vaginal Disorders

(a) Simple vaginal laceration is a frequent result of parturition with consequent infertility. Healing is slow and protracted, the tissues around the tear becoming infiltrated and very firm. A scab forms over the surface. The mare resents the stallion, heat is usually delayed, and service ineffective in all probability through the increased acidity of the vaginal content and the bacterial invasion of the cervix.

(b) Vaginal laceration complicated with intra-pelvic abscessation has been encountered. The vagina became constricted and the rectum occluded. Death eventually followed bursting of the bladder.

(c) Vagino-rectal fistula occurs when the foot of the foetus punctures both structures but is withdrawn before birth. In this condition infertility results and it may prove advisable to rest such a mare and to allow her to skip a season. Surgical intervention is essential.

(d) Complete vagino-rectal fission occurs when the foot of the foal punctures the two structures but is not withdrawn during birth. Stitching with catgut has proved useless and silk has to be employed to hold the structures. If foaling occurs towards the end of the season the mare should be allowed to skip the next season.

(e) Diphtheritic vaginitis of unknown origin resulting in barrenness has been seen, the entire vaginal lining is covered with pseudomembranes. Response to treatment is very slow.

Vulvar Disorders

Abnormal anal retraction has been mentioned as a cause of distorting vulvar position to a horizontal plane. The continuous entrance of faecal matter into the vagina throug the upper vulvar commissure results in a muco-purulent vaginitis which resists all forms of treatment. Death of the foetus and its abortion eventually follow.

Relaxation or injury to the vulvar sphincter muscle frequently leads to sucking wind into the vagina with consequent bacterial contamination of the genital tract. The treatment recomended is surgical and consists in peeling off the lining mucous membrane of the upper vulvar commissure and stitching or clipping the surfaces together. The operation is simple and is performed under local anaesthesia. Its evaluation is however difficult. The spontaneous recovery rate of genital affections on mares in good health is high. Furthermore the result of the operations is not always immediate, the mare frequently only breeding the next season or later. Mares treated by uterine medication without stitching have conceived without difficulty.

Where the vulva appears abnormally large and horizontal or where aero-vagina exists with the consequent risk of infection, uterine treatment should first be carried out followed by suture of the vulva.

In conclusion it may be stated that the whole gynaecology of the thoroughbred mare under South African conditions requires further study and investigation.

THE USE OF GASTRIC MUCIN IN THE EXAMINATION OF SPECIMENS FOR ANTHRAX

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Onderstepoort

Gastric mucin has been used by a number of investigators for the demonstration of bacteria when present in small numbers. Nungester and his co-workers(1) found that when B.anthracis was injected subcutaneously into rats its pathogenicity was greater when suspended in gastric mucin than in saline. The majority of workers have used the intraperitoneal route for their injections. This route is unsatisfactory for injecting material from specimens such as bonemeal, meatmeal or skins which are the usual ones sent in for examination for anthrax. If gastric mucin could produce its effect with subcutaneous injections, it would be applicable in anthrax diagnostic work.

Experimental Observations

The effect of 5 per cent gastric mucin on the pathogenicity of B.anthracis was compared with that of saline when the injections were given subcutaneously in guinea pigs. It was found that B.anthracis was considerably more virulent when injected with gastric mucin.

The mucin was prepared by adding 100 ml. of distilled water to 5 grams of gastric mucin, stirring it well and then placing it in flowing steam for half an hour. After this it was strained through gauze and distributed in suitable quantities into sterile test tubes. These were placed in flowing steam for one hour. No pH correction was made. The mucin gave satisfactory results at its usual pH of between 4.5 and 5 when prepared by the above method.

Examination of specimens for anthrax has been done up to the present by the method of de Kock, Sterne and Robinson(2). In this 30 grams of bonemeal or thin strips of skin are placed in 35 ml. of saline, mixed and heated for two hours at 65° C. The mixture is then stirred and allowed to settle for five minutes. Two guinea pigs are then each injected subcutaneously with 2 ml. of the supernatant fluid. This test is still carried out as before, but, in addition, two guinea pigs are each injected subcutaneously with 4 ml. of a mixture of equal parts of the supernatant fluid and 10 per cent gastric mucin. The mucin is prepared as described previously only 100 ml. of distilled water is added to 10 grams of mucin. It is distributed in 5 ml. amounts into test tubes prior to the final steaming. When the test is done, 5 ml. of the supernatant fluid from the specimen being tested is added to

the 10 per cent gastric mucin in the tube, the mixture shaken up well and 4 ml. of the mixture injected. The injections are done under the skin of the abdomen.

It was not found possible to dispense with the previous test entirely as the mucin also enhances the effect of any putrefactive organisms which may be present. This results in the death of guinea pigs whereas those injected with the supernatant fluid only, survive. The best results were obtained when the two tests were done concurrently.

Thirty-two routine specimens to which both tests were applied gave identical results in twenty-six cases. In two cases, one a bonemeal sample and the other a skin sample the presence of B.anthracis was demonstrated by the use of mucin and not by saline alone. In the other four cases the guinea pigs survived the saline injection but died from the effects of putrefactive organisms when the injection was given with mucin.

Conclusion

Gastric mucin can be used with advantage for the diagnosis of anthrax in specimens provided that there are not many putrefactive organisms present.

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(2) De Kock, G. v.d. W., Sterne, Max, Robinson, E. M. Sterilization of Bone Meal. *Jnl. S.A. Vet. Med. Assn., Vol.* 9, *No.* 4, pp. 138-141.

THE USE OF CARBAMYLCHOLINE CHLORIDE IN VETERINARY PRACTICE

(Compiled by R. Clark and J. I. Quin)

The Section of Physiology and Pharmacology, Onderstepoort, recently sent a circular to all practising veterinarians in the Union, asking them to report on their experience with the use of carbamylcholine chloride. Numerous interesting replies were received and we wish to thank all those that gave us the benefit of their experience.

The following notes have been compiled from the replies :

It must be remembered that carbamylcholine-chloride is a parasympathetic stimulant and as such not only causes increased motility and secretion of the digestive tract but also retardation of the heart, peripheral vasodilation and increased bronchial secretion. It also causes contraction of the urinary bladder and, in some species, of the uterus. Profuse sweating may be produced in horses.

The effects of even moderate doses on the circulatory and respiratory systems may be very severe in cases showing a pre-existing derangement of these functions. A thorough examination of the patient is therefore essential before the drug can be used with safety.

If necessary the effects of the drug can be counteracted by the administration of atropin.

As carbamylcholine chloride for use in large animals is usually made up as a 1,1000 solution, doses given in cubic centimetres should be read as containing 1 mgm. of the drug per c.c.

CATTLE

1. *Atony and Impaction (Primary)* : Numerous reports indicate success in mild cases. Doses suggested from 2 to 5 c.c. Small doses (2-3 c.c.) repeated at 30 or 60 minute intervals most favoured. Single large doses apparently usually unsatisfactory.

Several reports of fatality in severe and chronic cases. Good results reported provided the mass is softened previously by dosing sugar water, salines and oils. It is suggested that in chronic cases such treatment should be continued for 2-3 days before the drug is used. Small repeated doses of carbamylcholine to follow such premedication.

2. *Atony and Impaction as Complications of Anaplasmosis*: Very dangerous in advanced debilitated cases (this is probably due to depressing action on the heart superimposed on anaemia and general weakness). Small repeated doses to be used with great caution only after premedication. One correspondent reports very good results by

giving the drug *per os* (8 mgm. of the powder in a pellet of porridge four times a day). (The *per os* administration should receive more consideration.)

3. *Hoven* (acute): The majority of replies indicate that the drug is ineffective and dangerous when used alone. Good results are claimed for small repeated doses (2 to 4 c.c. every 45 minutes) if used in conjunction with antifermentatives and the passage of the probang.

(Acute bloat caused by lucerne may frequently occur despite the presence of active ruminal movements. In the majority of cases it is probably due to frothing of the ingesta which can be broken by turpentine.)

4. *Hoven* (sub-acute and chronic): Good results reported with small repeated doses.

5. *Retained Afterbirth*: Apparently very little used. Two colleagues report no success and one reports 50 per cent good results but states "the drug cannot be compared with stilboestrol."

6. *Plant Poisoning* (unspecified): One report of fatal results. (Clark — in press) has shown that carbamylcholine chloride does not restore motility in rumen paralysis due to prussic acid. In fact the severity and duration of the paralysis is increased. Furthermore the two agents combine to cause acute respiratory and circulatory failure. The drug is therefore strongly contra-indicated in prussig acid poisoning.

Note: It is reported that no cases of abortion have been seen despite the frequent use of the drug in cows up to eight months pregnant.

HORSES

1. *Impaction and Constipation*: Several reports of good results but all advocate small doses (1 to 2 c.c.) at ½ to 1 hour intervals. Should be used in conjunction with back-raking, enemas and oil and anodyne drenches especially in severe cases.

One correspondent reports good results in retention of the meconium in new-born foals in conjunction with enemas where these alone were not effective.

2. *Flatulent Colic*: Good results with small repeated doses.

3. *Urinary Retention*: Good results but possibility of obstruction must be eliminated before treatment.

4. *Laminitis*: Good results.

5. *Oedema of the Extremities following Strangles*: One reply claims excellent results in such conditions from the injection of 2 c.c. t.i.d. for two days. (The mode of action in such cases is obscure.)

6. *Azoturiea and Urticaria* are also mentioned as having been successfully treated by the drug.

Note: Several correspondents stress the necessity of preventing horses from rolling after treatment. The animal should be led by a reliable attendant until all reaction has passed off.

SHEEP

1. *Intussusception*: One report claims the successful treatment of this condition with the drug given after large doses of liquid paraffin.

DOGS

1. *Impaction*: Good results are claimed if used in conjunction with liquid paraffin *per os,* enemas and digital manipulation. Doses recommended are 2 to 6 mgm. *per os* or 0.15 to 0.25 mgm. *subcut.*

Eclampsia: Good results are claimed with 0.1 to 0.2 c.c. subcut.

PIGS

The drug is stated not to be very satisfactory when used on pigs. Doses of 3 to 5 c.c. may have little effect. (*Small repeated doses should be tried.*)

SUMMARY

It will be noted that the doses used by most veterinarians are considerably lower than those usually advocated by manufacturers. Small repeated doses apparently give very much better results than single large ones.

The drug is extremely active and can form a very valuable addition to our armoury provided it is used with discretion and caution and in conjunction with other suitable medication. On the other hand, it may be not only ineffective but also highly dangerous if looked upon *per se* as a panacea for all atonic conditions of the digestive tract.

RESULTS OBTAINED WITH MODIFIED ASCHEIM-ZONDEK PREGNANCY TESTS ON MARES

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Onderstepoort

In 1947 the routine testing for pregnancy of serum samples from mares was started at Onderstepoort at a charge of 10/- per sample. During the period November, 1947 to March, 1948, well over 200 tests were carried out. The owners were later asked to report on the foaling of the mares tested and the results are given in this paper. The majority of the tests were done on Thoroughbred mares but the results on a small number of Percherons are given separately.

Method: It is stipulated that samples must only be taken between the 40th and 100th days of suspected pregnancy and the date of the last service must be given. Sample bottles of 25 c.c. capacity each containing 5 c.c. of a 10 per cent boracic acid solution are issued. The blood is tapped directly into these bottles and despatched immediately. This method has proved entirely satisfactory.

Three immature female white mice, between 21 and 28 days old, are used for each sample. The mice are each injected with one c.c. of the serum subcutaneously on two successive days and killed for examination 48 hours after the second injection. The diagnosis is made on the reaction of the uterus and ovaries, the main criteria being follicular stimulation and the presence of blood-points on the ovaries.

Results: (a) *Thoroughbreds.* Subsequent reports were obtained on a total of 168 tested mares. Of these 117 had been given as positive, 47 as negative and 4 as doubtful (retested).

Of the 117 positive reactors, 102 foaled, 10 aborted and 5 gave no indication of having been pregnant.

Of the 47 negative reactors one foaled subsequently.

There were, therefore, six errors in 164 diagnoses. In other words the test was proved correct in 96 per cent of cases.

False Positive Results: As stated above 5 out of 117 positive reacting mares did not foal. As there can be little doubt that these animals were pregnant at the time of the test, the explanation may either be unobserved abortion or reabsorption of the foetus. The importance of this latter factor in equine infertility is not known. The

mares in question gave positive reactions between the 53rd and 72nd days of pregnancy, indicating that the death of the foetus occurred after this period.

False Negative Results: Only one mare gave a negative test during the correct period for sampling (61 days) and later foaled. This error in the test cannot be explained.

The Time of Testing: According to work done overseas the gonadotrophic hormone of pregnant mare serum appears at about the 40th day of pregnancy, reaches its height at about the 75th day and then declines to disappear about the 100th day. Two mares bled 102 and 129 days after service respectively, gave negative tests but foaled later. These are not included as errors as the specified time of testing was not adhered to. On the other hand 21 samples taken after the 100th day (maximum 133 days) gave positive results which later proved to be correct. There is undoubtedly a marked individual variation in persistence of the hormone. After the 100th day a positive result can be relied on but a negative result is of doubtful significance.

With regard to the earliest period at which mares can be tested, one animal gave a negative result at 36 days and a positive at 56 days.

As the practical value of the test depends on an early diagnosis, mares should be bled six to nine weeks after the last service. Animals which give a negative test at 6 to 7 weeks should be kept under observation for a further 3 weeks and then retested if they have not come into season. This procedure will not only eliminate wrong diagnoses due to the late appearance of the hormone in particular mares but will also indicate non-pregnant animals suffering from anoestrus.

The Incidence of Abortion: As shown above 10 out of a total of 117 pregnant mares aborted. In seven of these cases the dates of abortion were given, these showed that abortion took place at the following periods of pregnancy, viz., 168, 202, 249, 251, 270, 273 and 275 days. The cause of the abortions is not known.

Percheron Mares: A total of 21 Percheron mares were tested and later reported on. Of these 19 were positive and two negative. All these tests subsequently proved to be correct.

The Gestation Period: The dates of service and foaling were given in respect to 96 Thoroughbred mares and 19 Percherons. From these figures the gestation periods were calculated. Their distribution is given below:

Gestation Period (Days)	Number of Mares	
	Thoroughbred	Percheron
301-305	2*	0
306-310	1	0
311-315	1	0
316-320	5	0
321-325	11	3
326-330	17	1
331-335	20	6
336-340	21	6
341-345	10	3
346-349	8	0

* Both survived.

Discussion

These figures show that the test is very reliable (97 per cent correct over all figures including the Percherons) provided it is carried out during the correct period of gestation. A negative result is of no significance unless the time of suspected pregnancy is known. Mares showing a positive test should not be sold as guaranteed in foal owing to the possibility of reabsorption of the foetus.

TWO OUTBREAKS OF ANTHRAX IN EQUINES DUE TO INGESTION OF CONTAMINATED OATS

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East London

History

During the early morning of the 17th March, 1942, one horse and mule at the Municipal Stables, Klipfontein Road, Mowbray, Cape Peninsula, died, the only symptoms noticed by the foreman being that of colic.

Dr. E. C. Nelson, M.R.C.V.S., Municipal Veterinarian, conducted a post-mortem on these two animals, the only pathological changes found being a gastro-enteritis (no gelatinous infiltration and no enlarged spleen). Blood smears taken proved negative. A large number of animals were off their food. He concluded that the food was at fault, and suspected poisoning.

During the day three more animals died, and no post-mortem examination was made on them.

During the early morning of the 18th two more mules died and these were subjected to a post-mortem examination. In each case the characteristic yellow gelatinous infiltration and petechiae were in evidence and caused him to suspect Anthrax in spite of the negative blood smears of the previous day. Again in both cases the spleens were normal in size.

The blood smears taken from these two animals revealed only rare Anthrax bacilli in the blood smears but numerous Anthrax bacilli in the spleen smears.

Control Measures

All the equines in the stable were immediately inoculated, and as a point of interest some of the sick animals were done and some were left uninoculated. All the equines that were noted to be sick when the inoculation was carried out, eventually died, both the inoculated and non-inoculated ones.

No more carcases were cut into, and thorough and repeated disinfection of the stables was carried out. This was done by burning all manure and bedding. The mangers and floor were scrubbed and sprayed with cyllin fluid and chloride of lime. A huge trench was dug and the dead animals buried therein with about 150 lb. of chloride of lime to each animal. No treatment of the sick animals was attempted.

Dr. Nelson and Mr. Karney, the Stable Foreman, both of whom had been handling the infected carcases were examined and given a prophylactic N.A.B. injection by the Medical Officer in Charge of the Cape Town City Infectious Disease Hospital.

Approximately 10 days later Dr. Nelson unfortunately developed a malignant pustule on the left wrist and was successfully treated after a long illness at the abovementioned hospital. Injections of N.A.B. were used daily for the first three days and then M & B 693.

Courses and Symptoms

Deaths continued to occur until the 21st March, by which time a total of 11 horses and 16 mules had succumbed to the disease.

It was then considered that the worst was over, and the only further cases that occurred were one horse that died on the 26th March, and one mule on the 28th March. The former was a wellbuilt grey horse that was sick at the start of the outbreak, but showed wonderful improvement, and died rather unexpectedly.

Most of the cases appeared to be of the peracute and acute type, and most of the sick animals showed a high temperature, general depression, loss of appetite, accelerated pulse, laboured respiration, and dark bluish-red cyanotic mucous membranes, frequently studded with petechial haemorrhages. Some showed very sever colicky pains, and only 3 of the total of 29 animals that died showed the typical acute oedemateous swillings on the surface of the body, viz., one was swollen in the throat region, one in the scrotal region and one in the off fore shoulder and leg. Many of the sick animals also showed constipation during the early stages of the disease.

The following table gives the particulars of the deaths that occurred :—

Date	Horses	Mules	Total
17th March	2	3	5
18th March	2	4	6
19th March	4	3	7
20th March	1	5	6
21st March	2	1	3
26th March	1	–	1
28th March	–	1	1
	12	17	29

Origin

At the time of the outbreak there were 69 equines in the stable, but 14 of these had been introduced on the 16th March. None of these 14 animals became sick or died. Of the 55 animals that were originally in the stable, over half succumbed to the disease.

On investigation it was found that during the week previous to the commencement of the deaths, oats from a blood-stained bag had been fed to the animals, and a portion of this oats was only reluctantly eaten after it had been dried in the sun. The fact that each animal received 1 lb. of oats per day further pointed to infected oats as the source of infection.

The bag in question was submitted to the Government Pathologist, Public Health Laboratory, Cape Town, who found Anthrax spores present on the stained portion, thus proving that the animals had literally been dosed with Anthrax infected oats.

For a year or two after this outbreak all equines were regularly inoculated against Anthrax every 9 months and all introductions inoculated at least 14 days before introduction, and no further mortality took place.

It is of interest to note that another outbreak of Anthrax occurred among some horses belonging to the A.I. Ice Cream Factory, Gardens, Cape Town, at exactly the same time, with symptoms of gastro-enteritis again being predominant. No infected bag could be traced in this instance, but it is significant that the oats fed to these animals was supplied by the same firm that supplied the infected consignment of oats to the Mowbray Municipal Stables.

At this time bags were extremely scarce, and no doubt some farmer when bagging his oats crop, either through carelessness or ignorance, used one or two bags that had become contaminated probably from a beast that had died of Anthrax, and thus caused the death of a number of valuable equines, which cost the Cape Town Municipality over £1,000 alone for replacement of the animals, not to mention the medical expenses involved in Dr. Nelson's treatment and recuperation.

The above are again instances where prevention is better than cure, and had this particular farmer been made aware of the danger of opening suspected Anthrax carcases, by means of film or other propaganda, he would no doubt have never allowed the carcass in the first case to have been opened, and would certainly not have put down bags and have allowed these to become contaminated with blood and then have used them for bagging his crop of oats.

One wonders what would have been the outcome had these bags of infected oats been used for human consumption.

Summary

Two outbreaks of Anthrax in equines due to feeding of oats contaminated with Anthrax spores have been described.

Acknowledgement

Sincere thanks is expressed to Dr. E. C. Nelson, Director, Maitland Abattoirs, Cape Town, for supplying certain data and for revising this article.

PRELIMINARY NOTE ON VENENATIN, A GLYCOSIDE FROM THE BARK OF ACOKANTHERA VENENATA G. DON.

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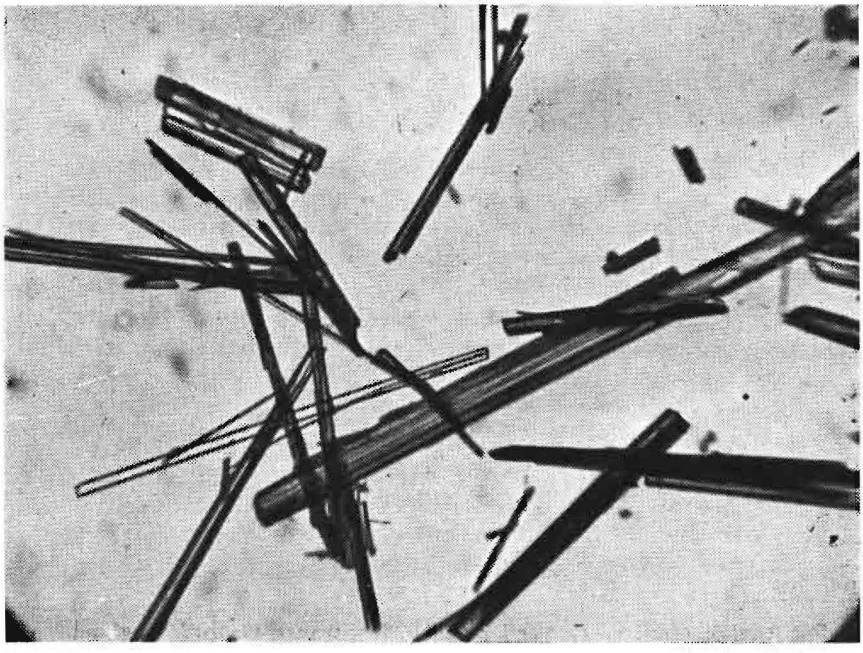
(Received for publication 21st May, 1949.)

Acokanthera venenata is a species, well-known in South Africa. Common names for this tree are "Poison Bush," "Bushman's or Hottentot's poison bush." (Afrikaans: "gifboom.")

The material for this research was collected in the Pietersburg district, Transvaal. The cold, aqueous extract of the bark was shaken, firstly with ether and then with chloroform. The chloroform extracts were clarified and dried over anhydrous Na_2SO_4 and concentrated when venenatin crystallizes out on standing. After four or five recrystallizations from chloroform, the glycoside is obtained pure.

Venenatin crystallizes from chloroform in long, colourless, prismatic needles (fig. 1) which sinters at 163° C. and melts at 230° C. (Kofler micro-melting point apparatus). It crystallizes with chloroform of crystallization. It may be crystallized from methanol or dilute ethanol when it melts at 163° C.



Venenatin is very soluble in ethanol, methanol (hot), dioxane and acetic ether. It is weakly soluble in cold chloroform, sparingly soluble in water and insoluble in ether and petrol ether.

Venenatin gives a positive Legal-test.

Venenatin has a specific rotation of —57.2° in abs. alcohol at 27° C.

In the lactone-titration of the glycoside, the following molecular weights were obtained : 565, 562, 543.

The following combustion analyses were obtained on the glycoside, crystallized from chloroform and dried to constant weight in high-vacuum at 110° C.* :—

	63.24	8.27
	63.19	8.46
	62.66	7.87
Calculated for		
$C_{29}H_{44}O_{10}$:	63.02	8.03

Venenatin is a rhamnose glycoside.

An investigation on the cardiac activity of venenatin, by N. Sapeika, of the Cape Town University, will be published within a short time.

The investigation is being continued.

* Analyses by Drs. G. Weiler and F. B. Strauss, Oxford, England.

CASE REPORTS

EQUINE TRANSIT TETANY

B. M. McINTOSH,
Port Shepstone

History

The subject was a 4 years old native-type horse mare which had been purchased in Bethlehem by a Port Shepstone speculator. It was railed together with 15 other horses, in the same truck, from Bethlehem on Tuesday, 13/4/48 and arrived in Port Shepstone on the Thursday; a journey of approximately 300 miles. When the animals were offloaded this mare was noticed to be stiff in the front limbs and there were jerking movements of the head down towards the front limbs.

Symptoms

I saw the mare 8 hours after offloading and by then the symptoms were marked. These were typical and as described in the textbooks. An unusual feature, however, was that there was a marked swelling of both supraorbital fossae and the eyelids were swollen partly obscuring vision. The violent tonic muscular spasms were bilaterally symmetrical and were more marked in the head, neck and forequarters. There was no protrusion of the membrana nictitans as occurs in tetanus. Although the mare remained standing respiration was extremely difficult.

Treatment

The mare was given intravenously 20 grammes of chloral hydrate as a 10 per cent solution in water. There was immediate relief ; the spasms ceased and the mare passed into a state of stupor. She remained standing but had to be supported. Owing to the marked improvement no further treatment was given and the following day she was eating well although her gait was slightly stiff. A few days later she was perfectly normal and the owner had no trouble in disposing of her to a buyer.

Comment

As there is supposed to be present in equine transit tetany a hypocalcaemia and a hypomagnesaemia total and quick recovery in this case without calcium therapy warrants mention. In country districts soluble calcium salts are not always readily available so that chloral hydrate on occasions might be a useful alternative treatment.

Taking into consideration the great distances which equines are transported in this country transit tetany does not appear to be as

common as in other countries. During the last war the S.A. Veterinary Corps transported to Durban and Pinetown by rail from most parts of the Union several thousand horses, amongst which a fair percentage were pregnant mares, without experiencing a single case of transit tetany. It is possible that the poor condition of the average pony taken off the veld is a factor acting against the more frequent occurrence of this condition.

SUSPECTED D.D.T. POISONING

W. J. NIXON,

Fort Victoria

A certain well-known brand of D.D.T. in 30% oily emulsion was broken down in the proportion of 1 in 40 with rain water and used to spray turnips. Two days later a heavy rain of about ¾" fell, and the following evening 6 or 8 turnips were pulled and the tops fed direct to two pet rabbits.

It was noted the following morning that the one rabbit, a fully mature 2 years old white doe, was lying on her side shivering and kicking uncontrollably at intervals. Muscular contractions were rapid, involving the entire system, and were almost continuous, although varying in intensity. She was conscious but lacked any muscular control. Pulse and respiration were too rapid to record while temperature was subnormal. The other rabbit, a buck, temporarily in the same hutch, was showing the same shivering fits to a lesser degree, but had sufficient control to lie in a natural resting posture.

By 11 a.m. the doe had become cyanotic and at noon died with a faint squeak. The buck showed symptoms all that day, but that evening ate a little beetroot and carrot, recovering by the following day.

Discussion

(1) Was the D.D.T. the cause of the symptoms ?

(2) D.D.T. in solution 1 in 130 was used, not more than ¼ lb. of turnip tops could have been consumed by each rabbit with possibly 1 oz. of the evaporation solution being ingested.

(3) Rain did not wash off the D.D.T. apparently.

(4) What effect would the D.D.T. have had if the turnip tops had been cooked for human consumption ?

THROMBOSIS OF THE POSTERIOR VENA CAVA IN A COW

J. R. FREAN,
Potchefstroom

On my return from leave last July, I was asked to attend to a young Friesland cow that had been ailing for about a fortnight. The history was that she had started purging profusely, had lost condition rapidly and had gone off her milk completely. She was in her second lactation but was not a heavy milker.

When I saw her she was in a near-emaciation state. She was still feeding but had a very capricious appetite. Her tail and hind quarters were soiled with dark-coloured watery faeces.

I was unable to arrive at a definite diagnosis and as she had been but a poor milker and was in a precarious condition we decided to destroy her.

On opening the abdomen I was immediately struck by the enormous, almost black, liver, which seemed to occupy nearly as much space in the right, as did the partly empty rumen in the left abdominal cavity. On section the black colouration extended irregularly about an inch below the surface.

The remaining tissue was somewhat darker than normal. Throughout, the lobules were prominent giving the liver an appearance not unlike that of the pig.

When I handled the liver I felt a hard streak through the diaphragm and thought that I had encountered the track of a foreign body. Further examination however, showed this to be posterior vena cava with walls thickened to approximately those of the aorta. Inside was a tapering thrombus projecting cranially from the liver for about nine inches. At it's caudal end the thrombus was very dark brown and completely filled the vein to whose walls it was adherent. From here it tapered gradually forward, becoming lighter up to the cranial third which was light buff in colour. The tapering end was surrounded by soft mucus-like material giving the impression that the thrombus was being dissolved gradually from before backwards.

TWIN " MONSTROSITY " IN COW

S. W. DE VILLIERS,
De Aar

History

A Registered Friesland Cow revealed a badly swollen foetus in the form of a rounded fleshy mass. As far as the arm could be inserted nothing else could be felt either anteriorly, posteriorly or laterally. There were no signs of any head or limbs. Delivery was attempted

by the insertion of numerous hooks and traction and also by piece-meal dissection but owing to the swollen state of the foetus delivery proved ineffectual.

Post Mortem

The animal was slaughtered and post mortem revealed a " monstrosity " along with a normal heifer calf lying anteriorly. The two hind legs are shown in the accompanying snaps with a body tapering to a point and with no neck or head attached. The appendages seen on the outside of the abdominal wall on section showed tissue resembling that of lungs and udder. Abdominal section revealed two rudimentary ribs only. They were about four inches long. A few coils of intestines were also seen but for the remainder, the cavity contained a mass of tissue only.

LETTERS TO THE EDITOR

64, Malan Street,
Riviera,
1st December, 1948.

The Honorary Secretary,
S.A. Veterinary Medical Association,
Pretoria.

Dear Sir,

On behalf of Lady Theiler, I wish to thank you for your kind words of congratulations on her eightieth birthday.

Also she asks me to convey to you, and through you, to your Association, of South African Veterinarians, her thanks for the very handsome as well as useful gift, which you, in association with the Onderstepoort staff gave her as a token of your appreciation of her contribution in the past to the welfare of Onderstepoort and of the profession. She is very proud of the honour shown her.

Sincerely yours,

(Signed) G. THEILER.

The Editor,

Dear Sir,

Ovariotomy of the Bitch

As you are aware a Government Veterinary Officer in South Africa has very little opportunity of becoming proficient in the surgery of small animals. Not only is it not his job but the lack of contact with his colleagues and the absence of assistance and facilities make it very difficult for him to get any experience even in his spare time. Recently, however, we had the rather unique experience of being two Government Veterinary Officers stationed at the same town and, in the absence of a private practitioner, we eagerly sought out surgical cases. Most of our operations were ovariotomies, which we performed turn and turn about, exchanging position of surgeon for nurse and vice versa.

At first we adhered to the conventional Ventral incision but were often disturbed at the difficulty experienced in hooking up one, or both, ovaries and also by the restriction of movement imposed by the shortness of the ovarian ligaments — particularly the right. Seldom were we able to bring forth either, or both, without having to "guddle" for a longer or shorter period — mostly longer; the omentum always seemed to be in the way! On occasions the unsuccessful surgeon made way for the assistant to complete the "fishing" operation. That all our patients made uneventful recoveries says more for the bactericidal properties of the

peritoneum than our operative skill. Then calling to mind the relative ease with which Professor W. M. Mitchell of the Royal Dick had been seen by one of us (F) lifting ovaries out of dogs' and cats' flanks, we decided to try this method.

We found a litter of mongrel pups and sacrificed one to map out the operation site and were immediately struck with the ease with which first the one ovary was taken through the flank and then the second through the other. We spayed the remaining bitches of this litter and were delighted to find that not only could an operation be performed in a very few minutes but that we were able to do so without our fingers touching the wound or entering the peritoneal cavity: also that the operation could be performed through such a small wound that suturing of the peritoneum and muscle layers became unnecessary. In a short while either of us was able to complete the operation from incision to last suture in less than fifteen minutes.

This method of spaying bitches, for which we claim no originality does to our mind render the operation a relatively small matter well within the capacity of other operative tyros. We feel that our erperience might be of value, particularly to those of our colleagues who work alone.

We found too that the younger the subject the more easily could the operation be performed and the more rapidly did the wounds heal. We consider pups just before weaning to be the ideal subjects for the operation.

The Operation

Preparation: Ordinary food allowed on day before operation. On day of operation only water given.

Instruments: 10 cc. syringe with fine needles, and nembutal. Primus or blow lamp, scalpel, 6 artery forceps, 1 rat-tooth dressing forceps, 1 blunt nosed scissors type forceps, small soldering bolt, 2 needles and silk and 1 pair surgical scissors.

Technique: The subject is anaesthetised with nembutal. Both flanks are then shaved with a safety razor whose guard has been removed — the area cleared being the depression bounded by the last rib, the tips of the lumbar transverse processes and the pelvis. The site washed with soap and water then swabbed with methylated spirits and, finally, ether.

The Incision: An inch long in small pups, and slightly longer in larger animals is made slightly anterior to the centre of the flank in a caudo-ventral direction in line with the fibres of the external oblique. A grid-iron incision is then made through the three layers of muscle. The peritoneum lies in very close association with the inner surface of the transversus abdominis: on penetrating the latter, the former is recognised by it's glistening appearance. An opening is made just large enough to admit the nose of the blunt forceps. One edge of the peritoneal opening is siezed with a Spencer Wells and the blunt forceps inserted in a dorsal direction, at the same time lifting it slightly against the inner abdominal wall. It's tips will become arrested in the angle formed by the bodies and transverse processes of the lumbar vertebrae in which neighbourhood the uterus and ovary have become exposed to manipulation through gravitation of the intestines. Open the forceps and lightly grasp loose tissue and

bring it through the opening where it will be found to contain either the ovary or the uterus or both. When first we tried this "lucky dip" method we were amazed at our apparent luck in picking up ovary or horn so easily each time until we realised that from a properly chosen site there was virtually nothing else to grab. A Spencer Wells is now closed over tissue between the ovary and the tip of the horn, and the ovary and loose tissue removed with scissors and the cut surface sealed with the heated soldering bolt. The horn is then released and it falls back into place. The skin wound is closed with one or two mattress sutures — mostly one only is needed. The wound surface wiped dry and covered with a small wad of dry cotton wool when the patient is turned over and the operation repeated on the opposite side. The animal is then kept in a warm place until it recovers from the anaesthetic.

After Care: Keep the patient warm until the effects of the anaesthetic have worn off, then allow repeated small drinks of water or milk. The sutures can mostly be removed in 24 hours and, in any case, not later than 48. Otherwise no particular care is required except to ensure that the animal does not have too large meals for a few days. The only casualty experienced to date was a case where the owner foolishly overfed a spayed pup, when the abdomen became so distended that the wound opened up with hernia ensuing.

This simple method of spaying bitches obviates (a) entry with fingers into peritoneal cavity, (b) intra abdominal ligatures, (c) peritoneal and muscle-layer sutures, (d) covering of wounds. We found that by drying the skin wounds and leaving them uncovered healing is so stimulated as to permit of removal of sutures in 24 hours. On the other hand, covering them keeps them in a soggy state which delays healing and forms a suitable medium for bacterial growth. We also found that where sutures were left longer than 48 hours there was a tendency towards suppuration, whereas early removal prevented this.

Yours faithfully,

J. R. FREAN.
M. DE LANGE.

PASTEUR'S OPINION OF THE VETERINARIAN*

Cholera broke out in Egypt in 1883 and, on Pasteur's suggestion, a scientific mission consisting of Straus, Roux, Thuillier, and Nocard, all Pasteurians, was fromed to study the disease. Nocard was professor of pathology and clinical medicine at the Alfort Veterinary College and

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*Abstracted from the article —
Quelques pages d'histoire de la bacteriologie et de l'immunologie.
A propos del' épidémie recente de choléra en Égypte.
La decouverte du Vibrion cholérique.
Ses conséquences.
G. Ramon and A. Delaunay with the collaboration of Mme. Marcelle Delaunay-Ramon.
Rev. d'Immunologie (1948), 12, 3-4, 141-189.

J.H.M.

Pasteur says of him that " he will bring his deep knowledge of contagious microbial diseases into the research work."

However, things did not move as quickly as Pasteur's colleagues would have liked. In France, one must always reckon with administrative delays. Further, Nocard was, on the authority of those in high places, to be replaced by Mahé, a doctor specializing in sanitation. This proposed elimination of Nocard upset his colleagues considerably. Pasteur wrote a letter to the responsible Minister and some passages are given:—

" As to M. Nocard, it appears that he will be left out of the mission. If this is so, I will regret it very much indeed, for two reasons; first that M. Nocard will certainly be hurt if he is deprived of the honour of being a member of the mission after having been approved by the Advisory Committee (Comité Consultatif). This is a question of personal dignity that affects me because of my friendship for, and the esteem in which I hold, this learned professor of the Alfort College; however, because of the big things at stake I do not consider this of first importance. The second reason is much more serious: as I see it, the absence of M. Nocard could very seriously prejudice the work of the mission. The great difficulty in the study of human infectious diseases is the impossibility of making experiments on man. My research programme includes many experiments on animals. A big step forward will have been made when cholera is transmitted to an animal. It is in this connection, Monsieur le Ministre, that the presence of a veterinarian appears to me absolutely necessary. Fnally, this morning I received a letter from Mm. Strauss, Roux, and Thuillier saying that they made it a point of honour not to be separated from M. Nocard.

I beg of you, Monsieur le Ministre, seriously to consider the honourable and patriotic devotion of M. Nocard and his colleagues in their eagerness to go and live in the midst of an epidemic area, ————. I do not ask for the substitution of M. Mahé by M. Nocard; on the contrary, I am pleased that a sanitary expert has been nominated, but I attach an extremely high importance to M. Nocard's inclusion. As I said before, his presence appears indispensable to me.

May I, Monsieur le Ministre, have full confidence in your final decision. The urgency of this decision is such that I would deem it a favour if you would send a telegram to Arbois (where Pasteur was living).

I have the thonour,

etc.,

L. PASTEUR."

Pasteur won his point, and Roux, as Chief of the mission, received the following letter from the Minister of Commerce:—

" Sir,

I have the honour to inform you that, as from to-day, you have been put in charge of a scientific mission to study cholera in Egypt. As collaborators, you will have Drs. Strauss, Thuillier, and Nocard.

An allowance of forty thousand francs has been granted. I have

no doubt that the studies you are about to undertake, under the auspices of your illustrious master, will help to enrich French science.

I am, etc.,

MINISTER OF COMMERCE."

To complete the story, it should be said that Koch and his colleagues appeared on the scene in Egypt. They concentrated on examining the intestinal flora and demonstrated the cholera vibrio, whereas Roux and his workers tried, unsuccessfully, to isolate the responsible microbe from the blood. Koch returned to Germany in a blaze of glory and Roux, Strauss, and Nocard, very dejected and crestfallen, rejoined Pasteur in France. Thuillier, sad to relate, fell a victom to the disease he was helping to investigate.

THE TREATMENT OF STERILITY IN COWS

In view of the increasing use of hormone and vitamin preparations for the treatment of sterility in cows, I should like to direct the attention of your readers to the folowingl paragraph taken from an article by W. J. Gibbons under the title " Progress in the Treatment of Dairy Cattle Diseases," and published in the " North American Veterinarian," Vol. 29, No. (1948), page 638. The paragraph reads as follows:—

" The term ' functional sterility ' is being used more and more in relation to cattle. In my opinion only a small percentage of sterility in cows can be directly ascribed to a definite dysfunction. The poor results following the empirical use of vitamins and hormones seem to support this contention. To the cattle practitioner who is examining many sterile cows, the impression that functional sterility is highly prevalent is fostered by the result of his examinations, which may show that 50 per cent of the cows examined are normal insofar as he can determine. Many years ago, the author cultured and sectioned a large number of genital organs which, in the live animal and after slaughter, were apparently normal. Cultures, in a large percentage of the cases, showed streptococci and staphyloccocci. Microscopic endometritis and salpingitis were common lesions."

Although no statistics are available it is felt that infection is by far the major cause of sterility in cows in South Africa. Such infection may be specific or non-specific in nature and either active or latent at the time of examination. Diagnosis is especially difficult in regard to latent infections. It is definitely inadvisable to use gonadotrophic hormones such as pregnant mare serum where the possibility of latent infection has not been rigidly excluded. Such treatment may result in a flaring up of the infection. Only in individual cases of primary functional sterility can such treatment be advocated with any hope of success.

J. I. QUIN.

The Editor,

Dear Sir,

The use of Pregnant Mare Serum on Bitches

The following reports of the successful use of P.M.S. on three cases of sterility in bitches may prove of interest to your readers.

Case 1

Fox Terrier bitch, age 5 years.

Previous History: Regular prolonged oestrus periods with failure to conceive.

Diagnosis: Failure of ovulation during oestrus.

Treatment: 2 c.c. P.M.S. on 25/5/48. Served 29/5/48, 31/5/48 and 4/6/48.

Result: Whelped 6 pups on 2/8/48.

Case 2

Bull Dog bitch, age 4 years.

Previous History: Several oestrus periods but refused dog on all occasions. Forced mating useless.

Diagnosis: Sexual hypofunction.

Treatment: 2 c.c. P.M.S. on 4th day of oestrus and served naturally 4 days after injection.

Result: Whelped 6 pups.

Case 3

Bull Dog bitch. Age 3 years.

Previous History: Never pregnant despite regular oestrus and frequent mating to proved sires.

Diagnosis: Failure to ovulate.

Treatment: 2 c.c. P.M.S. on 4th day of oestrus, served 4 days later.

Result: Pregnant.

As both the litters so far obtained after the use of P.M.S. are rather large for the breeds, it would appear that a superovulation may have been brought about and that a smaller dose should be used.

E. O. LE RICHE.

TREATMENT OF SNAKE-BITE IN 1820*

" The following singular remedy is much used by the Hottentots, and by many of the colonists, who have borrowed it from them. When a

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* Culled from the book: " Narrative of a Residence in South Africa," by Thomas Pringle (London: Edward Moxoxn, Dover Street, 1835).

Thomas Pringle was an 1820 Settler who led his party to, and established them at, Glen-Lynden on the Baviaans River.

person is bitten by any of the more venomous snakes, a domestic fowl is instantly procured, and the fleshy part of the breast cut open, it is pressed fresh and palpating to the wound. The virus is, by this means, rapidly abstracted; and if the poison is very deadly, the fowl speedily exhibits clear proof of its malignancy, becomes drowsy, droops its head, and dies. It is then withdrawn, and a second is cut open and applied in the same manner — a third, if requisite; and so on, until it appears, from the decreased influence of the poison on the fowls, that its destructive virulence is effectually subdued. The worst crisis is then considered to be past, and the patient in most cases recovers."

"An instance of the successful use of the above remedy was mentioned to me by Mr. Wait, a Scotch farmer at Camtoos River, near Algoa Bay. His youngest child, a fine boy of about three years of age, while playing in the garden, had stumbled on a very large puff-adder, and was bit by it. The mother (to whom the terrified infant betook itself, lisping out that a "big worm" had bit it) instantly cut open the breast of a fowl, as she had been previously instructed to do by the Hottenots, and applied it to the part. In a few minutes the animal sickened and died. A second was applied and died also. A third was so much affected by the venom as to appear giddy and stupid, but survived the operation. The child was then made to drink largely of sweet milk; the limb was placed in a running stream, and afterwards smeared over with tar, which gradually removed the violent inflammation, and the livid hue which had begun to spread over it; and in the course of a few days the parents enjoyed the happiness of seeing their child (rescued by this means alone from a frightful death) once more restored to perfect health."

J.H.M.

HORSE PRACTICE

Notes from Current Literature

Prepared by The Jockey Club of South Africa

EXTRACTION OF WOLF TEETH FROM THOROUGHBRED HORSES

In the Questions and Answers column of "The Veterinary Record" of 11th September, 1948 (Vol. 60, No. 37, p. 445), the answerer states that the secret in extracting wolf teeth is to get a firm grip and then rotate the tooth outwards to crack the outer alveolar wall. When this is done the tooth almost falls out. He advises against direct pulling. He states that he has known cases of improvement following the extraction of these teeth, but while they undoubtedly interfere with proper mastication, they are more important with reference to bit control, and many horses do not go well until the wolf teeth are removed.

LEY FARMING

In a paper presented to the Yorkshire Division of the N.V.M.A., published in "The Veterinary Record," of 21st August, 1948 (Vol. 60, No. 34, p. 406) H. I. Moore deals with ley farming and states that by ley is meant arable land under grass which has been laid down to pasture or for hay for a specific purpose and for a prescribed number of years, after which it will be ploughed up again and cropped according to rotational practice. At the same meeting R. H. Smythe dealt with the veterinary aspect of ley farming. From the South African point of view the remarks made by Smythe on the effect of ley farming on fertility are interesting. He says that there are undoubtedly basic differences in new leys which do not satisfy the requirements of the animal; while rapidly growing grasses contain estrogenic substances which stimualte oestrous, they are also capable of upsetting the hormone balance, particularly the complicated estrogenic and lactogenic balance of the anterior pituitary.

The foaling-rate in many thoroughbred studs in South Africa is very low, and on some of these the pasture consists almost entirely of green crops.

EQUINE ABORTION

In a short note by Bruner, Edwards, Doll and Moran, in "The Cornell Veterinarian" for July, 1948, p. 313, the authors state that of the aborted equine foetuses examined by their department approximately 17 per cent are streptococcic abortions, and the streptococci are invariably beta-haemolytic cocci, which ferment lactose and sorbitol and belong to the Lancefield group. Their note describes the isolation from an aborted foetus of a motile streptococcus belonging to group D. It seems that the streptococci in that group have been found in cheese and parturient women, and are not known to be pathogenic. The authors considered it responsible for the abortion.

PROBLEMS ASSOCIATED WITH INFERTILITY IN THE MARE

Sefton in a paper presented to the A.V.A. Conference, Sydney, (published in the "Australian Veterinary Journal," Vol. 24, No. 9, p. 245) surprisingly states that it is important that foaling mares be served 8 to 10 days after parturition. (This has been the practice for generations but evidence questioning the wisdom of this practice is accumulating.) In a discussion on this paper one speaker stated that fertility from mating at this heat was about 20 per cent worse than at later heats. One speaker mentioned (though there was nothing to indicate that it was made in semi-humorous vein) that he had recently seen an article referring to the existence of an hereditary class of persons in Arab communities who were experts in diagnosing pregnancy in camels by tasting the urine.

In "The Australian Veterinary Journal," Vol. 24, No. 6, p. 152, there is a valuable summary of an address delivered by Bain to the Australian Veterinary Association, N.S.W. Division. Bain had spent a season at Claiborne Stud in Kentucky (one of the biggest and most successful in America). The paper is based on the methods and practice of Caslick at that stud, and will well repay study by anyone engaged in thoroughbred practice.

Teasing: He thinks that lack of attention to this most important detail is the cause of much temporary sterility, especially in mares with foals at foot. He advises teasing every other day after an oestral period.

Optimum Time of Mating: Hammond estimated that ovulation occurs between 48 and 24 hours before the end of the oestral period, irrespective of its length, and, therefore, mating should not take place at the beginning of the period. At Claiborne Stud mares are served at the beginning of the periodand of 1,978 mares bred, 1,576 or 79.7 per cent became pregnant. Caslick took 615 more or less normal periods and classified them according to the day on which the mares were bred and the results were:—

Service on the 1st day of the period	63.1% conception.
Service on the 2nd day of the period	65.0% conception.
Service on the 3rd day of the period	64.4% conception.
Service on the 4th day of the period	55.7% conception.
Service on the 5th day of the period	39.1% conception.
Service on the 6th day of the period	28.5% conception.
Service on the 7th day of the period	20.0% conception.

American work indicates that the survival of sperms is seldom longer than 48 hours. Caslick suggested that the optimal vaginal health was during the first three days of the oestral period, which possibly leads to an increased survival time, or else the time of ovulation is not as clear-cut as Hammond thought. Whatever the explanation, Caslick's figures support the practice of early mating.

Foaling Heat: Only about 36 per cent of mares served during the foaling-heat became pregnant. When mares are not bred until the second heat, the percentages, and also the final or ultimate percentage for the season, are higher. Of 66 mares bred on the 9th day 33 per cent became pregnant to that service and 75 per cent became finally pregnant. Of 30

mares bred on the 10th day 36 per cent became pregnant to that service and 73 per cent became finally pregnant. Of 41 mares bred at second foaling-heat 63 per cent became pregnant and 88 per cent became finally pregnant. It is, therefore, recommended not to breed a mare until the second foaling-heat, except late in the season. Caslick states that an unhealthy uterus is expressed in terms of a weak and sickly foal or in abortion. In view of the common practice to serve the mare during the foaling-heat, it is as well to repeat Caslick's advice that no mares should be bred during the foaling-heat that have:—

1. Retained their placenta in part or whole for over six hours.
2. Given birth to a sickly or dead foal.
3. Had an active uterine discharge, determined by speculum on the on the 6th day.
4. Sustained extensive bruising or laceration during foaling.

Aspiration of Air into the Vagina: This is one of the most common causes of infertility in the mare. Caslick prefers to operate for this condition during oestrous, as it can then be done under local anaesthetic without a twitch. The skin-mucous junction is scarified down from the dorsal commissure of the vulva on both sides and the scarified surfaces are then united, preferably with closely spaced Michelle clips which can be removed on the 6th day. The commonest fault is that the extent of suturing is inadequate. During service the sutured area must be protected by a cross suture "at the central extremity."

The Jockey Club of South Africa subscribes to the following Journals:—

American Journal of Veterinary Research.
Animal Breeding Abstracts.
Australian Veterinary Journal, The
Blood-Horse, The.
Canadian Journal of Comparative Medicine.
Cornell Veterinarian, The.
Journal of the American Veterinary Medical Association.
Journal of the Royal Army Veterinary Corps, The.
Journal of the South African Veterinary Medical Association, The
North American Veterinarian, The.
Onderstepoort Journal, The.
Racing and Breeding.
Thoroughbred Record, The.
Thoroughbred, The.
Veterinary Journal, The.
Veterinary Medicine.
Veterinary Record, The.

These Journals are available on loan, free of charge, to any Veterinarian. Applications should be addressed to:—

The Keeper of the Stud Book,
P.O. Box 3409,
Johannesburg.

BOOK REVIEWS

"THE PHYSIOLOGY OF DOMESTIC ANIMALS," by H. H. Dukes. 6th Edition. 1947. Comstock Publishing Co. Inc., Ithaca, New York.

The latest edition of this well-known text book contains almost 100 pages more than the last. The main expansion is in the chapters on blood, ruminal digestion, carbohydrate metabolism and the male generative system. A new chapter on growth has also been incorporated.

The whole text has been revised where necessary and numerous later references have been cited.

With this new edition "Dukes" will certainly maintain its place as the standard text book on Physiology for the veterinary student and practitioner alike.

R.C.

"PREGNANCY DIAGNOSIS TESTS: A REVIEW," by Alfred T. Cowie. 1948. Commonwealth Agricultural Bureaux Joint Publication No. 13.

This book of 283 pages is closely packed with information on the diagnosis of pregnancy in domestic and many other animals. For the purpose of comparison much information on the work on humans is also included. Clinical methods of diagnosis are discussed but the main emphasis is on laboratory tests. The fact that nearly 100 pages are devoted to bibliography indicates the scope of the work.

It is shown that the mare is the only domestic animal on which a reliable laboratory test for pregnancy can as yet be performed.

Every laboratory worker in this field should certainly possess a copy of this book.

R.C.

"VETERINARY HELMINTHOLOGY AND ENTOMOLOGY," by H. O. Mönnig.

The third edition of this compact and extremely informative volume published by Messrs. Bailliére, Tindall and Cox for the guidance of veterinary students and parasitologists appeared the early part of 1948. The book appears to have been in great demand as a text book for veterinary students particularly as a lapse of a considerable period occurred during which it was unobtainable.

As is pointed out by the author in his preface to the third edition, important alterations have been made and this is true especially in so far as the addition of many original illustrations is concerned. These considerably enhance the value of the book and the plates illustrating the eggs of a great number of internal parasites should be greatly appreciated

by both the student and practical parasitologist. Alterations in nomenclature and the inclusion of the more recently discovered methods of treatment and prophylaxis, which appeared after the second world war, have brought the book as nearly up to date as the ever-widening scope of parasitology makes possible.

So heavy has been the demand for the third edition that copies are again unobtainable, but it is believed that an additional printing will make the volume available again in the near future.

R. DU TOIT.

BACK NUMBERS: "S.A.V.M.A. JOURNAL."

Wanted: Four copies of Volume XV, No. 1. Please communicate with Dr. H. H. Curson, 16, Myrtle Street, Pretoria.

SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

Minutes of Council Meeting held at 2.15 p.m. on Thursday, February 10, 1949, at the Tilsim Hotel, Pretoria.

Present: J. H. Mason (President), A. M. Diesel (Vice-President), M. H. V. Brown (vice J. G. Boswell), R. Clark (Editor), A. D. Thomas, G. Pfaff, A. C. Kirkpatrick (Hon. Life Vice President), M. de Lange (Hon. Treasurer), A. R. Alexander, B. S. Parkin (vice S. W. J. van Rensburg), C. F. B. Hofmeyr, H. P. Steyn, W. D. Malherbe (Hon. Secretary).

Apologies: P. J. du Toit (Hon. Life Vice-President) and P. S. Snyman.

The President opened the meeting by welcoming Drs. Brown, Pfaff and Hofmeyr.

1. *Minutes of meeting on November* 18, 1948. As these had been circulated they were taken as read, and adopted.

2. *Matters arising from these minutes*:—

(a) *Tuberculosis Scheme*: Dr. Thomas on behalf of the committee introduced its report, which had been circulated to Council. Dr. Diesel explained that the D.V.S. was forming a committee to consider the inauguration of the interim scheme. He was asked to request the D.V.S. to include a member of Council on the committee, if possible.

Agreed: To send a copy of the report to D.V.S.

(b) *National Health Council*: As acceptance of nomination by Council's nominee had not been received, the matter was held over.

(c) *Restriction on the sale of drugs*:

(i) *Sale of certain pharmaceutical products*: The Secretary reported on correspondence with the local agents on use of the phrase restricting use to and prescription by veterinarians. He was instructed, with Dr. Parkin, to deal further with the matter.

(ii) *Complaints by Members referred to Veterinary Board*: Dr. Diesel reported that after consideration by the Board a committee had been appointed (consisting of himself, Dr. Parkin and Col. Jeffreys as legal adviser) to consider the position of veterinarians associated with commercial firms. Other complaints had still to be considered by the Board.

(d) *Registration Fee Conferences*: Held over.

(e) *Resolutions General Meeting*: Replies received in connection with resolutions were presented. A deputation consisting of Drs. Mason, Pfaff, Hofmeyr and Diesel, was appointed to meet the Minister of Agriculture in connection with Resolution 3.

(f) *Veterinary Board Rulings*: Secretary reported that the Veterinary

Board had agreed to make available, in general terms, rulings on etiquette and conduct, for publication in the *Journal.*

(g) *Welfare Societies*: Secretary reported on progress made in respect of the unauthorised use of drugs. Close liaison has been kept with the Veterinary Board.

(h) *Reciprocity with R.C.V.S.*: After discussion it was decided that the legal aspects would be referred to the Diesel Committee (see item 4 below) with a view to obtaining legal powers to "screen" undesirable types of entrants to the Profession in South Africa.

(i) *Use of the word "veterinary" by commercial firms*: This report to the Veterinary Board would also be considered by the Diesel Committee.

(j) *Membership Australian V.M.A.*: Held over.

3. *Calling of emergency meetings by Council*: It was felt that provision should be made in the Constitution for the calling of meetings at short notice in cases of emergency. Any decisions at such meetings would have to be ratified by the next regular Council meeting.

4. *Nomination of member for Diesel Committee* to advise the Veterinary Board regarding amendments to the Veterinary Act (16 of 1933). Dr. Pfaff was nominated on this committee which is to consist of Dr. Diesel and representatives of the Faculty and the Association.

5. *Maud Bales Scholarship*: Held over.

6. *Natal Research Institute*: Secretary reported on correspondence concerning the lack of a veterinary appointment on the agricultural faculty in P.M.B. It was learned that the Secretary for Agriculture had been and was making representations to the Public Service Commission for such an appointment.

7. *Letter from Dr. G. Theiler*: Noted. Decided to publish in *Journal.*

8. *Complaints against a member*: Report from Veterinary Board on action taken. Noted.

9. *New Members*: The following names were accepted for submission to the next General Meeting: A. J. du Plessis, A. B. la Grange, J. M. W. le Roux, S. M. McLoughlin, V. E. Osborn, J. W. Pols, D. G. Steyn, H. J. J. Terblanche, P. W. Thorold, G. F. J. van Rensburg, A. J. Vlok, P. P. C. Wacher, L. D. S. Chisholm.

10. *Qualifications for membership S.A.V.M.A.*: Decided: the discretion of Council was sufficient safeguard and no amendment of rules was necessary.

11. *S.A. Kennel Union Rules*: *re* veterinary attendance at shows. Decided: Secretary should write, suggesting alteration of rule.

12. *Ex Officio member of Council*: Held over, after discussion.

13. *Veterinary Association for Students*: After discussion, found that the organisation already existed for students to meet and to represent matters to Council through Secretary, and if necessary for representatives to do so in person. It was suggested that the Pretoria Branch could also provide a useful forum for discussion of topics provided by students.

14. *Specialization*: After discussion, this matter was dropped in view of earlier findings.

15. *Invitation to veterinarians to advertise*: Secretary reported on correspondence with kennel club show organizer, who had acted in ignorance of the Veterinary Act, and now understood the position.

16. *XIVth International Congress*: Decided to nominate Dr. J. G. Boswell as the Association's representative at the above congress in London, if this would be feasible.

17. *General*:

(a) Suggestion (Dr. van Rensburg, now in U.K.) that next International Congress be held in South Africa, held over.

(b) Letters from President of N.V.M.A. read, inviting nomination of an S.A.V.M.A. member as its official delegate to the N.V.M.A. Annual Congress during the closing phases of the International and inviting papers on small animal clinical subjects. Dr. Boswell nominated as delegate, if available.

(c) Contracts between Veterinarians and farmers associations or cooperative societies. Decided: to circulate a statement on pros and cons of various types of contract already prepared by Dr. Parkin, to members of Council and to branches for comment. To be discussed at next Council meeting.

(d) On account of the great increase of Council business it was decided that meetings should in future be held every two, instead of every three months.

(e) Dr. de Lange submitted the report of the subcommittee on restriction of the sale of drugs. This would be circulated to Council for consideration at the next meeting.

The meeting was adjourned at 6.10 p.m.

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

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

EDITORIAL

THE CO-OPERATIVE EMPLOYMENT OF VETERINARIANS

A big problem facing the live stock industry of South Africa is the provision of adequate veterinary services in the rural areas. Up to the present the Government Veterinary Officers have given assistance where and when they could, but their districts are too extensive and their available time too limited for this arrangement to prove satisfactory. With the intensification of farming and the increasing value of stock, expert clinical attention to individual animals is essential in order to stem the present appalling waste of animal life and productivity. It is extremely unlikely that any government will be able or willing to supply such a service.

During recent years the scope of private practice has extended beyond the big towns, but is still confined to the more closely settled areas around them. The services of a veterinarian are almost unprocurable in most of our cattle-ranching and sheep-raising districts. Owing to the long distances to be travelled and the present inexperience of stock owners as to the value of veterinary attention, independent private practice in such localities is economically not yet practicable.

It has frequently been suggested that the government should subsidise veterinarians in such areas. This could either be done by the payment of a part-time salary for State work or by intermittent payment for specific work.

A development that has recently come to the fore is the co-operative employment of veterinarians by groups of farmers, an arrangement which is very common in New Zealand. By this means the veterinarian is assured a reasonable income, but the formulation of such contracts has given considerable difficulty.

Recently a sub-committee of the Council of this Association was appointed to investigate the matter and their remarks on three possible schemes are given for general information.

Scheme I. Retaining Fee.

1. The veterinarian is paid an annual fee for maintaining practice in a particular area.
2. The fee would be paid by a public body, farmers' association, municipality, etc., or a combination of these.

3. For the fee certain specified work of well-defined scope may be required of the veterinarian, e.g., periodic meat inspection, care of animals, etc.
4. Members of, say, the farmers' association might be given preferential treatment, e.g., priority, percentage reduction of fees, etc.
5. The services of the veterinarian to other members of the public should be free of all restriction. These services should also be available to the government.
6. The poorer the area (for general practice) the more attractive should be the retainer.

Remarks. Municipalities pay retainers for municipal work, the veterinarian otherwise carrying on ordinary private practice.
The rebate for purposes of preferential treatment may be earmarked for payment of the retaining fee.
If the State were to introduce a retaining fee scheme for providing veterinary services in rural areas perhaps in association with municipalities, this scheme would probably be the popular one.

Scheme II. Salary Basis of Employment.

1. Remuneration is on salary basis.
2. The veterinarian would provide services to employer(s).
3. His services would not be available to the general public except with his employer's consent.
4. Initiative would tend to be decreased and difficulties might arise as a result of too many employers.

Remark. This type of employment resembles in some ways that by the State Service — with the disadvantage of insecurity of tenure and absence of pension rights, and the advantage of choice of and security of location.

Scheme III. Guarantee of Net Earnings.

1. In this the guarantors whose financial standing must be inquired into, would make good any shortage of earnings below an agreed figure.
2. Some preferential treatment of the guarantors should be introduced (c.f. Scheme I), e.g., priority, rebates to guarantors.
3. If at the end of the financial year any shortage were to be claimed by the veterinarian, his books would have to be submitted to audit.
4. He would be free to attend the animals of the general public.

5. Care should be exercised in agreeing on what may be legitimately charged against running expenses to enable nett earnings to be calculated, e.g., medicines, rental of buildings (consulting room, pharmacy, etc.), interest on capital, depreciation of equipment, transport, etc. A simple way out of this difficulty might be to guarantee taxable income.

   Remarks. This scheme is already operating successfully in several areas. The sum guaranteed ranges from £840 - £1,500 net earnings, varying according to locality and terms of contract.
   Rebates to guarantors could be earmarked to meet any shortage if necessary.

THE EXAMINATION OF BULL SEMEN

S. W. J. VAN RENSBURG AND N. C. STARKE,
Onderstepoort

The introduction of artificial insemination, and with it the realisation that the bull plays a far more prominent rôle in the causation of herd infertility than was hitherto considered to be the case, have focused increasing attention within recent years on the great importance of semen examination in sterility and artificial insemination work.

The purpose of the examination is twofold, namely, to determine the degree of fertility possessed by the bull in question, and to ensure that the semen is free from pathogenic organisms which may convey disease to the cows either by coitus or by artificial insemination.

COLLECTION OF SEMEN

No thorough evaluation of semen can be made from a sample collected in a haphazard fashion such as scooping it out from the vagina after natural service, or even by massage of the ampulla, since such samples are not sufficiently representative. Even under normal conditions bulls' semen is subject to great fluctuation. An examination of only one sample, therefore, merely refers to the condition of the semen at the time that sample was collected. When the semen appears to be of doubtful quality one should particularly guard against condemning the animal merely on a single examination. In such cases judgment should be deferred until a number of samples taken at intervals have been examined and found to show the same defects. Further, after a period of sexual rest the first ejaculate is usually not typical and the second one should preferably be submitted for examination.

The semen should be collected by means of an artificial vagina and the whole ejaculate ought to be available for examination. In the collection of semen one should guard against factors which may have a detrimental effect on the sperm such as sudden temperature changes, exposures to sunshine ,organic poisons, water, disinfectants, contact with metals and bacterial contamination. In cold weather semen can be protected against temperature shock by placing the tube containing it in a water bath at 30° - 35° C. immediately after collection, and allowing it to cool slowly.

Examination should be carried out as soon as possible after ejaculation. Where this cannot be done, or if it is necessary to transport the semen any distance, it should be placed in a sterile glass tube and packed in ice. A convenient way of sending semen by post or

rail is to pack the tube containing it in ice in a rubber glove, which is then again enclosed in a tin or bottle.

There is no single test which on its own will yield a complete evaluation of the physiological and hygienic qualities of the sperm. For a realiable assessment of the quality and purity of sperm a combination of several different methods of examination should be applied, such as the following:—

1. *Physical Properties.*

The average volume per ejaculate is about 5 cc., but it may vary considerably even in the same animal. In young bulls it is usually less than in adults. A small volume need not necessarily be associated with reduced fertility or a pathological condition. Although there is a tendency for the average volume to decrease from normal to affected bulls this is not invariably the rule. For instance, in epididymitis the volume is often as large as in fertile bulls. The bulk of the volume is derived from the accessory glands, and it is, therefore, more an indication of the secretory activity of these glands than of the testes.

Normal semen is opaque, white to yellowish white in colour with a milky consistency. The higher the concentration of spermatozoa the whiter and thicker is the ejaculate. In aspermia and oligospermia the ejaculate is thin and watery, but this is also seen in incomplete ejaculation. A dirty grey colour and the presence of floccules, giving it the appearance of mastitis milk, indicates the admixture of pus and can usually be traced to infection of the vesiculæ seminales. Normal semen is almost completely odourless..

2. *Motility.*

Examination for motility should take place as soon as possible (within thirty minutes) after collection of the semen, and to obtain proper evaluation care should be taken to maintain the sperm at body temperature during examination and to prevent drying of the semen on the slide. Maintenance of a constant temperature is best obtained by examining the slide on an electrically heated warm stage or by placing the microscope in a thermostatically controlled incubating chamber. Failing that, the slide can be warmed up to body temperature over a flame immediately before the examination is made.

A small drop of semen is placed on a clean coverslip with a pipette and a hollow-ground slide is inverted over the coverslip. In the absence of a hollow-ground slide the coverslip can be supported on the slide by placing two other coverslips on the two ends of the slide. It is then examined under the low power of the microscope.

Motility, too, may show great variation, and while poor movement should be viewed with suspicion, it does not on its own justify condemnation of the bull concerned, since it is not uncommon to get specimens of poor motility periodically from normal fertile bulls.

The ideal is a strong, progressive forward movement of the individual spermatozoa as opposed to a sluggish, rotary or brownian type of movement. In semen of good concentration movement of individual sperm is not seen except at the edges, and one only notes mass movement. In good quality semen this is shown by dense waves which change direction rapidly. Such semen is rated at 90 - 100 per cent., i.e. 5. In semen rated at 75 - 90 per cent., i.e. 4, the waves are less forceful, but still distinct. In a 60 - 75 per cent., i.e. 3, semen, a few weak faint waves are seen and movement is altogether slower. In 45 - 60 per cent., i.e., 2, there are no waves and most sperms have lost the forward progressive movement, the majority moving in circles or oscillating with many non-motile sperm being pushed about by a few active ones. Such semen is of poor quality. In semen rated as 1, i.e. below 40 per cent., only a few sperms are active, the majority being non-motile or showing oscillating movements. Sperm which shows no movement at all is rated as 0.

Besides noting the active progressive mass movement of sperm shown by the above method, one should also look for evidence of agglutination of sperms and accumulation of pus cells which indicate grossly pathological samples.

The examination should be carried further by observing the directional motility shown by individual sperms. For this purpose 10 cc. normal saline is added to 0·1 cc. semen and one drop of this is viewed under a coverslip on a slide. Note the percentage of motile sperm, the percentage showing true directional motility and those showing non-progressive motility. The latter may be moving in circles or backwards or show feeble oscillating movements, characteristic of poor quality sperm.

For the rapid microscopic examination of undiluted bull semen Blom has designed a very useful type of glass chamber. By means of three different heights in this chamber it is possible to carry out three different estimations of the given specimen with one preparation. Motility is estimated at body temperature in a layer of 350 μ in thickness; the movement of the individual sperms is examined in the very thin layer of semen formed between two plane-ground glass plates pressed together, and the density is estimated in a layer of semen 50 μ in thickness.

3. *Density.*

In bulls with good fertility the average density is 800 million sperm per cc. According to Lagerlof the borderling for the concentration should be 200 million per cc., while British workers put the limit as high as 500 million per cc. It must, however, be pointed out that the fertilising capacity of a bull depends on the *quality* rather than the *quantity* of sperm ejaculated.

Apart from Blom's comparing chamber referred to above, the two chief methods for determining density are the hæmocytometer, by means of which the number of sperms is determined in exactly the same manner as the blood cells, and the different opacity methods designed by various workers. A rapid method of estimating density in this manner by using Brown's opacity tubes is that described by Kyaw which depends on the fact that there is a single linear relation between opacity and density.

4. *pH.*

The pH of normal semen lies between 6·6 and 6·8. According to Blom the pH of the three different secretions which compose the ejaculate is as follows:— That of the cauda epididymidis is acid (6·2 - 6·4); that from the vesiculæ seminales, which forms the greater part of the ejaculate, is strongly acid (5·68 - 6·15), while finally that derived from the prostate and bulbo-urethral glands is markedly alkaline (up to 8·24).

pH should be determined within fifteen minutes after collection. A fairly accurate estimation can be made with the B.D.H. Universal Indicator. It is generally found that the lower the initial pH the better are motility and density; and semen which retains its motility well becomes increasingly acid on storage.

When one or both of the acid components are deficient or absent, there is a swing towards an alkaline reaction, and in the normal bull this may be seen in sexual overwork and in incomplete ejaculation. When pH rises to over 7 and both the latter possibilities can be ruled out, it is usually an indication of a decrease or complete cessation of spermiogenesis or of a pathological condition in one or both vesiculæ seminales.

5. *Methylene Blue Reduction Test.*

Walton and Edwards have shown that there is a definite relationship between the number of services per conception and the respiration rate of bull sperm, the fewer the number of services per conception, the greater the average initial respiration rate.

The object of the methylene blue reduction test is to determine the respiration rate of sperm by measuring the time taken to decolourise a standard solution of methylene blue. The dye is made up by dissolving a 5 mgm. tablet methylene blue in a sorbitol base in 10 cc. phosphate or citrate diluent. 0·9 cc. semen which has been diluted down to a concentration of 200,000 per cu. mm. in buffer solution is placed in a small test tube and thoroughly mixed with 0·1 cc. of the methylene blue solution. It is covered with a seal of liquid paraffin and incubated at 43°C. in a water bath. The end point is reached when the buffered semen returns to its original colour. The average reduction time for a sample of good semen is under twelve minutes.

6. *Morphology.*

Every ejaculate contains a number of abnormal spermatozoa independent of the degree of fertility shown by the bull concerned. Therefore, no semen examination is complete without a study of the morphology of the sperm and a differential count which shows the types and percentage of abnormalities found. It is generally accepted that normal semen should not contain a higher percentage of abnormal spermatozoa than 20.

Morphology is studied in stained smears under an oil immersion lens. In order to avoid damaging the sperm meticulous care should be taken in preparing and staining sperm smears. Fresh semen can be examined undiluted, or, particularly when the density is high, it can be diluted 1 : 10 in either phosphate or citrate buffer or in physiological saline. A small drop is placed on one end of a clean slide. A coverslip is held over it at an angle of 45° and gently drawn back until contact is made with the drop of sperm which then spreads out. Then the coverslip is pushed forward smoothly and gently, drawing the smear behind it over the slide. The smear is air-dried and stained.

Another method is to put a small drop of semen on a clean slide. Hold another clean slide at right angles over this and, without exerting pressure, spread out the semen by drawing the upper slide swiftly and lightly over it. In this case one usually finds the best smear on the upper slide.

Many different methods of staining have been devised, such as :—

1. *Giemsa:* Fix in methyl alcohol for five minutes, then place face downwards for one hour in the following :—

Giemsa	3 ml.
Distilled water	32 ml.
Acetone	5 ml.
pH 9·0 buffer	2 ml.

Wash in water and dry with blotting paper.

2. *Iron hæmatoxylin:* Fix in osmic acid vapour (2%) by standing it in an incubator over the vapour for about five minutes. Wash overnight under a running tap; stain in 2½% ferric ammonium sulphate for 24 hours; wash in distilled water for two minutes; stand in Heidenhain's hæmatoxylin for another 24 hours; wash in distilled water; differentiate by dipping in ferric ammonium sulphate for 1 to 2 minutes, and wash.

3. *Hæmatoxylin-eosin:* Fix first by heat and then by immersing in methyl alcohol for two minutes; stain with filtered hæmatoxylin for six minutes; wash in tapwater and place in weak alkaline distilled water for one minutes; stain with saturated alcoholic eosin for two minutes; wash and dry.

4. *Carbol-fuchsin-eosin:*

(a) Stock solution is prepared by dissolving 10 parts basic fuchsin in 100 parts 95% alcohol. Add 10 parts stock solution to 100 parts 5% carbolic acid solution. Add 20 cc. of this carbol-fuchsin to 10 cc. saturated alcoholic solution of eosin. The final solution is only to be used after storage for at least a fortnight. Filter on to smears and stain for five minutes before washing off in tapwater. Counterstain for five seconds with Loeffiers alkaline methylene blue.

(b) The stain consists of:— Ziehl Nielsen carbol fuchsin 7 parts and eosin (bluish) saturated alcoholic solution 1 part. Clear the smear by standing in 0·5% solution of chlorazene for 5 - 7 minutes. Rinse gently in tapwater and wave in air to dry. Apply the stain for about one minute. Rinse in tapwater and air-dry.

5. *India Ink:* One drop of semen on the slide is mixed with 3 - 4 drops India ink, spread out on the slide and dried over a flame. This is a useful rapid-staining method, though it does not give much detail. Instead of India ink a 10% solution of nigrosin can be used.

The abnormalities found in such stained smears may be classified as follows:—

A. *Abnormal forms* such as: (a) Giant sperms. These are rare. (b) Dwarf forms in which the deformity is generally seen in the head. They are not regularly present, but may constitute 3 to 4 per cent. of normal sperm. (c) Teratomatous forms such as double heads or double tails. Both these abnormalities may occur in the same sperm. Being of rare occurrence they appear to be of no significance as far as fertility is concerned. (d) Medusa forms (fig. 1, i) have been described by Blom as occurring in semen samples at an average rate of 1 per 10,000 sperms in normal bulls. These bodies are considered to be detached fragments of the ciliated border covering the epithelial cells which line the efferent tubules of the testes. Medusa forms are also stated to occur on a big scale in centrifuged sediment from samples of low concentration in bulls suffering from pathological conditions in the testis and epididymis, in which spermiogenesis is often impaired or has ceased completely.

B. *Abnormalities of the head* are very frequent, and from the fertility aspect they are of greatest importance. They may be subdivided as follows:—

(a) Loose heads, which may be present in 1 to 3 per cent. in normal sperm. Although frequently pathological they may also be the result of careless manipulation in the preparation of smears. If present in large numbers it is advisable to control by making duplicate

smears. Hancock has noted headless sperms in one breed, in which motility and other characteristics were normal, but 100 per cent. sperms were decapitated. Histological examination showed some degeneration of the testes. This condition caused complete sterility, and the evidence suggested that it is due to a recessive genetic factor.

(b) Alteration in the shape and size of the head such as narrow, short, wide, round, pear-shaped, club-shaped and deformed heads.

(c) Detached *galea capitis.* Blom observed spontaneous complete detachment of the *galea capitis* which covers the anterior part of the head (fig. 1, h). This has been noted in up to 18 per cent. of sperm, and their presence is ascribed to very long abstinence, as the result of which many of the closely packed sperms in the cauda epididymis are dead and undergo regressive changes, among which detachment of the galea is one of the first to become visible.

(d) The galea capitis may show other deviations in that it may be too large, too small, oblique, or deformed.

(e) Abnormality of the acrosome associated with complete sterility has been described in England, Holland and Denmark by Hancock, Teunissen and Blom respectively. Hancock studied seven cases in one breed and found that the seven bulls were all closely related. He, therefore, regards this as a hereditary defect. In smears stained with India ink the condition is presented as a refractile unstained area situated somewhat laterally at the anterior pole of the head in nearly 100 per cent. of the sperm (fig. 2). An important feature of this condition is that the semen shows no evidence of abnormality to all other tests.

C. *Abnormalities of the middle piece.* The attachment of the middle piece to the head may be abaxial. The piece may be swollen and even ruptured, after which it assumes a fibrillar appearance. It may also be abnormally short, very wide, thin or deformed. Such deviations of the middle piece are not frequent, but must be regarded as serious since they retard or completely inhibit motility.

D. *Abnormalities of the tail.* Persistent protoplasmic droplets may be seen on the neck, middle piece or tail of the sperm, and in the latter case it is usually accompanied by loop formation of the tail (fig. 1, e - g). The droplets may still become detached and thus not interfere with sperm movement, but the presence of more than 3 per cent. of proximal droplets (fig. 1, e) must be viewed with suspicion.

Curved tails are frequent and may be seen in up to 4 per cent. normal sperm (fig. 1, g). Coiling of the tail, which may also involve the head (fig. 1, c), is usually seen in normal sperm which has suffered temperature shock, or in which the bull has been overworked or shows a tendency to masturbation. Another abnormality which may be shown is the rudimentary tail.

E. *Presence of cells.* A few desquamated epithelial cells from the uro-genital tract may be present in normal sperm, but the appearance of pus cells (fig. 1, n) must always be regarded as serious, since they indicate infection of the genital tract and their presence calls for the immediate withdrawal of the bull from service.

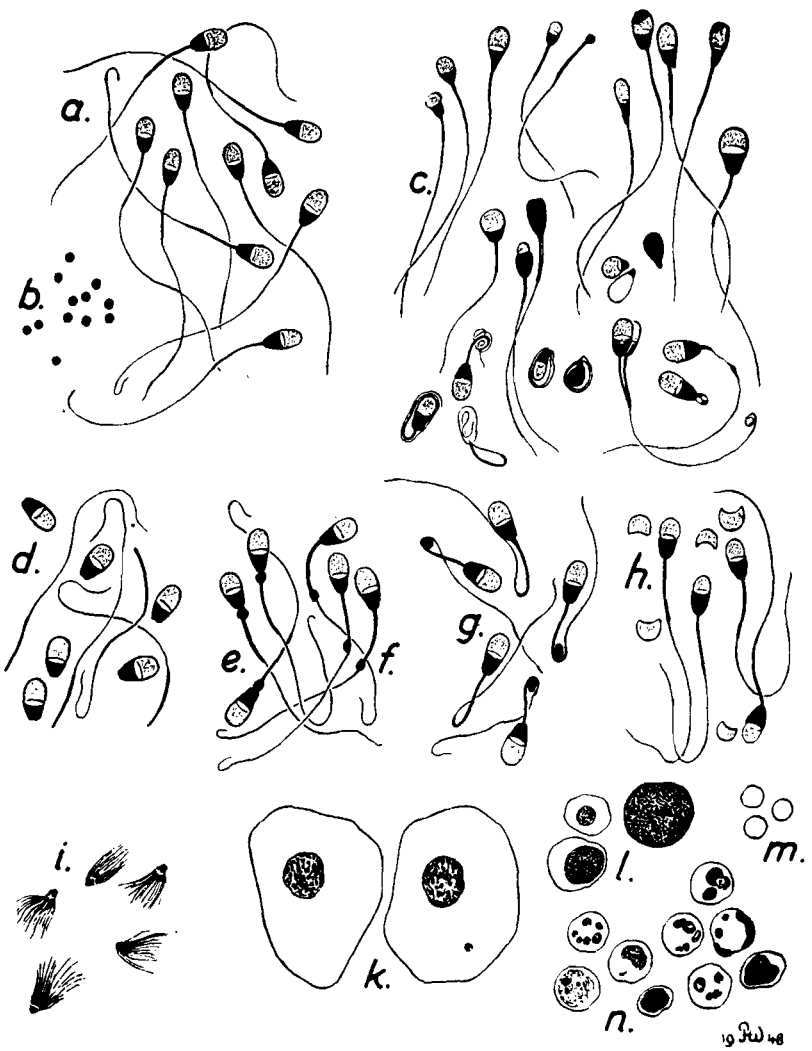

Fig. 1. — Different types of abnormal sperm. (Reproduced from "*Om Spermaundersogelsesmetoder hos tyren*" Erik Blom).
(a) Normal sperms; (b) free protoplasmic droplets; (c) different types of abnormal forms; (d) loose normal heads; (e) sperms with proximal droplets; (f) sperms with distal droplets; (g) curved tails; (h) detachment of galea capitis; (i) medusa formations; (k) desquamated epithelial cells; (l) primordial spermatic cells (from cases of severe degeneration); (m) erythrocytes; (n) pus cells.

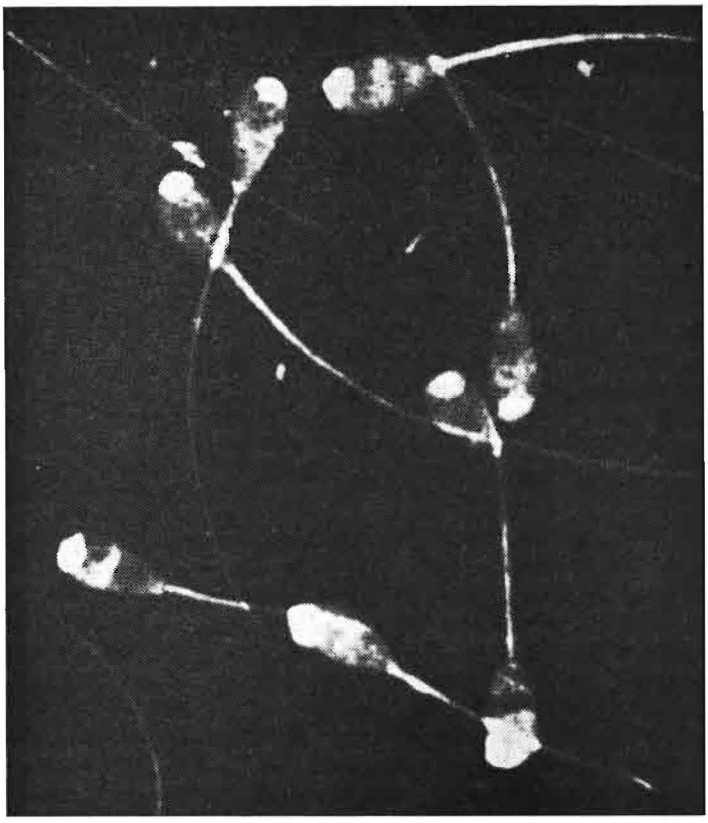

Fig. 2 — Sperm showing abnormality of the head (reproduced from *"The Veterinary Record,"* J. L. Hancock).

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A NEW AID FOR THE CONTROL OF BRUCELLOSIS

G. C. VAN DRIMMELEN

An anti-brucellosis vaccination campaign in dairy herds has no influence on the animals which eliminate brucella organisms in their milk. No suitable test was available for the differentiation of bovine brucella "carriers" from other cattle which show a positive blood serum agglutination reaction, until the recent report of the new technique for the Ring Test on milk (Van Drimmelen, 1949). The most important difficulty in connection with blood serum agglutination test is that many animals entirely free from virulent brucella organisms show a positive reaction, whereas some animals in which the infection is maintained fail to show a positive reaction.

Cattle exposed to brucella abortus infection may eventually be grouped in three classes according to the results of exposure:—

(a) Mature bulls and pregnant cows often are infected and usually become "carriers" for life.

(b) Mature heifers and non-pregnant cows may be infected, but frequently eliminate the organism entirely from their bodies.

(c) Calves and a considerable number of adult animals fail to become infected.

In combating contagious abortion in dairy herds by the removal of infected cows, one of the greatest problems has been to get rid of all animals belonging to class (a) without removing those belonging to classes (b) and (c). Instead of being a danger to the herd, the animals in class (b) are actually highly desirable cows on account of their active resistance to brucella infection. In fact, it is the aim of vaccination projects to bring about this state of immunity in the entire cattle population.

The object of this report is to review the relation between the new technique for the Ring Test and the modern methods of combating brucellosis in dairy herds, with special reference to vaccinated cows.

Control Methods

The active resistance to reinfection in an animal immunised by a transient infection is a most desirable quality in herds established in infected areas. The protagonists of the "test and slaughter" or "test and isolation" methods of brucellosis control have partly overcome this difficulty by the very successful campaign in favour of *calfhood vaccination.* As a rule calves inoculated with massive doses of certain strains of Brucella organisms will develop increased resistance to future infection without retaining the infection or the permanent blood

serum agglutination reaction. Notably strain 19 (Buck, 1930) of the Bureau of Animal Industry which was originally isolated from the milk of a stud Jersey cow, " Victor's Lady Matilda," has been extensively used for this purpose in many countries.

Birch, Gilman and Stone (1944) and Kerlin and Graham (1945) have demonstrated the virulent Br. abortus organisms in discharges from vaccinated animals exposed to virulent infection showing that vaccination does not prevent infection although it usually prevents abortions resulting from infection.

There is evidence that the immunity produced by inoculating adult animals is stronger than that produced in calves (Buck, 1930). The result is that those who insist on demanding negative blood reactions have recently had to concede to the raising of the age of calfhood inoculation from the 4 - 8-month-old period previously stipulated to the 6 - 10-month-old period favoured at present.

Robinson (1918) first succeeded in cleaning a heavily infected herd from brucellosis by consistently removing all reactors to the blood serum agglutination test. The drastic action taken resulted in the depletion of the herd by two-thirds of its most productive members. The infection on this property has, hovewer, not been recorded again since its historical eradication in August, 1916, until the present year (1949) when a fresh outbreak was diagnosed there.

Usually animals of both group (a) and group (b) show reactions to the blood serum agglutination test, but attention has persistently been drawn to the fact that some " carriers " of infection fail to react to the agglutination test (Bang, 1906; McFadyean, 1921; Giltner, 1924; Thomsen, 1928; Birch, e.a. 1934; Stockmayer, 1937; Beach, e.a. 1940; Blom, 1949). Beach, Irwin and Ferguson (1940) demonstrated the low infectivity of cows known as " ceased " reactors and occasionally found to be excreting Brucella organisms. Others have, however, found non-reacting but infected bulls to be particularly apt to spread infection when the *ampullæ* or *vesiculi seminales* were permanently infected (Blom, 1949). These non-reactors would therefore remain a possible source of reinfection in a herd from which all reactors were being removed. To a lesser extent horses, pigs and other animals infected with Brucella abortus may act as sources of infection for cattle in a herd being cleaned by the removal of agglutination test reactors.

Greater use of the strain 19 vaccine in dairy herds appears to be strongly indicated (Van Drimmelen, 1948). Indeed, if a test for " carriers " of infection were generally available there would be no objection to wholesale vaccination. The removal of reactors not carrying or spreading virulent infection is criticised for its adverse effect on herd resistance to infection.

The question of positive serum reactions is further complicated by the recent discovery that 20% of the persons who ingest killed Brucella organisms develop specific agglutinins in the blood (Braude, Gold and Spink, 1949). If this should also happen in cattle it would tend to increase the cost of cleaning a herd by testing.

Tests to determine the "Carriers"

It appears that the introduction of the numerous techniques advocated for the detection of the infected animals ("carriers" of infection), among the total number of animals reacting to the blood serum agglutination test, have not been successfully developed to a stage where their application by the practitioner becomes economical and practical. Briefly the following methods have been tried:—

1. Cultural examination of milk, blood, tissues, and excretions.

On account of the difficulty with which Brucella organisms are cultivated, their demonstration has always remained a specialised laboratory method. The time and media required make this a most expensive method. Specimens of the fœtus, or of the milk, must be collected with aseptic precautions. Even under the most favourable conditions only about 80% of infected animals can be located in one test by this technique, and the results may not be available before eight or fourteen days after collection of the material (Henry, Traum and Haring, 1932; Huddleson, 1943).

2. Microscopic examination of fœtus and afterbirth.

Though practised in some advanced dairying areas this method has obvious limitations where close supervision of the breeding animals is not practised and where no veterinarians are near at hand. The technique is not very difficult. Only a small proportion of infected animals can, however, be found in this way.

3. Biological tests of blood, milk, tissues and excretions.

The guinea-pig and hamster are fortunately highly susceptible to brucellosis. Guinea-pig inoculation tests provide the surest way of isolating the organisms from specimens if the agglutination test on the guinea-pig blood and the spleen culture are carefully carried out. The time required for this test is often six to eight weeks for positive cases. In doubtful cases which require sub-inoculations three months may be occupied.

4. The whey agglutination test.

The milk whey, after separation from the cream and curd, may be tested by the agglutination test technique. The results obtained indicate that a specifically high whey agglutination titre is present in infected cows. This is probably caused by the location of chronic foci in the udder and the local antibody production. Preparation of the whey by

a standardised technique has not been achieved satisfactorily. The test requires laboratory facilities (Traum and Maderious, 1947; Wood, 1948).

5. The blood serum titre differential test.

The method of examining the effect of vaccination of animals on the blood serum titre was advocated by Dick, Venzke and York (1947) and by Venzke (1948). Actively infected animals with a stabilised or declining titre were reported to fail to show any increased reaction after vaccination, whereas non-infected reactors showed a sharp rise in titre about the seventeenth day after vaccination. This test was done by the rapid plate agglutination method. The three tests required and full month occupied by the operations limit the usefulness of this test.

6. The bactericidal test.

The introduction of the bactericidal test has made little headway. It is a laboratory test which requires media, pure cultures, bovine complement, sterile sera and high technical skill. The results are variable on account of the difficulty in standardising the technique (Irwin and Beach, 1946; Huddleson, Wood and Cressman, 1945).

7. The Opsonocytophagic test.

The limitations of this test are its variability and the difficulty with which the Opsonocytophagic index has to be determined (Huddleson, 1943).

8. Allergic tests.

The use of allergic tests has been limited by the extreme sensitivity of non-infected contact animals (Live and Stubbs, 1947).

The Technique for the Modified Ring Test

(*The dilution technique*)

The original "Abortus Bang Ringprobe," the Ring Test for fresh milk, is a brucellosis test for bulk milk samples. This may be used for:—

(i) Survey purposes.

(ii) Maintaining freedom from infection in herds in a brucellosis-free area.

The modified Ring Test is a brucellosis test for individual cattle by the dilution technique. In vaccinated cattle four or more months after vaccination this may be used for:—

(i) Determining the extent of infection in vaccinated dairy herds.

(ii) Eliminating "spreader" and "carrier" cows from vaccinated herds.

This test can also be used for dry cattle using blood serum or citrated blood mixed with fresh milk from a non-reacting cow, but the results will, however, have no more significance than the blood test. Some dry cows will supply a serous fluid from the teat orifices on milking. This can be used for a milk ring test by the new dilution technique and will have the full extra significance on the milk test.

The production of coloured antigen for the test has been described elsewhere (Van Drimmelen, 1948), but slight modifications in the test procedure for individual cattle require a brief account of the technique:—

The Ring Test Dilution Technique

1. Three clean clear glass test tubes of about 0·8 mm. diameter are set up for each animal to be tested.

2. A pipette or syringe adjusted to deliver equal amounts of approximately 1·0 ml. is used.

3. A small quantity of fresh milk previously tested to show no reaction is obtained and one ml. of non-reacting milk filled into tubes No. 2 and No. 3.

4. A sample of milk from the animal to be tested is obtained and 1 ml. is placed in tube No. 1 and a further 1·0 in tube No. 2.

5. The contents of tube No. 2 are mixed and 1·0 ml. of the mixture transferred to tube No. 3. This is again mixed and 1·0 ml. of the mixture discarded.

6. Stained antigen is added to the tubes, one drop (·07 ml.) to each.

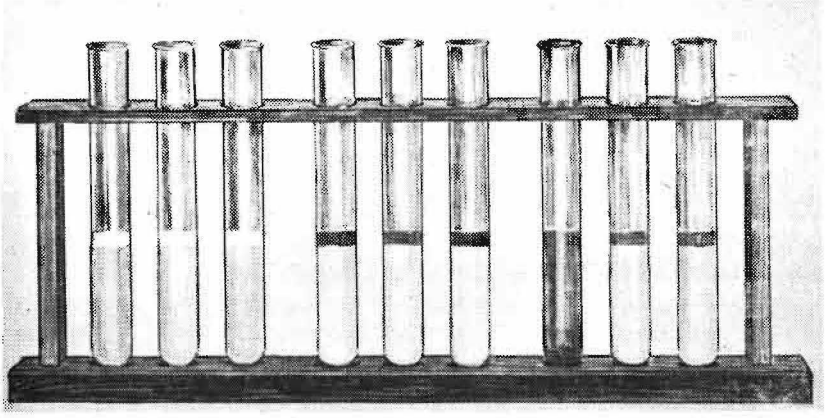


Fig. 1. — The appearance of Ring Test results: Tubes No. 1 - 3, negative milk: (white cream and purplish milk); tubes No. 4 - 6, positive (purple cream, white milk), No. 4 : pure, No. 5 : 1 in 2, No. 6 : 1 in 4; tubes No. 7 - 9, serum from blood or udder of dry (positive) cow ; No. 7 : no cream, purple sediment, No. 8: 1 in 2, No. 9: 1 in 4.

7. The tubes are shaken and incubated 40 - 50 minutes.

8. A violet ring in the cream of all three tubes is produced by milk from infected animals (fig. 1) and by milk from animals vaccinated a month or two previously. Negative animals show a purplish colour in the milk with a white cream layer. If vaccinated more than four months prior to testing, the milk in the first of the three tubes may show a faint ring reaction, but the dilutions in the second and third tubes will not show a ring. Udder secretion without cream, if from an infected cow, will show a ring in the second and third tubes, but a purple sediment in the first. (See tubes No. 7, 8 and 9, fig. 1.)

This test shows additional advantages over conventional tests in that it combines the good qualities of several. The rapid result is comparable to that of the rapid plate agglutination test, the high reliability with that of the tube agglutination test and the special sensitivity to udder infection with that of the whey agglutination test. These are combined with the newly discovered distinction between vaccinal and infection reactions. The milk of vaccinated non-infected cows shows very little, if any, reaction three or more months after inoculation, and in the third tubes no rings have been demonstrated, whereas all infected cows tested have consistently shown positive reactions in all three tubes.

The Anti-Brucellosis Campaign in a Dairy Area

It is visualised that an approach to the anti-brucellosis campaign in a given area would be made by making a preliminary survey of the incidence of brucellosis in the herds distributing milk. Samples of the bulk milk from all producers or from all cans if possible, may be examined by the original method described for the "Aborus Bang Ringprobe" (Fleischauer, 1937, 1939; Hermann, 1937, 1939; Norell and Olsen, 1943; Bruhn, 1948; Christiansen, 1948; Van Drimmelen, 1948). Single tubes would be set up for each test, marked, and 1·0 ml. milk from the relative samples plus one drop of antigen incubated for 50 minutes.

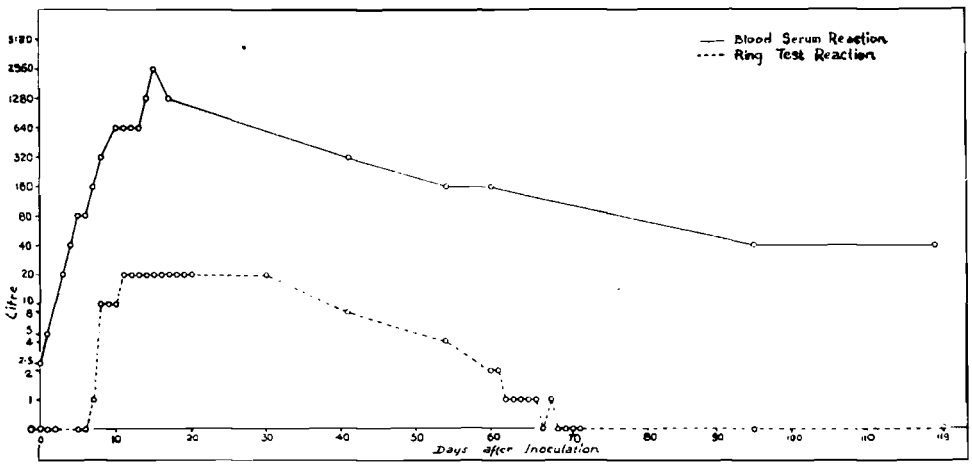
The results would be recorded as positive, doubtful or negative and two or more tests on successive days could be undertaken to confirm the results if desired.

Unless special circumstances exist, inoculation of any infected and contact herds not previously vaccinated, should be the first step. If desired, the actual presence of infection on the farm could again be confirmed. Examination of the breeding record, the milk record or both, and the reports of the owner on vaccinations, will usually locate the most likely cases of brucellosis immediately. With the aid of a few single tube tests a negatively reacting milk could be selected. Such milk could also have been brought from headquarters

or from the daboratory. By applying the *dilution technique* in three tubes on each of the suspects the infection could be established if no vaccine was inoculated during the previous four months. If possible, infected animals could be removed before vaccination, since it does not influence the course of infection.

Final Elimination of "Carrier"

Four months after inoculation it is possible to distinguish the cows with udder infection from the non-infected cows by means of the new modification of the Ring Test, viz.: *The dilution technique.* Individual cows in the herd would be tested and the animals that give a positive ring test reaction in all three tubes, would be isolated and if desired subjected to further examination. Three or more months after vaccination the vaccinal reactions encountered have never exceeded a titre of 1 : 2, although the animals generally retain a positive blood serum titre considerably longer (Graph a).



Discussion

The results obtained with the Ring Test on milk can best be explained by reference to graph (a). This graph shows the contrast of the effect of taking readings by the blood serum agglutination titre and by the Ring Test titre. The graph shows the findings in a typical vaccinal reaction of a lactating cow. The blood serum titre rises for a period of two to three weeks and then gradually drops, but a positive reaction is retained for months and sometimes years.

The Ring Test titre rises sharply on the eighth day approximately and drops to nil before the tenth week. A very slight residual reaction if any, remains and yet at the peak of the blood serum reaction a highly positive Ring Test reaction is present. [Graph (a) does not show the

maximum Ring Test titre. Values up to 1 : 5,000 have been encountered in other cases.]

Infected cows show a gradual drop in the blood serum agglutination titre after the peak has been passed. At the time of subsequent abortions or calvings the titre may be raised again temporarily. The Ring Test titre was always found to be very high in infected cows. This agrees with the findings of Traum and Maderious (1947) in connection with the whey agglutination titre and it suggests that the local formation of antibodies in the udder, where the infection is usually maintained, is probably responsible. (Harris, Grimm, Mertens and Ehrich, 1945; Van Drimmelen, 1949.)

The general impression gained from comparing the work on the modified Ring Test and the experiences reported with the whey agglutination test, favours the adoption of the Ring Test. It is much easier to perform, the results are available almost immediately and the results are not so easily influenced by the variations of technique. The modified Ring Test gives a most reliable diagnosis of Brucella infection and it can be regarded as the best assistance to overcome the defects in diagnosis of the disease. When the results of the new dilution technique are compared with the blood serum agglutination test, the uninfected reactors to the latter can be selected (Van Drimmelen, 1949). When these Ring Tests are compared with the cultural and guinea-pig inoculation results, the uninfected samples from infected cows which intermittently excrete the organism, will be indicated so that retests may be done. (Bang and Bendixen, 1932; Stockmayer, 1937; Van Drimmelen, 1949).

To date only the results of the Ring Test for bulk samples of fresh milk have been shown to be of major importance in brucellosis control. This type of test lends itself to municipal and State control activities. The results of the Modified Ring Tests for milk samples of individual cows by the new dilution technique are insufficient to justify a similar statement. The promising results obtained do, however, strongly recommend extensive field trials by practising veterinarians.

The encouragement and advice received from Professor G. v. d. W. de Kock, Director of Veterinary Services, and Professor E. M. Robinson, Assistant Director of Veterinary Services, are gratefully acknowledged. The help of Miss G. E. Laurence and Mr. Theo. Marais in connection with the drawings and photographs is warmly appreciated.

Summary

1. Difficulties in connection with the control of brucellosis in cattle by means of vaccination combined with blood serum tests are reviewed.

2. The usefulness of the author's modification of the Ring Test

for milk, which requires three tubes for each animal to be tested, in overcoming some of these difficulties is estimated.

3. The modified Ring Test is recommended because of its reliability, its rapid results, its special sensitivity for udder infection and its distinction between vaccinal and infection reactions.

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A SIMPLIFIED METHOD FOR THE PRIMARY ISOLATION OF THE DERMATOPHYTES

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In the primary isolation of the dermatophytes trouble is experienced with bacterial contaminants which grow rapidly and inhibit the growth of the slower-growing fungi. Various media and methods have been described for overcoming the difficulties caused by these contaminants — media containing ox-gall and crystal violet, also ox-gall, crystal violet and streptomycin[1], a method of soaking material in a mixture of corrosive sublimate and alcohol for 1 - 2 minutes[2]. These methods, although efficient, are somewhat cumbersome, hence the desire for a simpler one.

Two of the common bactericides, copper sulphate or corrosive sublimate, incorporated in Sabouraud's Maltose or Dextrose agar, have been found to give excellent results, the advantage being that these substances can be added at any stage during the preparation of the media. Copper sulphate is used in a final dilution of 1/2000 and corrosive sublimate in 1/10,000. The skin scrapings and hairs are simply seeded onto the media and incubated at 22°C — bacterial contaminants are inhibited but rapid-growing fungal contaminants such as penicillium, mucor, etc., have to be picked off as soon as recognised (Hoerlein)[3].

The pathogenic dermatophytes only appear after 48 - 96 hours, whereas numerous fungal contaminants appear within 24 - 48 hours, and if picked off immediately do not inhibit the growth of the pathogenic species.

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A NOTE ON THE OCCURENCE OF THE "GAPEWORM"—SYNGAMUS TRACHEA IN NATAL

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The object of this note is to record the finding of Syngamus trachea in young chickss for the first time in South Africa. The majority of worms in poultry, reported from different parts of the world, have, at various timess, been seen in South Africa, but there is still a worm that has not, as yet, been found here, viz., Oxyspirura mansoni or Manson's Eye-worm. As this worm belongss to the family Thelaziidæ, and owing to the prevalence of Thelazia rhodesii (Desmarest, 1828) in the eyes of ruminants in the Union, it is felt that Manson's Eye-worm will, before long, be found.

In December, 1948, two young Black Australorp chicks of about two months of age were received at Allerton from Red Hill, Durban. These birds were in poor condition and showed marked respiratory symptoms. The breathing resembled somewhat the respiratory symptoms shown in Newcastle Disease with, however, additional symptoms of sneezing and frequent swallowing. Swabs from the mouth and throat were taken, but pigeons injected with this material were unaffected, thus proving that it was not Newcastle Disease.

History

A visit was made to the farm from which the chickens originated. It is situated on a hill which is cut up into small properties. Most of the people run fowls on a small scale and the hygiene is only fair. This disease has been prevalent in this area for the past few years, and has been diagnosed by these backyard poultrymen as an ordinary cold. Lately, the mortality increased and this was the reason for the sending of infected chicks to Allerton. During November and December, 1948, the mortality rate on this farm had risen to 60% among these two-months-old chicks. The original stock had been purchased either locally or in Durban, and otherwise settings of eggs had been procured there and given to broody hens to hatch out. Round this area and all up the North Coast road are numbers of Indians, all of whom run a few fowls. It is suggested that this parasite may have been introduced into this area from the East by fowls brought by seamen to their friends in this area.

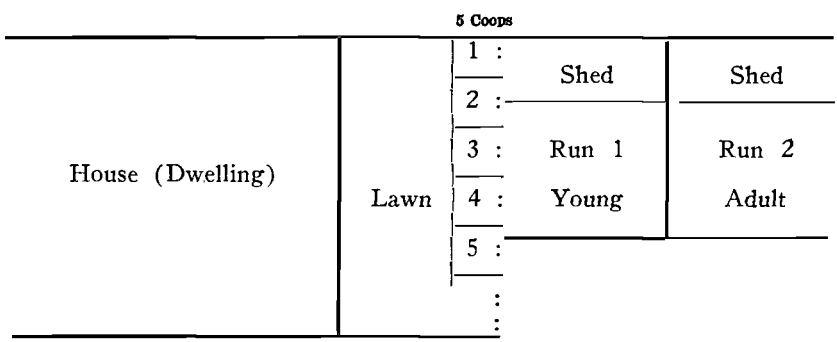
The infected flock comprised seventy birds, of which twenty-two were between the ages of two and four months. When this farm was visited in January, all birds up to the age of four months were showing characteristic symptoms of respiratory distress. The infected birds

appeared drowsy, and sneezed often with frequent swallowing movements. They were stunted in growth and their heads were drawn against their bodies. From time to time they stretched out their heads to the fullest extent and, at the same time, opened their beaks widely in an attempt to obtain air. Occasionally a convulsive shaking of the head was seen, as if the bird were attempting to remove some obstruction from the nose or throat. Some of the older birds showed slight respiratory symptoms, but there were odd cases of roup among them, which may have accounted for the difficulty in breathing. It is probable that, once a bird passes the four months age, this tracheal worm does not cause many deaths, although the bird may still harbour the parasite and perpetuate the disease.

Post-mortem examination revealed an emaciated carcase, together with signs of anæmia. On exposing the whole length of the trachea, one could observe, through the cartilages, what appeared to be masses and strings of coagulated blood. When the trachea was split open it was found that what appeared to be coagulated blood were either masses of worms or single worms. The mucous membrane showed pin-point hæmorrhages where the worms had attached themselves. Actual small amounts of coagulated blood were also present in the lumen of the trachea together with mucous. In the majority of cases Syngamus trachea was found in the lower third of the trachea and numbered from two to thirty specimens. The nostrils were usually occluded with masses of mucous.

Management of Infected Flock

The housing of birds on this plot consisted of a shed and a camp divided into two by a partition down the middle; the floors all being ordinary ground. (See sketch.)



As can be imagined, these runs have been in use for a long time and are probably " stock sick ". No chicks could be reared in the pens, forcing the owner to rear them on the lawn. Adult birds are at present in Pen No. 2. The runs are occasionally planted with lucerne, which serves as green food. Adjoining Pen 1, and encroaching on the lawn,

are five coops where broody hens are placed to hatch out "settings" of eggs. The baby chicks, when hatched, are allowed to run on the lawn for about 2 - 3 weeks, and then placed in Pen 1. Up to the age of 14 days the chickens thrived, but, at this age, they showed signs of being feverish and off-colour, developing a slight watery discharge from the nostrils, but proper respiratory symptoms developed slowly.

Syngamus trachea: This is red in colour and the male and female are found in permanent copulation, thus giving them the characteristic appearance of the letter 'Y'. The life cycle of this parasite, as described by Wehr (1944), is interesting. Eggs that are deposited in the trachea are coughed up, swallowed and pass to the exterior in the fæces. Following a period of incubation under optimum conditions, eggs become embryonated from 8 - 14 days. Transmission may now take place in one of two ways, i.e. by direct ingestion of the embryonated eggs or infective larvae, or indirectly, by the ingestion of earth worms containing free of encysted larvae, which the earth worms obtained by feeding on contaminated soil. Slugs and snails may also act as intermediate hosts. It is suggested that after infection of the bird, the larvae either reach the lung via the bloodstream or through the oesophageal wall and enter the lungs from the outside.

Treatment:

The treatment that was advised is one in use in England and is mentioned in the Handbook of Poultry Diseases, compiled by the National Veterinary Medical Association of Great Britain and Ireland and Biester and De Vries. Barium antimonyl tartrate powder is blown by an insulflator into a ventilated box, in which infected birds are placed. They remain in this box for at least ten minutes.

Summary

(1) The finding of syngamus trachea is recorded for the first time in the Union.

(2) A focus of infection has been discovered in the Red Hill area of Durban.

(3) A description of the disease in young chickens is given.

Acknowledgment

Ds. A. S. Canham, Officer-in-Charge, Allerton Laboratory, is thanked for his assistance and facilities provided.

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EAR SCAB IN SHEEP AND GOATS

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On the 6th November, 1948, the Manager, Neudam, submitted an ear from a dead sheep for examination and from this several scab mites were removed. On the 8th November I visited the farm to institute an investigation and inspected all the sheep on the farm.

After handling and subjecting numerous sheep to a searching examination, it became evident that ear scab is most difficult to detect in infected live animals owing to the deep-seated habitat of the acari. In a few cases white scabby crusts were found in the ears, upon removal of which mites were demonstrable. In two animals handled scab mites were present in the infra-orbital fossæ. In no instance could lesions be found on the bodies of the sheep examined nor did any of the sheep evince signs of irritation or discomfort by shaking of the heads or scratching of the ears.

That the majority of the sheep inspected must have been infected, was borne out by the fact that five of the six sheep autopsied later that day harboured mites in the ears — these animals died from exposure after soaking rain followed by a very cold spell during the previous night. In addition, all the sheep which died from other causes from time to time subsequent to the discovery of the infection, were examined for this condition; the usual clinical finding being negative while at post mortem numerous mites were demonstrable in the depths of the auditory canals. A fairly constant post-mortem finding in infected ears was the presence of a plug of wax — some measuring up to one inch in length — in the depth of the meatus, beyond which is was invariably possible to remove further acari. The plugs themselves when broken up, harboured many mites.

A small transmission experiment was attempted to ascertain whether the ear parasites will produce lesions on the bodies of sheep, but the infecting acari died or disappeared within eight days and no lesions developed. For this purpose two young sheep were selected on the 8th November, 1948, and some 8 - 10 mites (some in copula) placed on the moistened skin in three different places, viz., over the shoulder, the rump and on the dorsal aspect of the broad tail. The wool over these sites was gathered and tied together with a piece of twine in order to prevent the parasites from immediately dropping off and also to facilitate locating the infected areas during future inspections. On the 15th November, 1948, I again visited Neudam, accompanied by seven members of the South African Police, to whom I lectured on scab, and during the practical demonstration these two lambs were thoroughly examined, but no mites or initial lesions could

be found. Another thorough table-inspection a week later revealed similar negative findings and the lambs were discharged.

During my examination of the above two sheep I found that they were infested with both biting and sucking lice (*Bovicola ovis* and *Linognathus africanus*), and a certain farmer expressed the opinion that this may have accounted for the negative transmission result, as blue lice are cannibalistic and amongst others also prey on scab mites. Consequently a further attempt was made on the 13th December, 1948, when numerous ear scab mites were placed on the tail — a site much favoured by sheep scab acari — of a clean ewe. This ewe was again examined on the 22nd December, 1948, and on the 6th January, 1949, but on both occasions no parasites or lesions were visible.

Ear scab in goats has frequently been encountered in South West Africa, but no record could be traced in regard to the occurrence of this infection in sheep. It was therefore decided to infect a few goats in order to ascertain whether the sheep psoroptes will maintain their existence in the ears of these animals. As no goats are being kept at Neudam, five were obtained from a neighbouring farm and the ears of four of these treated with a mixture of oil and paraffin (2:1) even though on macroscopical examination the ears appeared to be clean and free from any signs of parasitic infestation. On the 13th December, 1948, the untreated goat was slaughtered and *Psoroptes communis var. caprœ* were removed from the ear canals. This, then, also afforded an opportunity of transferring goat ear mites to the ears of sheep, although Shilston (1915) found on several occasions that when acari from the ears of goats were placed in sheeps' ears they quickly died or disappeared in every instance.

For the purpose of this transmission experiment, only the left ears of the four treated goats and two treated sheep were infected with *Psoroptes communis var. ovis* and *P. com. var. caprœ* respectively by introducing into each ear at least three pairs in copula as well as some single mites. About an hour before placing the acari into the ears, the latter were cleaned by instilling into them a little dioxygen and swabbing out with cotton wool. These animals were slaughtered from time to time to check up on the spread of the infection, and my findings are contained in the following table:—

Animal.	*Date Infected.*	*Date Slaughtered.*	*Findings and Remarks.*
Goat No. 1	13.12.48	22.12.48	Right ear clean; left ear contained 5 females, 2 larvae and 2 nymphs.
Goat No. 2	13.12.48	6. 1.49	Right ear clean and left ear, although somewhat scaly, harboured no mites.
Goat No. 3	13.12.48	2. 2.49	No acari could be found macro- or microscopically.
Goat No. 4	13.12.48	2. 2.49	Externally the ears appeared to be quite clean without signs of scaliness, but at post mortem both ears contained waxy plugs in auditory canals with numerous acari in and beyond these plugs.
Sheep Ewe No. X267	13.12.48	22.12.48	Two females and one larva removed from *right* ear; canal of left ear occluded by presence of abscess in inner ear — no acari present in scrapings.
Sheep Ewe No. X232	13.12.48	6. 1.49	Nothing unusual macroscopically; scrapings from right ear contained no acari, while one live female was found in left ear.

From these observations it would appear that the goat ear acari are non-infective to sheep, but the reverse seems to apply in the case of sheep ear psoroptes when transferred to the ears of clean goats judging particularly from the marked positive finding encountered in goat No. 4.

The acari found in the ears of sheep were submitted to Onderstepoort for identification and the Director of Veterinary Services in his minute No. 151/2 dated 29th November, 1948, advised as follows:— " ... the mites present in the specimen are all *Psoroptes communis.* As *Psoroptes communis var. ovis* (sheep scab) are indistinguishable from *P. com. var. caprœ* (goat ear mange), I am unable to tell you which species we are dealing with.... The presence of the mites in the infra-orbital fossæ is probably associated with the ear mange, as these two situations afford rather similar conditions both probably suitable to the mites."

This latter remark recalls to mind a previous failure in a transmission experiment here when an abortive attempt was made to infect a clean sheep with mites removed from the infra-orbital fossæ of a

scab-infected sheep. I feel convinced now that at that time we were dealing with ear mange acari and not the true body scab mites. Although it has at yet not been possible to establish a microscopical difference in the morphology of these two varieties, I am of the opinion that a physiological difference does exist, particularly in regard to the question of locomotion. The ear mange parasites appeared to be more active and moved about more quickly than the acari I have so far observed after their removal from the bodies of sheep infected with scab. It is therefore possible that there may be an anatomical difference in the structure of the organs of locomotion.

When the ear scab was detected at Neudam, I decided to try out a few lines of treatment before resorting to flock treatment of all the small stock on the farm. I was at the time particularly concerned about the presence of the hard waxy plugs in the ears and desired to ascertain whether treatment in any form would be effective or not. Holding the view also that used motor oil may be a bit too thick for effective penetration, I tried mixtures of a thinner oil, viz:, " Gargoyle " brand of separator oil. For the purpose of this experiment, fifteen sheep were selected and treated in five batches of three each on 22nd and 30th November, 1948, instilling about 5 cc. of the following mixtures into each ear on two occasions:— *Batch No. 1* — used motor oil and paraffin, 2:1; *Batch No. 2* — separator oil and paraffin, 2:1; *Bach No. 3* — separator oil 2 and paraffin 1 plus 5% Benhex; *Batch No. 4* — Diesoline plus 5% Benhex; *Batch No. 5* — separator oil 4 parts and 1 part Tetmosol.

The majority of these sheep were slaughtered at varying intervals and scrapings from the ear canals examined macro- and microscopically; the following table furnishes an account of my observations:—

Sheep No.	Treatment.	Condition of Ear. 22/11/48.	Condition of Ear. 30/11/48.	Observations and Remarks.
J 1070		n/u	n/u	Killed 5/12/48 and no acari found.
GR 38B	Batch No. 1	n/u	——	Died 26/11/48; few scales present in both ears. Plug of wax in right ear was saturated with remedy. No acari could be found.
Z 16		Dry white scales in left ear.		Killed 13/1248/ — no mites found.
X 405		n/u	n/u	Killed 13/12/48 — no mites present.
X 94	Batch No. 2	n/u. Few ear ticks present.	n/u. Ticks dead.	No mites demonstrable in scrapings taken on 6/1/49 and ewe discharged.
X 429		Few scales in both ears.	Inside and outside of ears scalded.	Killed 6/12/48 — both ears badly scalded although mucous membrane of deeper ear unaffected. No mites.
R 5357		n/u	Ears showed signs of scalding.	Killed 6/12/48 — both ears scalded. No acari found.
X 267	Batch No. 3	Full of crusts; remedy does not flow into left ear readily (abscess at post mortem).	do.	Infected with goat acari on 13/12/48 — see table on page ——
V 291		n/u. Ticks in both ears.	n/u	Killed 13/12/48 — no mites or ticks.
WK 114X		n/u. Abscess in left ear.	Somewhat scalded.	Killed 6/12/48. One live and one dead mite found in scrapings.
X 407	Batch No. 4	Few scales in right ear; left ear contained ticks.	Both ears scalded.	Killed 13/12/48. No mites present. Ticks dead.
X 232		Few ticks present	Both ears scalded.	Infected with goat acari on 13/12/48 — see table on page ——. No ticks.
G 293		n/u	Slight signs of scalding.	Killed 13/12/48 — no mites demonstrable.
grade V 944	Batch No. 5	Crusts in left ear. Also ticks.	do.	Killed —/12/48 — both ears badly scalded. Contents of ear canal slimey. No acari found.
		Ticks both ears.	do.	No mites in scrapings taken on 6/1/49 and ewe discharged.

From the above it became clear that both separator oil and diesoline were unfortunate choices as these oils caused slight to severe scalding in and around the ears. It does not appear, further, that the addition of double benhex (wettable powder) or tetmosol to these dressings has any advantage over the administration of oil and paraffin alone. The latter is cheaper, effectively penetrates and breaks up the plugs and also destroys the parasites. It is significant, too, that the only positive finding after the two treatments was in the case of sheep

No. WK 114X (Batch No. 4), which had been hand-dressed with a mixture containing 5% benhex.

Conclusions

1. Sheep ear scab is caused by *Psoroptes communis* which may be the *var. ovis* or the *var. caprœ*, as these two are indistinguishable; a physiological, if not anatomical, difference is, however, submitted.

2. The infection is confined only to the ears and infra-orbital fossæ of the hosts and experimentally it has been found that the acari do not maintain their existence nor do they cause lesions when transmitted to other parts of the body of a sheep.

3. Owing to the deep-seated habitat of the mites in the depths of the auditory canals and the invariable absence of symptoms indicative of an ear affection, this type of mange may easily escape detection and yet be very prevalent in a particular herd. A definite negative diagnosis can only be made at a post mortem examination of a suspected animal.

4. While it has been possible to infect at least one clean goat with sheep ear mange, attempts to infect sheep with goat ear acari have been unsuccessful, suggesting that there might even be a third variety of *Psoroptes communis.*

5. Treatment and eradication present no difficulty and hand-dressing of hte ears and infra-orbital fossæ with a mixture of used motor oil and paraffin (2 : 1) was found to be quite effective towards this end.

CASE REPORT

INTERNINAL CALCULUS AND RUPTURE OF SMALL COLON IN A HORSE

S. W. DE VILLIERS,
De Aar

Subject:

Horse stallion " Rainbow," of Flemish breed, aged about 15 years, took ill on Wednesday morning, 26th January, and died the same night.

Ante-mortem Symptoms:

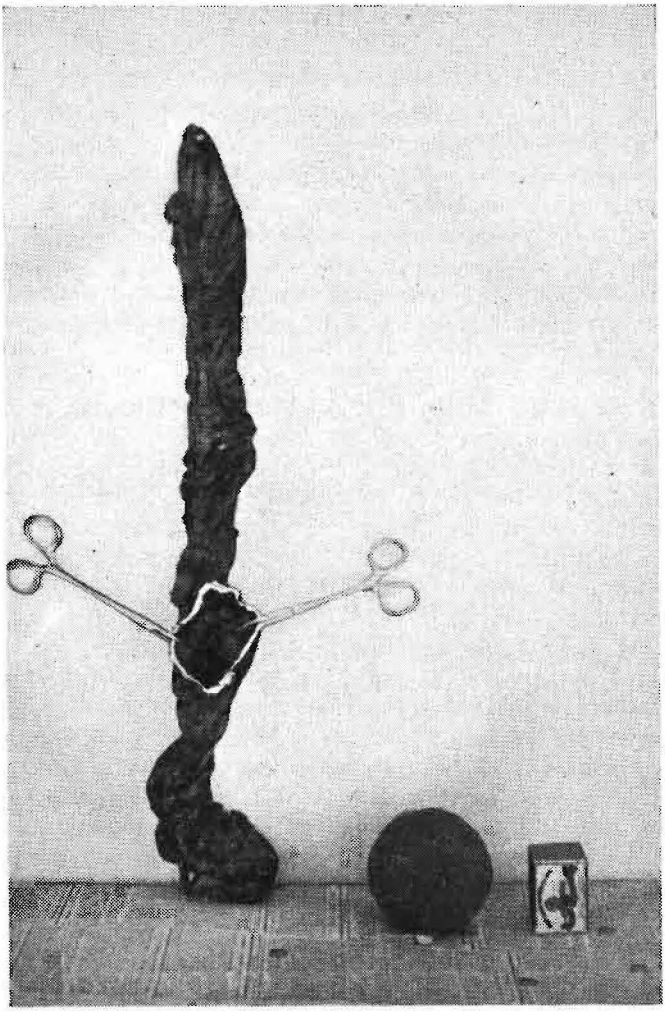
Unfortunately I was not available when called upon to examine this animal prior to death, so that the symptoms given here are those described to me by the owner. " The previous day, Tuesday, the animal was in perfect health. On Wednesday morning 8 o'clock it was noticed to be off its feed. No fresh dung was observed in the stable, so the animal was given a drench consisting of a pint of strong black sweetened coffee. It appeared to be very dejected, standing with head down. At 10.30 it lay down and appeared to be getting worse. At about 4 p.m. a local farmer was called and he gave it a drench of 1 pint of raw linseed oil by bottle through the left nostril. (Incidentally I noted on post mortem that the whole of the oil was contained in the stomach.) At about 6 p.m. the animal commenced to sweat profusely and the respirations were markedly increased. At about 11 p.m. there were marked contractions of the muscles of the abdominal wall and the 'boarding' of muscles appeared at intervals of about 10 minutes. The animal appeared to be in great pain and as far as could be judged died between 1 - 2 a.m."

Post mortem:

A post mortem was held by me on the Thursday. The first thing noticed was an accumulation of about a double handful of dung lying between the intestines and the left abdominal wall. Rupture was obvious and it was found in the small colon, as will be seen in the accompanying photo. Lying next to the liver and loose in the abdominal cavity was a large calculus, the cause of the rupture. For the remainder the lesions shown were those associated with a acute diffused peritonitis.

Description of Calculus:

A smooth rounded object about the size of a large navel orange and slightly compressed laterally. Whereas a cricket ball has a circumference of $8\frac{3}{4}$ inches, the circumference of the calculus is $10\frac{1}{2}$ inches one way and $9\frac{3}{4}$ inches over the compressed sides. *Colour:* Light greenish grey and slightly tinged with yellow. *Consistency:* Hard as a stone. *Heights* $3\frac{5}{8}$ inches and *width* 3 inches. *Weight:* 17·35 ounces. *Rupture*



in Intestine: About 3½ inches long. The edges were touched with white paint so as to show them against the dark background.

Feeds and Water:

The animal was fed on dry lucerne and green feed (lucerne and barley), and grain consisted of mealies, barley and oats. Water is slightly brackish.

Presumably a deposition of salts together with bile salts took place around a nucleus and over a period of years, the calculus increasing in size worked its way backwards and eventually got lodged in the small colon.

I wish to express my thanks to Mrs. W. D. Church, of De Aar, for taking the photo.

CORRESPONDENCE

The following letters are published for the information of members.

Director of Veterinary Services,
P.O. Box 806,
Pretoria.

The Secretary,
S.A.V.M.A.,
Onderstepoort.

Dear Sir,

Inoculation of Stock against Anthrax by Private Practising Veterinary Surgeons.

Under the Stock Diseases Act certain specific areas are proclaimed where the inoculation of stock for Anthrax is compulsory, and it stands to reason that it should be carried out under the supervision of this Department.

In those cases where owners engage the services of a private practising veterinary surgeon, this Departmemnt will recognise such inoculations provided the veterinary surgeon issues to the owner a certificate stating:—

(a) the date of the inoculation,

(b) the number and class of stock inoculated,

(c) the number and class of stock not inoculated and the reasons for not inoculating them, and

(d) the batch number of the vaccine used.

In areas where no compulsory inoculation is in force the certificates indicated above are not necessary.

In the case of an outbreak of anthrax it is expected that the veterinary surgeon will consult the senior veterinary officer or his deputy before any inoculation is undertaken.

The Departmemnt will not accept any responsibility for any bad effects resulting from such inoculation.

A. M. DIESEL,
for Director of Veterinary Services.

The following Magisterial Districts are gazetted Anthrax-Infected Areas:—

G.N. 2699 of 20.12.1946:

(a) The following Magisterial District in the Cape Province:—
Mafeking.

(b) The following Magisterial Districts in the Transvaal Province:—

Benoni, Bethal, Boksburg, Brakpan, Bronkhorstspruit, Germiston, Groblersdal, Johannesburg, Krugersdorp, Lydenburg, Marico, Nigel,

Pietersburg, Potgietersrust, Pretoria, Roodepoort, Rustenburg, Springs, Standerton, Vereeniging, Witbank and Zoutpansberg.

G.N. 2351 of 7.11.1947:
The Magisterial Districts of Brits, Lichtenburg and Waterberg.

G.N. 510 of 5.3.1948:
The Magisterial Districts of Keiskamahoek and Middledrift.

G.N. 727 of 9.4.1948:
The Magisterial Districts of Delareyville and Randfontein.

ROYAL COLLEGE OF VETERINARY SURGEONS

9/10 Red Lion Square,
LONDON, W.C.1,
16th June, 1949.

Dear Sir,

A graduate of the University of Pretoria, in making application for registration in the Register of Veterinary Surgeons of Great Britain and Northern Ireland under section 13 of the Veterinary Surgeons Act, 1881, said that he thought that the expression used in the said Act of 1881 "Colonial List of the Register of Veterinary Surgeons" should be altered.

Would you be so good as to communicate to the members of your association, or cause this letter to be printed, so that they may understand that whilst the strict legal title under the Act of 1881 must remain for the moment the "Colonial List" the list is termed by the Council of this Royal College, and will be published as such — "Commonwealth and Colonial List".

It would need specific legislature in this country, which will have to be undertaken at such future time when opportune, to alter the title of the 1881 Act.

I do trust that your members will appreciate that in 1881 circumstances were somewhat different from those which now exist, and it is not the fault of this Royal College that the Act should remain un-amended on this point.

Yours faithfully,

W. G. R. Oates,
Registrar.

The Secretary,
The Veterinary Association of South Africa,
P.O. Onderstepoort,
Pretoria, South Africa.

SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

Minutes of Council Meeting held at 2.15 p.m. on Thursday, May 12th, 1949, in Prudential House, Pretoria.

Present: J. H. Mason (President), A. M. Diesel (Vice-President), A. D. Thomas, R. A. Alexander, M. H. V. Brown (*vice* J. G. Boswell), G. Pfaff, S. W. J. van Rensburg, M. de Lange (Hon. Treas.), P. S. Snyman, C. F. B. Hofmeyr, R. Clark (Editor), W. D. Malherbe (Hon. Secretary).

Apologies: P. J. du Toit (Hon. Life Vice-President).

The President opened the meeting by welcoming Dr. van Rensburg to his first meeting after his return from Europe.

1. *Minutes of meeting on February 10, 1949.*

2. *Matters arising from these minutes*:—

(a) *National Health Council*: The Secretary reported that Dr. Pullinger had accepted nomination as S.A.V.M.A. representative.

(b) *Restriction on the Sale of Drugs*:

(i) The Secretary reported on correspondence with the local agents of Fort Dodge products. A basis of co-operation had been established and he was requested, with Dr. Parkin, to clarify outstanding points.

(ii) A letter from the Natal Branch was considered. Since several matters under negotiation had not reached finality, it was not yet possible to give a statement on progress.

(c) *Registration Fee, Conferences*: After discussion, it was decided to split up the fees for expenses in connection with the General Meeting, £1 to be for registration and £1 for the dinner and dance (member and partner).

(d) *Welfare Societies*: The Secretary reported that the Departmment of Health had made inspections of an organization not under veterinary control, and arising from these, had prohibited the importation, purchase, acquisition, keeping, use, prescription, order or supply of poisons or preparations to members of this organization.

(e) *Membership*: *Australian Veterinary Association*: The Secretary reported on correspondence with the Australian association. Dr. Malherbe was nominated for membership of that association.

(f) *Calling of Emergency Council Meetings*: The wording of a proposed alteration of Constitution to provide for calling of emergency meetings of Council, was agreed upon in principle. The proposal would be submitted to the General Meeting.

(g) *Maude Bales Scholarship*: Council discussed draft proposals for the institution of a student bursary out of a trust fund to be established by Mrs. Bales, mother of the late Dr. Maude Bales. The President would convey the Council's views to Mrs. Bales's representatives.

(h) *Natal Agricultural Research Institute*: The Secretary reported that a Senior Lectureship post in Veterinary Science had been created and advertised to members of the Veterinary Division. A letter from the Natal Branch was read expressing disappointment that it was not a professorship. Council felt that as the salary scale offered was no worse, and technically better, than that paid to the Veterinary Division, and as much would depend on the merit of the appointee, no useful purpose would be served by boycotting the post.

(i) *International Veterinary Congresses*: The suggestion of Dr. van Rensburg that an invitation should be offered for the next "International" to be held in the Union, had been discussed with the Directorate of the Veterinary Division. Certain practical difficulties precluded the proposed invitation at this stage.

Dr. Alexander raised the question of the financial support of Veterinary Congresses and the contribution of the Association. After discussion it was referred back for clarification. The Secretary for Agriculture had refused the support of the Government.

(j) *Delegate to N.V.M.A. General Meeting*: Dr. Boswell would no longer be in England. Dr. Mason was nominated as the Association's delegate.

(k) *Contracts with Farmers' Associations, etc.*: The statement of various schemes, with their pros and cons, prepared by Dr. Parkin, had been circulated to Council. It was decided that it should be regarded as a general guide, and that the Editor would embody it in an editorial in the *Journal*.

(l) *De Lange Committee Report*: This had not been circulated, as a ruling by the Pharmacy Board was still awaited on a complaint that a chemist was selling "restricted" drugs to lay persons. Knowledge of this ruling was necessary to determine whether legislation was required.

(m) *Tuberculosis Scheme*: Apparently, the suggestion of a Council nominee on the Divisional Committee drafting the Interim Scheme had not been accepted. This committee would, however, in its work consult (amongst others) members of the existing S.A.V.M.A. committee: Drs. Thomas, Marais and Alexander.

3. *New Members*: The following names were accepted for submission to the next General Meeting: A. S. McChlery, J. P. Kriel, I. McFarlane, J. F. du Plooy, C. v. N. Jonker, W. du T. Malan, M. M. Greathead, R. W. Muir, W. H. Andrews.

4. *S.A. Bureau of Standards*: Council nominated Dr. I. P. Marais (alternate Dr. van Aswegen) to serve on a committee dealing with model regulations for farm dairy buildings, and one to prepare a code of practice "amplifying the set of model regulations for farm dairy buildings".

5. *Artificial Insemination*: Held over.

6. *Natal Anti-Tuberculosis Association*: The request for a representative of the S.A.V.M.A. in the place of the late Mr. Amos, would be referred to the Natal Branch for nomination.

7. *Relationship between Private Practitioners and G.V.O's*: Not discussed.

8. *Affiliation with Southern Rhodesia Veterinary Association*: The suggestion from Rhodesia was sympathetically considered, but Council considered that a better course would be to form a Southern Rhodesia branch of the S.A.V.M.A.

9. *Financial support for the establishment of a new Journal in Holland*: Council regretted that this was not feasible.

10. *News Stories about Veterinarians in Newspapers*: As these were frequently appearing it was decided that the Secretary of the Newspaper Press Union be notified as to the ethics of the veterinary profession so that he could inform his members.

11. *General*:

(a) *Invitation of Australian Veterinary Association*: No local S.A.V.M.A. member would be able to be present at their Annual General Meeting, but Dr. H. Hindmarsh, of Sydney, would be asked to represent the S.A.V.M.A.

(b) *Date of General Meeting*: Decided to hold this as soon as possible after the third week in September.

(c) *Booklet with Constitution and Veterinary Act*: As this booklet was out of print and the Veterinary Act was to be amended, it was decided that until reprinting was feasible new members would have to be sent one copy in rotation.

(d) *Next Council Meeting*: July.

The meeting was adjourned at 5.10 p.m.

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

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

OBITUARY

HANS SIGWART

Hans Sigwart, Dr. med. vet., diet at Swakopmund on the 7th of June, 1949, at the age of 64 years. He was born in Germany in 1885 and he qualified at the Veterinary High School, Stuttgart, in 1908. In 1912 he arrived in German South West Africa and received a Government appointment as District Veterinary Surgeon for the districts of Otjiwarongo and Outjo. At the outbreak of the First World War, 1914, he joined the German "Schutztruppe". After the war all the German government officials were repatriated with the exception of three veterinarians (Sigwart, Maag and Schmid), who were allowed to remain in the territory and were appointed as private veterinary surgeons for the farmers' organisation for two years.

A. Goodall, then Chief Veterinary Surgeon of the S.W.A. Administration, took over the three German veterinarians in the Government's service of the Mandated Territory in 1922. From 1922 to 1940 the late Dr. Sigwart was appointed as District Veterinary Surgeon in the districts Okahandja, Keetmanshoop, Grootfontein and Gobabis ,and during this time with his professional enthusiasm and his great experience he rendered valuable services to the country. After the outbreak of the Second World War his career was seriously interrupted by five years' camp life (1940-1945), during which time he was heavily struck by the death of his wife. After returning from camp he took up his loved profession again as Government Veterinary Surgeon at Windhoek, which post he occupied until a few weeks before his death.

The veterinary profession has lost a highly esteemed and trusted colleague and a dear friend. He will be greatly missed by the members of his profession and a wide circle of friends. To his children we extend our heartfelt sympathy in their irreparable loss.

HOW TO KILL AN ASSOCIATION

(*Reprinted from "The British Friesian Journal"*)

(1) Don't come to the meetings.

(2) But, if you do, come late.

(3) If the weather doesn't suit you, don't think of coming.

(4) If you do attend a meeting, find fault with the work of the officers and other members.

(5) Never accept an office, as it is easier to criticise than to do things.

(6) Nevertheless, get sore if you are not appointed on a committee; but, if you are, do not attend the committee meetings.

(7) If asked by the Chairman to give your opinion regarding some important matter, tell him you have nothing to say. After the meeting, tell everyone how things ought to be done.

(8) Do nothing more than is absolutely necessary, but, when other members roll up their sleeves and willingly, unselfishly use their ability to help matters along, howl that the Association is run by a clique.

(9) Hold back your dues as long as possible, or don't pay at all.

(10) Don't bother about getting new members. Let the Secretary do it.

(11) When a banquet is given, tell everybody money is being wasted on blow-outs, which make a big noise and accomplish nothing.

(12) When no banquets are given, say the Association is dead and needs a can tied to it.

(13) Don't ask for a banquet ticket until all are sold.

(14) Then swear you have been cheated out of yours.

(15) If you do get a ticket, don't pay for it.

(16) If asked to sit at the speaker's table, modestly refuse.

(17) If you are not asked, resign from the Association.

(18) If you don't receive a bill for your dues, don't pay.

(19) If you receive a bill after you've paid, resign from the Association.

(20) Don't tell the Association how it can help you, but if it doesn't help you, resign.

SUDAN GOVERNMENT

Applications are invited for the post of Veterinary Research Officer in the Sudan Veterinary Service. Qualifications required are membership of the Royal College of Veterinary Surgeons or S.A. equivalent, and a University degree, preferably in Veterinary Science. Salary will be fixed between £E 780 and 1200 in accordance with age, experience and qualifications. In addition, a cost-of-living allowance from £E 180 to £E 390 per annum according to the number of dependants is at present payable.

Contractual period envisaged is 15 years, on completion of which candidate qualifies for gratuity of £E 5,500. Promotion to the post of Assistant Director (Research) may be open to the selected candidate.

Applications from the Union of S.A. should be sent by air mail to Director, Sudan Veterinary Service, Khartoum, as soon as possible, but not later than September 30, 1949.

More detailed information about the post, and application forms, are obtainable from the Hon. Secretary, S.A.V.M.A.

EDITORIAL

THE SUTHERLAND-STRACHAN MUSEUM OF MEDICAL SCIENCES

Professor A. Sutherland-Strachan was for many years External examiner in Pathology to the Faculty of Veterinary Science and was well-known to most members of our profession. Before his death he visualised a museum of medical sciences at the University of the Witwatersrand. Largely owing to his enthusiasm a suitable building was constructed at the medical school, but this now stands empty, a memento to an unfinished ideal.

As a tribute to the memory of a distinguished and beloved colleague the following bodies have decided to launch a joint appeal for funds to enable this ambitious project to be furthered, viz.: The University of the Witwatersrand; the Southern Transvaal Branch of the Medical Association of South Africa; Witwatersrand University Post-graduate Association; South African Institute for Medical Research, and the Students' Medical Council of the University of the Witwatersrand. The South African Institute for Medical Research has donated its entire collection of pathological specimens.

The museum visualised would represent all branches of medical science and would include X-ray photographs, histological preparations, lantern slides and films. Such a central museum would be of inestimable value to medical and veterinary science throughout Southern Africa, and its sponsors have honoured the members of the veterinary profession by inviting them to contribute towards it. The museum will be available to veterinarians and veterinary students.

Members wishing to contribute should send their donations to the Hon. Treasurer, S.A.V.M.A., P.O. Onderstepoort. The final list and total sum will then be forwarded as from veterinarians. It is proposed to make up the list on the 31st March, 1950.

DIE VERGELYKENDE WAARDE VAN ARSEEN, B.H.C. EN D.D.T. INDIEN GEBRUIK IN DIPBAKKE TEEN BOSLUISE OP BEESTE

P. M. BEKKER, H. GRAF, J. R. MALAN en S. W. VAN DER MERWE,
Onderstepoort

(Voorgedra voor die Kongres van die Suid-Afrikaanse Vereniging vir die Bevordering van Wetenskap te Kimberley, Julie 1949.)

INLEIDING

Met hierdie publikasie beoog ons om 'n oordeel te vel oor die praktiese waarde van arseen, Benseenhexachloried (BHC) en Dichlorodifeniel-trichlooretaan (DDT) as dipstowwe. Slegs die beheer van bosluise op beeste deur middel van dipping word hier behandel. Bespuiting van diere kom nie in aanmerking nie omdat die omstandighede dan heeltemal anders is aangesien die oplossing dan altyd vars en nie besoedel is met grond, mis, uriene en dies meer nie.

Die gegewens gebruik is 'n gedeelte van dié verkry uit 'n jarelange en uitgebreide reeks van grootskaalse veldeksperimente in die Oostelike Provinsie en elders onder die persoonlike toesig van een van ons (P.M.B.) asook skeikundig-analitiese laboratoriumbevindings van dipmonsters uit die eksperimentele en ander dipbakke.

Vir die vergelyking van die waarde van die verskeie dipstowwe is die volgende in ag geneem:

1. Die aard, stabiliteit en toets van dipstowwe.
2. Die uitwerking op —
   (a) *Boophilus decoloratus* (Bloubosluis) en wel die arseenbestaande variëteit hiervan. *Boophilus* is 'n *een-gasheer*-bosluis.
   (b) Die volgende twee- en drie-gasheer-bosluise: *Rhipicephalus appendiculatus* (Bruinbosluis), *R. evertsi* (Rooibosluis), *Amblyomma hebraeum* (Bontbosluis), *Hyalomma aegyptium* (Bontpootbosluis).
3. Die uitwerking op beeste.
4. Die koste van dipping.

1. DIE AARD, STABILITEIT EN TOETS VAN DIPSTOWWE

A. ARSEENDIPSTOWWE

Arseendipstowwe bestaan in wese uit 'n waterige oplossing van natrium-arseniet van meesal 'n 0·16% As_2O_3-konsentrasie. Dit is alom-

bekend dat dit 'n baie stabiele oplossing is. Indien egter min beeste of met lang tussenposes gedip word, mag die arseniet (trioksied) deur spesifieke bakterieë gedeeltelik na die arsenaat (pentoksied) geoksideer word. Dit is egter geen belangrike faktor met gereëlde weeklikse dipping nie en waar 'n neiging tot oksidasie bestaan, kan dit ook buitendien maklik beheer word, byvoorbeeld deur die byvoeging van melasse.

Vir die bepaling van arseen bestaan daar 'n toetser, Jodometer genoem, waarmee beide arseniet en arsenaat bepaal kan word. Die metode is eenvoudig dog akkuraat, en kan vinnig uitgevoer word. Daarby is die toetser goedkoop.

B. B.H.C.-Dipstowwe

B.H.C. is onoplosbaar in water, en gevolglik is van *emulsies* en *suspensies* gebruik gemaak. Van eersgenoemde is twee tipes uitprobeer, een met kresole as basis en die ander volgens 'n eie formule (E30) waarin tolueen as oplosmiddel, kaseïen-harpuisseep as emulsifiseerder, asook 'n stabiliseerder en 'n preserveermiddel gebruik is.

Suspensie-dipstowwe het bestaan uit benatbare poeiers en pastas.

Goedhouvermoë: Gevind is dat *emulsies* relatief onstabiel is, dit wil sê, neem betreklik vinnig af in konsentrasie soos Tabel I duidelik aantoon.

TABEL I

B.H.C.-Emulsies

(Alle waardes van die weeklikse dippings is aangege in dele per miljoen gamma B.H.C.)

	Dipbak A.	**Dipbak B.**	**Dipbak C.**
Varsvulling	**40**	**100**	**100**
Byvoegings	**80**	**200**	**208**
Waardes verkry	42	85	81
	42	85	81
	40	78	70
	46	71	73
	39	85	62
	43	80	65
	38	87	54
	37	82	64
	39	73	57
	35	73	62
Opmerkings	**Hou redelik.**	**Hou redelik.**	**Waardes sak te laag**

Soos skeikundig vasgestel kan word, is dit dus duidelik dat emulsies geneig is om betreklik vinnig in sterkte af te neem. Terloops mag gesê word dat met dipping van skape die verswakking baie meer ooglopend is en baie groter is as met suspensies. Dit is van so 'n graad dat die gebruik van emulsies vir hierdie doel onprakties is.

Alhoewel B.H.C.-suspensies meer stabiel is, toon hulle ook 'n afname in konsentrasie. (Sien Tabel II.)

TABEL II

B.H.C.-Suspensies

(Alle waardes aangegee in dele per miljoen gamma B.H.C. Dipping weekliks)

	Dipbak A.	Dipbak B.
Soort suspensie	Benatbare poeier	Pasta
Varsvulling	**80**	**100**
Byvoegings	**80**	**100**
Waardes verkry	78	90
	71	79
	68	85
	70	75
	69	77
	61	83
	63	83
	56	77
	60	75

Hier is wel ook 'n afname te bespeur, maar dit is geensins so erg as in die geval van emulsies nie, waar in aldrie gevalle *dubbelsterkte*-byvoegings gedoen is. Die suspensie (Tabel II) is aangemaak en aangevul op dieselfde basis, dit wil sê, geen ekstra byvoegings is gedoen nie.

Bepaling: Die chemiese bepaling van B.H.C. maak gebruik van die feit dat deur hidrolise alleenlik drie chlooratome afgesplits word, wat dan op die gewone metode bepaal word met silwernitraat, ammoniumtiosianaat en 'n ferri-indikator. Met gewone tegniese B.H.C. is aangeneem dat dit 10% gamma-isomeer bevat. 'n Waarde van 0·005% gamma B.H.C. (50 d.p.m.) beteken dus slegs dat in werklikheid 'n *totale* B.H.C. van 0·05% bepaal is. Met dipstowwe, waar 'n B.H.C. van hoër gamma-gehalte gebruik is, is die ooreenstemmende hoër faktor gebruik om die gamma-gehalte uit te werk. Die gamma-isomeer word dus nie direk bepaal nie, maar bereken na bepaling van die totale B.H.C.

Alhoewel ons nie nou die saak hier meer breedvoerig wil bespreek nie, mag ons net op 'n verdere ernstige moeilikheid wys. Gegewens is beskikbaar wat aandui dat skeikundige bepalings nie altyd inligting verskaf oor die *effektiewe* bosluisbeherende konsentrasie nie. Hierdie gegewens toon dat somtyds betreklik hoë B.H.C.-waardes in dipbakke gevind mag word, waarvan die uitwerking op bosluise tog laag is. Of ons hier te doen het met die vernietiging van die gamma-isomeer, is nog 'n ope vraag.

Die bepalingsmetode is lank en gevolglik kan 'n skeikundige maar sowat tien monsters per dag doen. Dit is onwaarskynlik dat 'n variasie van hierdie metode in die veld gebruik kan word en tot datum is nog nie 'n velddiptoetser vir B.H.C.-dippe in gebruik nie.

Eksperimenteel is wel getoon dat indien noukeurig te werk gegaan word en deur byvoegings op 'n hoër peil as dié van die eerste opvulling

te doen, die waardes in die dipbak op 'n redelike sterkte gehandhaaf kan word, soos die volgende voorbeeld toon:—

TABEL III

B.H.C.-Suspensie

(Waardes aangegee as d.p.m. γ B.H.C.-dipping weekliks)

Varsvulling	**100**
Byvoegings	**120**
Waardes verkry	96
	93
	96
	67*
	89
	83
	87
	87
	93

* Hierdie waarde is foutief, want die volgende bepalings is gedoen sonder dat byvoegings intussen gemaak is.

In die gewone praktyk egter is die posisie minder gunstig. Die gemiddelde eienaar is nie gekenmerk deur noukeurigheid nie! Die neiging tot afsakking van die B.H.C. bemoeilik ook die neem van verteenwoordigende monsters.

Die volgende tabel (IV) is 'n opsomming van 100 roetine-monsters ontvang uit gebiede waar, omdat geen arseen gebruik is nie, die gammasterkte volgens regulasies 100 d.p.m. moes gewees het. (Hierdie regulasie, wat in werklikheid bloot eksperimenteel was, is teruggetrek en die gebruik van B.H.C. sonder arseen word nie meer toegelaat nie.)

TABEL IV

B.H.C.-dippe (Roetine-monsters)

d.p.m. γ B.H.C.	Aantal monsters
0-9	17
10-19	18
20-29	15
30-39	16
40-49	18
50-59	7
60-69	4
70-79	3
80-89	1
90-99	0
100-109	1

Dit blyk dus dat dit in die praktyk feitlik onmoontlik is vir 'n boer of veeinspekteur om die korrekte konsentrasie te handhaaf.

C. D.D.T.-DIPSTOWWE

Die dipstof wat meesal gebruik is, het bestaan uit 'n eiegemaakte emulsie, E20 genoem, wat 20% para-para D.D.T. bevat het, met tolueen as oplosmiddel en 'n kaseïen-harpuisseep as emulsifiseerder, asook 'n stabiliseerder en preserveermiddel.

Dit is baie opvallend dat alhoewel 'n 0·1% p.p. D.D.T.-*emulsie* in staat is om die arseenbestande bloubosluis effektief te bestry, 'n *suspensie* van 0·12% p.p. heeltemal ondoeltreffend gevind is.

Wat die goudhouvermoë in die dipbak betref bestaan daar ook hier 'n neiging tot afname in sterkte, wat egter in die teenwoordigheid van arseen nie besonder groot is nie. Nadere ondersoek het getoon dat arseen verhoed dat die emulsie breek. In afwesigheid van arseen gaan die emulsie oënskynlik stadigaan oor na 'n suspensie wat blykbaar vinniger afneem in sterkte. Tabel V toon die uitwerking van arseen aan:

TABEL V

(Weeklikse dipping. Waarde aangegee as % p.p. D.D.T. bereken op 'n 70%-basis)

	Dipbak A.	Dipbak B.
Varsvulling	0·1% p.p. D.D.T. en 0·12—0·16% As_2O_3	0·2% p.p. D.D.T. en geen arseen
Byvoegings	do.	do.
Waardes verkry	0·114	0·215
	0·114	0·181
	0·105	0·185
	0·105	0·178
	0·110	0·168
	0·114	0·154
	0·112	0·140
	0·110	0·130

Die bepalingsmetode vir D.D.T. te Onderstepoort gebruik, berus op die nitrasie van D.D.T. waarna 'n oplossing daarvan in aseton en alkohol behandel word met alkoholiese KOH. 'n Rooierige kleur word verkry en 'n foto-elektriese kolorimeter gebruik vir die bepaling daarvan. 70% van die bepaalde waarde word beskou om in die para-para-vorm te wees.

Net soos met B.H.C. is dit ook 'n laboratoriumsmetode en bestaan daar geen veldtoetser nie.

2. UITWERKING OP BOSLUISE.

Om die uitwerking op bosluise te bepaal, is gebruik gemaak van 'n inspeksie van die diere met elke dipping en skatting van die graad

van bosluisbesmetting, asook van broeitoetse deur een van ons (P.M.B.). Voor en na dipping is volgesuigde wyfies van die diere afgeneem — eersgenoemde vir kontrole-doeleindes — en elkeen afsonderlik in 'n klein glasbuisie (⅝" x 1½"), waarvan die bodem met droë filteerpapier bedek is, geplaas. 'n Wattepluisie het as prop gedien. Waar moontlik is probeer om twintig bosluise te versamel. Gedeeltelik is die buisies op die betrokke plase, en later te Oos-Londen, gehou. Ook is in sommige gevalle duplikate na Onderstepoort gestuur om in 'n humiditeitskamer met konstante temperatuur en vogtigheid gehou te word. Geen wesentlike verskil is verkry tussen groepe op verskillende plekke gehou nie.

In tabel VI tot X word samevattend bevindings gegee in verband met —

(a) *Boophilus decoloratus;* Bloubosluis (arseenbestande variëteit).

(b) *Rhipicephalus evertsi;* Rooibosluis.

(c) *Rhipicephalus appendiculatus;* Bruinbosluis.

(d) *Amblyomma hebraeum;* Bontbosluis.

(e) *Hyalomma aegyptium;* Bontpootbosluis.

Wat die bloubosluis betref, is gebruik gemaak van die feit dat hierdie bosluis vir minstens 23 dae op een en dieselfde dier bly om sy lewensloop van larf, nimf en volwassene te kan voltooi. Indien dus 'n dipstof in staat was om *alle* stadia te dood, sou een dipping elke drie weke voldoende wees om die bosluis te beheer. As egter so 'n dipstof net die *larwes* sou dood, sou dit nodig wees om elke week te dip. By die uittoets van dippe is van hierdie feit gebruik gemaak. Beeste is naamlik weekliks gedip en in daardie gevalle waar die dipstof die larwes doeltreffend vernietig, is minstens na die vierde dipping nie meer volgesuigde volwasse bloubosluise gekry nie. In hierdie gevalle verdwyn die nimf die eerste, terwyl larwes wat in die tussenposes opgetel is, teenwoordig is. Die volwassenes word al minder om uiteindelik heeltemal te verdwyn.

Alle B.H.C.- en D.D.T.-syfers verteenwoordig die persentasie gamma B.H.C. (of d.p.m.) en die persentasie para-para D.D.T. respektiewelik.

TABEL VI

Boophilus decoloratus, Bloubosluis (arseenbestande)

No.	Dipstof.	Aantal Kolleksies.	% Dood.	Gelê % onvrugbaar.	Gelê % uitgebroei.	Opmerkings.
1	0·16 – 0·24% As_2O_3	9 x 20	0	12	88	
2	Kontroles	1 x 20	0	25	75	
3	0·005% γ B.H.C. (50 d.p.m.)	2 x 20 1 x 9 1 x 5	17	63	20	
4	Kontroles	2 x 20	3	55	42	
5	0·01% γ B.H.C. (100 d.p.m.)	2 fl 20	57	43	0	0·04% As_2O_3 teenwoordig.
6	Kontroles	2 x 20	5	60	35	
7	0·1% p.p. D.D.T.	1 x 20 1 x 7	69	21	10	In twee uit die drie bakke was 0·04% As_2O_3
8	Kontroles	3 x 20	2	43	55	
9	0·2% p.p. D.D.T.	3 x 20 1 x 1	93	7	0	
10	Kontroles	1 x 20	20	35	45	
11	0·12% p.p. D.D.T. *Suspensie*	1 x 20	0	10	90	Hier is 'n suspensie gebruik en nie 'n emulsie nie, soos in die ander gevalle. (Selfs geen effek op larwes nie.)
12	Kontroles	1 x 20	0	5	95	

Volgens hierdie tabel is dit baie duidelik dat arseen geen uitwerking op die arseenbestande bloubosluis het nie en sy uitbroeiing ongestoord toelaat. Beide 0·005% γ B.H.C. (50 d.p.m.) en 0·1% p.p. D.D.T. het 'n duidelike uitwerking sowel wat betref mortaliteit as belemmering van uitbroeiing. Met 'n verdubbeling van hierdie sterktes is daar 'n hoë sterftesyfer (57% en 93% respektiewelik) en 'n algehele onvrugbaarheid van die oorlewendes.

Wat die D.D.T.-suspensie betref is dit heel duidelik dat dit geen wesentlike uitwerking op die volwasse volgesuigde bosluis het nie.

Aangesien die bloubosluis 'n een-gasheer-soort is, is dit nie van groot belang as die dip nie al die volwassenes uitwis nie, mits dit natuurlik een of ander van die ontwikkelingstadia doeltreffend kan vernietig. Hier is veral die larwe kwesbaar gevind, sodat beide B.H.C. en D.D.T., indien weekliks gebruik, in staat is om die diere totaal skoon te hou van nimfe en volwassenes.

Daar is egter 'n verskil tussen die twee dipstowwe wat betref die nawerking of residuele effekte. Wat B.H.C. betref, het dit geen noemenswaardige nawerking nie en word die bosluis slegs 100% gedood in die larwestadium met weeklikse dipping. As met langer tussenposes gedip word, maak volwassenes wel hul verskyning.

In die geval van D.D.T. word ook veral net die larwes gedood, maar indien 'n 0·2% gebruik word, is dit in staat om beeste van bloubosluise skoon te hou al word veertiendaagliks gedip. Dit is volgens die proewe baie duidelik dat die nimf nie doeltreffend beheer word nie, maar dat die *larwe* wat self 'n week na dipping opklim nog gedood word.

Met 'n 0·5% p.p. D.D.T.-sterkte is vasgestel dat larwes nog tot twaalf dae na dipping gedood word.

In Suid-Afrika het 'n verdere probleem in verband met B.H.C. opgedoem, sodat 'n *B.H.C.-resistente bloubosluis* nou sy verskyning gemaak het. Whitnall en sy medewerkers (1948) het deur middel van in-vitro-toetse die bestaan daarvan bewys en hul bevindings in verband hiermee verlede jaar aan hierdie Vereniging meegedeel. Dipproewe deur Blomefield en Bekker nou pas voltooi, bevestig die bestaan van 'n B.H.C.-resistante varieteit. Verdere proewe deur hulle gedoen, toon dat *geen D.D.T.-weerstand* ontwikkel het nie en dat hierdie soort wel doeltreffend beheer kan word deur die gebruik van D.D.T.-emulsies as byvoegsels tot 'n sewedae-sterkte arseendip en wel met konsentrasies van 0·1% D.D.T. by varsopvulling plus 0·2% D.D.T. vir verdere aanvullings, plus natuurlik die arseen hiervoor benodig.

Departementele inligting dui daarop dat hierdie nuwe stam al taamlik verspreid voorkom, en byvoorbeeld alreeds in Swaziland is. Met inagneming van hierdie feite bestaan die groot gevaar dat B.H.C.-dipstowwe binnekort van geen verdere nut sal wees vir die bestryding van die bloubosluis nie. Alhoewel effektief is D.D.T. baie duurder.

DIE UITWERKING VAN B.H.C. EN D.D.T. OP TWEE- EN DRIE-GASHEER-BOSLUISE

In tabelle VII tot X word samevattend die bevindings in verband met hierdie bosluissoorte gegee:—

TABEL VII

Rooibosluis (Rhipicephalus evertsi)

No.	Dipstof.	Aantal Kolleksies.	Aantal Bosluise.	% Dood.	Gelê % onvrugbaar.	Gelê % uitgebroei.
1	0.005% γ B.H.C.	18	307	6	20	74
2	0.01% γ B.H.C.	18	312	22	9	69
3	0.0125—0.0150% γ B.H.C.	7	130	26	15	59
4	0.1% p.p. D.D.T.	6	83	12	12	76
5	0.2% p.p. D. D. T.	14	265	15	6	79
6	0.16% As_2O_3 en 0.24% As_2O_3	3	46	39	36	25
7	Kontroles — ongedip	14	266	2	11	87

TABEL VIII

Bruinbosluis (Rhipicephalus appendiculatus)

No.	Dipstof.	Aantal Kolleksies.	Aantal Bosluise.	% Dood.	Gelê % onvrugbaar.	Gelê % uitgebroei.
1	0.005, 0.01 en 0.0125% γ B.H.C.	7	95	8	3	89
2	0.12% As_2O_3 0.005% γ B.H.C.	1	10	50	20	30
3	0.16% As_2O_3, 0401% γ B.H.C.	1	20	90	10	0
4	0.2% p.p. D.D.T.	4	65	29	19	52
5	0.12% As_2O_3, 0.1% p.p. D.D.T	2	40	25	55	20
6	0 16% As_2O_3, 0.2% p.p. D.D.T.	1	3	67	33	0
7	Kontroles — ongedip	4	55	10	8	82

TABEL IX

Bontbosluis (Amblyomma hebraeum)

No.	Dipstof.	Aantal Kolleksies.	Aantal Bosluise.	% Dood.	Gelê % onvrugbaar.	Gelê % uitgebroei.
1	0.01% γ B.H.C.	12	168	22	38	40
2	0.12% As_2O_3, 0.005% γ B.H.C.	2	40	42	40	18
3	0.16% As_2O_3, 0.005% γ B H.C.	4	40	84	16	0
4	0.2% p.p. D.D.T.	1	5	0	0	100
5	0.12% As_2O_3, 0.1% p.p. D.D.T.	2	40	37	43	20
6	0.16% As_2O_3, 0.1 en 0.2% p.p. D.D.T.	5	80	65	34	1
7	Kontroles — ongedip	5	100	3	25	72

TABEL X

Bontpootbosluis (Hyalomma aegyptium)

No.	Dipstof.	Aantal Kolleksies.	Aantal Bosluise.	% Dood.	Gelê % onvrugbaar.	Gelê % uitgebroei.
1	0·01% γ B.H.C.	11	163	17	12	71
2	0·12% As_2O_3, 0·005% γ B.H.C.	3	38	73	20	7
3	0·16% As_2O_3, 0·005% γ B.H.C.	7	130	56	40	4
4	0·2% p.p. D.D.T.	2	15	10	30	60
5	Kontroles — ongedip	2	30	3	10	87

'n Kritiese ontleding van bogenoemde tabelle laat geen twyfel:—

(1) dat die alleengebruik van B.H.C. of D.D.T. vir hierdie groep van bosluise ontoelaatbaar is;

(2) dat tesame met arseen die vrugbaarheid van die wyfie in so 'n mate aangetas word dat die nakroos feitlik uitgewis word;

(3) dat die arseensterkte nie minder as 0·16% As_2O_3 behoort te wees nie.

Aangesien dipstowwe oor die algemeen slegs 'n minimale effek het op volwasse volgesuigde bosluiswyfies, wat betref die onmiddellike doodmaak, kan sterilisasie van eiers as gevolg van dipping nie sterk genoeg beklemtoon word nie. Van die oogpunt van verkryging van doeltreffende bosluisbeheer is dit van die uiterste belang.

Hierdie sienswyse word gesteun deur die bevindings van Arnold (1949), wat proewe gedoen het met *Boophilus annulatus* var. *microplus* (nie arseenbestande variëteit nie). Hy bevestig ook die effektiwiteit van arseen en die ondoeltreffendheid van die nuwere dippe op die volwasse wyfies.

Die versameling van voldoende volwasse rooibosluise vir broeitoetse was maklik, maar in die geval van die bontbosluise en veral die bruinbosluise was dit, toe ons eksperimente begin het, nie die geval nie. Alhoewel ses-en-dertig dipbakke betrokke was en wel oor 'n tydperk van bykans drie en 'n half jaar, kon waarnemings met hierdie bosluise eers in latere stadia van die proewe onderneem word.

By die begin was die arseenbestande bloubosluise die vernaamste probleem en is dus meesal plase uitgekies waar besmetting deur hierdie

bosluis die strafste was ten spyte van gereelde arseendipping. Bont- en bruinbosluise was gevolglik skaars. Met verloop van tyd, egter, het hulle meer en meer begin word as gevolg van die afwesigheid van arseen, somtyds so erg dat die proewe beëindig moes word, om deur byvoeging van arseen weer beheer oor die besmettings te verkry.

Talle van boere het presies dieselfde ondervinding opgedoen en was verplig om weer terug te gaan na arseen.

3. UITWERKING OP DIE DIERE

Wat arseen betref, is daar 'n mate van gevaar verbonde aan sy gebruik weens sy giftigheid, die neiging tot branding van beeste en 'n vermindering van die werkvermoë van trekosse onder ongunstige weersomstandighede, asook 'n geringe nadelige beïnvloeding van die melkproduksie.

Deur noukeurigheid en oordeelkundige toepassing kan hierdie nadele egter tot 'n minimum beperk word. Met inagneming van sy stabiliteit, effektiwiteit (behalwe teen die arseenbestande variëteit) en die lae koste word bogenoemde nadele deur hierdie voordele oorskadu.

In die geval van B.H.C.- en D.D.T.-dipstowwe soos hier gebruik, is geen nadelige uitwerking teëgekom nie, behalwe in een geval waar 'n ander oplosmiddel, naamlik benseen, in plaas van tolueen uitgetoets is. Albei is betreklik nie-giftig en kan sonder gevaar gebruik word onder alle weersomstandighede.

As hierdie dippe dus meer stabiel en doeltreffend was, sou hulle vanuit die oogpunt van veiligheid goeie plaasvervangers van arseen gewees het. Ongelukkig is dit nie die geval nie.

4. KOSTE VAN DIPPING

Ten slotte sal dit van belang wees om kortliks iets mee te deel oor die koste van dipping met die stowwe onder bespreking, en vir hierdie doel is Tabel XI opgestel.

TABEL XI

Vergelyking van Koste van Weeklikse Dipping met Arseen, B.H.C. en D.D.T.

Grootte van Dipbak : 4,000 gelling. Getal Beeste : 200.

Dipstof.	Koste van Varsvulling	Koste van Byvoegings (Basis 30 gell. per bees per jaar.)	Totale koste per jaar.	Koste per Bees per Jaar.
1. Arseen : 0·16% As_2O_3 :				
(a) Arseniet (poeier)	£2 7 3	£3 10 9	£5 18 0	7d.
(b) Goedkoop patente dip	£5 0 0	£7 10 0	£12 10 0	15d.
(c) Duur patente dip	£13 6 8	£20 0 0	£33 6 8	40d.
2. B.H.C. : 100 d.p.m. γ B.H.C.				
(a) Benatbare poeier	£9 0 0	£13 10 0	£22 10 0	27d.
(b) Pasta	£19 0 0	£28 10 0	£47 10 0	57d.
3. D.D.T.: 0·1 met 0·2% p.p. D.D.T. vir byvoegings :				
(a) Emulsie E20	£23 0 0	£69 0 0	£92 0 0	110d.
(b) Patente Emulsie	£24 2 4	£72 4 3	£96 6 7	116d.
4. Arseniet plus B.H.C. (100 d.p.m.)	£11 7 3	£17 0 9	£28 8 0	34d.
5. Arseniet plus D.D.T. (0·1% p.p.)	£25 7 3	£72 10 9	£97 18 0	117d.
6. D.D.T.: (0·5% p.p.)	£115 0 0	£172 10 0	£287 10 0	345d.
7. B.H.C. : 250 – 500 d.p.m. γ B.H.C.	£22 10 0	£33 15 0	£56 5 0	68d.–135d.
	–£45 0 0	–£67 10 0	–£112 10 0	

No. 6 en 7 toon toon die sterktes waarskynlik toelaatbaar vir B.H.C. en D.D.T. sonder arseen (behalwe die 0·04% As_2O_3 benodig vir die beskerming van die D.D.T.-emulsie) om 'n redelike bosluisbeheer te verkry. In die geval van B.H.C., egter, afgesien van die verlies van die biologiese waarde, kan die B.H.C.-bestande bloubosluis nie eers deur 500 d.p.m. γ B.H.C. volkome beheer word nie. (Ongepubliseerde bevinding van Blomefield en Bekker.)

Soortgelyke hoë sterktes word in verskeie ander lande vir dipping en bespuiting aanbeveel, dog watter boer sou bereid wees om sowat 7s. 6d. vir B.H.C. en 29s. vir D.D.T. per bees per jaar te betaal?

Opsomming

In hierdie artikel word die relatiewe bosluisdodende eienskappe van arseen, B.H.C. en D.D.T. behandel, indien gebruik in dipbakke met weeklikse tussenposes. Proewe is oor 'n aantal jare op 'n uitgebreide skaal uitgevoer.

Hierdie proewe het getoon :—

I. Dat nòg D.D.T. nòg B.H.C. toelaatbaar is vir alleengebruik op ons sogenaamde enkel- en dubbelsterktes (0·1% en 0·2% p.p. D.D.T. en 50 en 100 d.p.m. γ B.H.C.) in dipbakke omdat —

(a) hulle betreklik vinnig in die dipbak verswak;

(b) geen veldtoetsers beskikbaar is om 'n gewenste sterkte maklik te kan handhaaf nie. Die laboratoriumsmetodes vir bepaling van die sterkte is tydrowend, en dui baie keer, in die geval van B.H.C., nie die werklike bosluisdodende sterkte van die dipstof aan nie; en

(c) hul doeltreffendheid teen bosluise (behalwe die bloubosluis) onbevredigend is, veral as die dipstof vir 'n tyd in gebruik was.

II. In die emulsies soos hier gebruik, verloor B.H.C. sy sterkte vinniger as D.D.T. Emulsies van D.D.T. is in die teenwoordigheid van arseen betreklik stabiel en is die beste middel vir arseenbestande bloubosluisbeheer met 0·1% p.p. varsvulling en 0·2% byvoegings.

III. In suspensie (benatbare poeier)-vorm is dit gevind dat D.D.T. baie onbevredigend is, inteenstelling met B.H.C., wat verkiesliker in hierdie vorm is.

IV. Met die verskyning van 'n B.H.C.-bestande bloubosluis het die waarde van B.H.C.-dippe nog verder beperk geraak.

V. In teenstelling met arseendippe, wat 'n merkbare uitwerking het op die volwasse volgesuigde bosluise (behalwe teen die arseenbestande bloubosluis) het B.H.C. en D.D.T. geringe uitwerking beide wat betref die aantal gedood, sowel as die onvrugbaarheid van die eiers. Tesame met arseen, op 'n minimum sterkte van 0·16% As_2O_3, gee B.H.C. en D.D.T. 'n hoë syfer vir aantal gedood en feitlik 'n totale uitwissing van die nakroos van dié wat oorbly. (Sien tabelle VII tot X, laaste 3 kolomme.)

VI. 'n Sterkte van 0·5% p.p. D.D.T. (met 0·04% As_2O_3 as 'n preserveermiddel vir die emulsie) gee 'n algehele bosluisbeheer; met B.H.C. sou die waardes waarskynlik tussen 0·03 en 0·05% γ B.H.C. wees (behalwe teen die B.H.C.-bestande soort). Hierdie sterktes is vir Suid-Afrikaanse omstandighede egter onekonomies en sou nie deur die meeste boere aanvaar word nie.

VII. Die koste van dipping word behandel (tabel XI). Dit blyk dat met die huidige pryse arseendipstowwe die goedkoopste is, dan volg B.H.C., met D.D.T. heelwat duurder.

Vir hierdie redes het die AfdelingVeeartsenydiens besluit om die gebruik van D.D.T. en B.H.C. alleen toe te laat as byvoegings tot arseendippe (minimum 0·16% As_2O_3) om die arseenbestande bloubosluis te beheer en om die algemene doeltreffendheid van die arseendipstof te verhoog.

SUMMARY

In the above paper an attempt is made to evaluate the relative tickicidal properties of arsenicals, B.H.C. and D.D.T. when used in dipping tanks with weekly dipping intervals. Experiments were conducted on an extensive scale over a number of years.

These experiments showed that:—

I. The use of neither D.D.T. nor B.H.C., when used without arsenic at our so-called single and double strengths (0·1 and 0·2% p.p. D.D.T. and 50 and 100 p.p.m. γ B.H.C.) can be recommended in dipping tanks, since —

(a) these dips lose their strength fairly rapidly;

(b) no fieldtesters are available to provide a rapid check on their strengths. The laboratory methods for determining the strengths are tedious and time-consuming, and, in the case of B.H.C., do not always yield an indication of the lethal value of the dip; and

(c) their efficacy against ticks (except the blue tick) is unsatisfactory, especially when the dipwash has been in use for some time.

II. In the emulsions as used in this experiment, B.H.C. loses strength more rapidly than D.D.T. Emulsions of the latter are, in the presence of arsenic, fairly stable and proved to give the best control against the arsenic-resistant blue tick, when used at 0·1% p.p. for fresh filling and 0·2% p.p. for replenishings.

III. In suspension (wettable powder) form, D.D.T. was found unsatisfactory in contrast to B.H.C., for which suspensions proved the better medium.

IV. With the appearance of a B.H.C.-resistant blue tick, the value of B.H.C. dips has further been limited.

V. In contrast to arsenicals, which have a marked effect on the adult fully engorged tick (except, of course, against the arsenic-resistant blue tick), the effect of B.H.C. and D.D.T. as regards the % death before oviposition and the sterilization of the eggs of the survivors, is very disappointing. A combination of B.H.C. or D.D.T. with arsenic (minimum 0·16% As_2O_3) provides a high percentage of deaths before oviposition and practically 100% sterilization of the eggs of the survivors. (Refer to tables VII to X, last 3 columns, in which are listed the % dead, that is dead before ovipositing, % sterile and % hatched of the eggs of the survivors.)

VI. A strength of 0·5% p.p. D.D.T. (with 0·04% As_2O_3 as a preservative for the emulsion) gives a complete tick control; for B.H.C.

comparable figures would probably be in the line of 0·03 to 0·05% γ B.H.C., except, of course, against the B.H.C.-resistant blue tick. These strengths are, however, uneconomical under South African conditions and would not be acceptable to most farmers.

VII. The cost of dipping is considered separately (table XI). From this it emerges that at the present time arsenicals are by far the cheapest, followed by B.H.C., whereas D.D.T. is far more expensive.

In view of these findings the Division of Veterinary Services has decided to allow these dipping materials only as an addition to an arsenical dipwash (minimum 0·16% As_2O_3) to combat the arsenic-resistant blue tick and for increasing the tickicidal properties of the arsenical dipwash.

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THE SOFT PALATE (PALATINUM MOLLE) AS A CAUSE OF DYSPNOEA IN TWO RACEHORSES

J. QUINLAN, S. W. J. VAN RENSBURG and N. C. STARKE.

Two cases of dyspnœa which developed during galloping in thoroughbred horses will be discussed briefly, with the object of drawing pathology of the soft palate as an ætiological factor in dyspnœa, to the notice of our colleagues, and to request them to communicate their experiences of the condition for publication in this Journal or to the writers.

During thirty-five years of the closest contact with hunting, polo and racing, one of us (Q) has encountered only the two cases now being described.

The condition must be uncommon, since no reference to it can be found in standard text-books on surgery available (Möller und Frick, 1921; Frick, 1921; Fröhner und Eberlein, 1920; Röder und Berge, 1939; O'Connor, 1938; Merillat, 1921; Wooldridge, 1923; Frank, 1945).

The history of the two cases was similar. They were both very good race-horses; they had been in the top class of our horses in South Africa. Both were stallions, six years old. One had done all his racing at the coast, the other had raced only in the Transvaal. They were in excellent health and in hard racing condition. There was no history of any previous febrile disease, such as influenza, pneumonia, strangles or biliary fever. Nothing abnormal was noticed until the horses were five years old. Both had won races at this age. The difficulty in respiration developed later.

The owners stated the horses "choked up" during running after going a couple of furlongs; that they had become "roarers".

When the horses were galloped for their wind, after going about a furlong at half speed, a vibratory snoring noise became evident during expiration. It was quite different from the characteristic noise heard during inspiration in the true "whistler" or "roarer" (*Hemiplegia laryngis*). Continued forced exercise caused distress. When the horses were pulled up the noise disappeared. "Grunting" was not evident when the horses were tested in the usual way. It was concluded that the dyspnœa was due to a pharyngeal obstruction to expiration, either a new-growth or some lesion of the soft palate.

Examination of the pharynx and larynx with a rhino-laryngoscope did not show any pathological condition. Consequently it was decided to make a more intimate examination through a laryngotomy opening.

The horses were anæsthetised, using chloral hydrate in 10 per cent glucose-saline intravenously. Deep anæsthesia was completed by chloroform inhalation.

The larynx was opened by an incision through the crico-thyroid and crico-tracheal membranes, extending from the anterior aspect of the thyroid notch, through the cricoid cartilage to the first tracheal ring. A dilator was placed in position. The larynx and pharynx were then carefully examined. Nothing pathological was found. Since the snoring noise could arise only from vibration of the soft palate, no new growth being present, it was decided to remove a portion of it. This was done by grasping the free border (*Arcus palatinus*) in a strong curved forceps to a depth of about two-and-a-half centimetres. A portion of the palate was then excised by cutting around the forceps with a 9-inch slightly curved, blunt-pointed scissors. In this way a piece of the palate, approximately 4·5 - 5·0 cms. wide by 3·5 - 4·0 cms. deep was excised. Only the central portion was removed. There was no interference with the antrior or posterior pillars (*Arcus glosso-palatinus* and *Arcus pharyngopalatinus*).

Hæmorrhage was slight and needed no surgical intervention. The open border of the palate, which now appeared semi-circular, was not sutured. The laryngeal wound was left open. Recovery was normal.

It has been our routine procedure to wait two months before galloping horses for their wind following the ventricle-stripping operation for "whistling" and "roaring". During this period they are walked for one to one-and-a-half hours daily. This procedure was also adopted with the present cases.

When galloped both horses proved perfectly sound and have gone back to racing. Both have run since without showing evidence of dyspnœa, either in training gallops or racing.

The result of the operations proved that the cause of the dyspnœa in both cases was some pathological condition of the soft palate, perhaps a paresis or paralysis of the *M. palatinus* and the *M. levator veli palatinus,* both of which are supplied by the pharyngeal branch of the vagus nerve. The former shortens the palate, while the latter raises it and closes the posterior nares during deglutition. Regarding the physiological rôle played by the muscles of the soft palate during deglutition it can be pointed out that, even after partial removal of the palate, and with it, portion of the fibres of the muscles, the passage of food and water through the pharynx remained unaffected. The degeneration of the fibres of the pharyngeal branch of the vagus supplying the palatinus and the levator of the palate must have been entirely local, that is, of course, if the suggested diagnosis of the ætiology of the dyspnœa is correct. If the pharyngeal branch itself had been involved the horses would probably have shown difficulty in swallowing. As stated previously there was no difficulty with deglutition. The frequency of degeneration of the recurrent laryngeal nerve (*N. recurrens*), a branch

of the vagus, which supplies all the muscles of the larynx, except the crico-thyroid (*M. crico-thyroideus*), is well known. The *M. tensor veli palatini* may, of course, also have been involved. This muscle gets motor fibres from the mandibular branch of the trigeminus. It is suggested that its involvement is unlikely since there was no apparent pathology of any other structures supplied by this nerve. Neither is local branch-degeneration observed in a similar way to that occurring with the recurrent branch of the vagus. Anyhow it is not associated with similar ætiological factors.

The fact that the muscles of the soft palate, getting motor power from the vagus, namely the palatinus and the levator, whose healthy state appears to be concerned with normal respiration in the race-horse are involved may not be without significance. The commonest predilection site for vagal branch degeneration is, no doubt, the recurrent. May it not be that the fibres of the pharyngeal branch, supplying the palatinus and the levator of the soft palate, can also be concerned in a similar degeneration?

The fact that the condition developed in two good race-horses after their fifth year of age, without previous history of dyspnœa during racing, excludes congenital deformity of the palate such as has been described in certain breeds of dogs.

In view of the negative history of disease the development of the condition and its ætiology are difficult to explain. However, similar difficulty may be experienced with true "whistling" or "roaring" with which the writers suggest there is some similarity.

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SOME SURGICAL EMERGENCIES IN SMALL ANIMALS

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(Paper read to the Witwatersrand Branch in July, 1949)

It is not my intention to attempt to deal with or classify all the sudden and drastic happenings that a busy practitioner sees, but rather to describe a few cases that have been seen and treated, in the hope of provoking a discussion on them and other experiences.

Any sort of classification of emergencies is difficult — in the first place not all the cases noted here are emergencies in the strict sense, in fact some may be called owner's emergencies: where the owner considers that an animal is in dire need and must have immediate treatment when in reality things are not quite so desperate. Other emergencies can arise through the efforts of the practitioner himself, e.g. an anæsthetic crisis, as may appear in the course of an operation for some ordinary condition. But two large groups of cases can be separated, the first being emergencies connected with foreign bodies. It is a point of some interest that a large number of our cases in the urgent category are due directly or indirectly to foreign bodies. These usually are of extraneous origin, but many are formed in the body itself, and these, though not strictly foreign bodies, have the same, generally obstructive, effects. A second big group of emergencies is made up of those due to accidents and fights — a large number of varied and interesting cases fall under this heading.

To start with the foreign bodies: the most common of all is a bone (usually a piece of flat rib), stick or similar object lodged across the hard palate and jammed between the upper molars. This occurrence is always distressing to the dog, and often more so to the owner. Nervous dogs often go frantic and in their excitement do serious damage to the cheeks and lips from frenzied scratching and rubbing the side of the face along the ground. The treatment is simple and there is rarely any trouble in levering the bone free with the fingers or any blunt instrument. Sometimes it is so firmly wedged or the dog so excited or intractable that a short-acting anæsthetic such as pentothal sodium has to be used. No after-treatment is necessary unless skin wounds or abrasions need attention. One case worthy of note was a Sealyham, where a bone had been stuck for several days; a deep suppurative dermatitis had been set up on the cheeks and this took some time to heal after the cause of the trouble had been removed.

An encircling band of any elastic material is a foreign body seen fairly often in the mouth and elsewhere. In a few cases a tracheal ring from a sheep or calf pluck has become fixed round the tongue and one of these was a serious emergency, as the ring was round the root of the tongue and had produced a complete venous stasis. The tongue was several times its normal size and the animal — a Cairn Terrier — was in great danger of suffocation. Tracheotomy was considered and prepared for, but the tongue quickly went down when the tracheal ring was removed. A rubber band can perform a slow amputation, and a case worthy of mention was a cat with a very deep gash completely encircling the neck about halfway down its length. It had been treated in various ways by the owners for a considerable time, but the wound grew steadily larger and deeper. An ordinary stationer's rubber band was embedded deep in the mass of granulation tissue encircling the neck. It was difficult to imagine how the jugular veins and the trachea had escaped damage in this case. The wound healed quickly when the band was removed.

Foreign bodies in the eyes are not as commonly seen as one would expect, but are worthy of mention. Objects such as chips of stone or thorn tips embedded in the cornea seem to cause less irritation and pain than bodies in the conjunctival sac. They are usually easily removed with the aid of a surface anæsthetic such as butyn sulphate. An oculent containing a local anæsthetic is useful in after-treatment.

A mass of bone and meat stuck in the pharynx can give rise to a serious emergency. Greedy feeders are liable to this misfortune — and a case comes to mind of a bulldog with a mass of meat and gristle which he could not swallow lodged in his pharynx. He was quite blue when brought in and almost at his last gasp, so that it was obvious that something had to be done quickly. Fortunately a strong tag of cartilage was palpable at the back of the tongue and a quick pull on this brought out the spherical mass of soft veal bone and gristle, about 5 inches in diameter. A word of warning is perhaps apposite here: manual removal was the only way that such a foreign body could be removed in time, but the greatest care is necessary to avoid injury to the fingers from the almost convulsive jaw movements. There is tremendous crushing power in the back molars of a bulldog or similar breed.

Bones and other foreign bodies stuck in the œsophagus do not always constitute emergencies, but many of these cases must be treated without delay, as they have often been ill for some days, due to the all too common tardiness on the owner's part in seeking professional advice. Once a diagnosis has been established every effort should be made to remove the obstruction as the danger of perforation is always present, and the most common site is towards the œsophagus, so that a septic pleuritis always follows perforation. Many of the pieces of bone found in these cases have sharp and pointed ends, but even smoother ones can penetrate the œsophagus through necrosis of its wall, and once pene-

tration occurs the outcome is almost invariably a fatal one. The diagnosis in these cases is often difficult, but important points are pawing at the neck and throat and vomiting a minute or two after swallowing. The vomitus is mixed with saliva and may be evil-smelling, but does not have the odour of gastric contents. A general anæsthetic and a radio-opaque stomach tube under direct fluoroscopic observation usually confirms the diagnosis. The obstruction can be felt with the tube and often seen — but not always, because it is frequently a very thin sliver of bone and difficult to see under the screen. Removal with an œsophageal forceps under direct vision is always worth trying and often succeeds. The danger of tearing the œsophagus can be minimised by taking care that there is no undue resistance to the forceps and the foreign body. Where removal cannot be accomplished it is sometimes possible to push the mass into the stomach, where it can either be left to be digested or removed by gastrotomy.

An unusual case is worthy of description here: one where the obstruction was formed in the body. This was a five-year-old Scottish Terrier bitch which showed typical symptoms of œsophageal obstruction. She was very thin, fairly bright, and very hungry. Any solid food was swallowed eagerly and without difficulty, but came up again within two minutes; liquid foods were to some extent retained. She had been getting worse for several months. Radiological and fluoroscopic examinations were negative, but a soft obstruction in the œsophagus near the entrance to the stomach could be felt with the tube. Gastrotomy was performed and a spirocerca tumour removed with some difficulty from the œsophageal wall about two inches above the entrance to the stomach. The tumour measured $2\frac{1}{2}$ inches in diameter and stopped everything but a small amount of fluid. The bitch did well and put on condition but died about four months later with similar symptoms, and at post-mortem examination a large spirocerca mass was found further up the œsophagus.

Foreign bodies in the stomach do not as a rule give rise to emergencies, but in the intestine they very often do. Bones are not common as intestinal foreign bodies — most dogs eat bones, but the vast majority must either be digested or pass through the intestinal tract without doing any harm. It is an indigestible mass that causes obstruction of the bowel, and a variety of objects have been encountered here, including acorns, peach pips, stones, bits of leather collars and even a piece of gauze bandage impacted into a solid lump. It is worthy of note, especially from the diagnosis by palpation view point, that these objects causing obstructions need not be large and that they are seldom bigger than an acorn or peach pip. Vegetable matter of this kind seems to absorb the bowel secretions or in some way acquire a dry surface in the intestine, and when this happens they stop and will not move on, although in many cases they are not too big to be passed through the rectum. Pressure necrosis of the bowel wall then occurs and the case becomes a grave emergency. Owners seldom realise how

bad these are, and the usual history is gradually increasing dullness and refusal of any food whatsoever. An important point in the diagnosis is the dull, anxious eye: the eyeball is sunken and the conjunctive a dirty red. Operative removal of the foreign body at the earliest possible moment is necessary and is usually accomplished without undue difficulty. The foreign body should be pushed down the bowel a few inches to a part where there is no blood stasis or inflammation and removed thence through a longitudinal slit in the bowel wall. A few cc. of liquid paraffin injected into the lumen will often allow the foreign body to be moved along. If the bowel wall is already necrotic it is advisable to resect a few inches of it altogether and do an end-to-end anastomosis. An enteritis of varying severity is commonly present in front of the obstruction, but with suitable treatment this clears up very quickly once the foreign body is removed. It is advisable in this operation, as in most emergency major operations, to administer a glucose saline transfusion immediately before, during or after it.

Calculi are the most common obstructions which are formed within the body and those formed in the uro-genital system are encountered most frequently. In dogs the sex is of importance here as bladder calculi in the bitch, though they give rise to grave illness, rarely cause an emergency. In the male, however, calculi in the urethra often cause a complete obstruction to the flow of urine and the animal becomes very ill indeed in a short time. The case is usually presented in an advanced state of toxæmia with the history that he could not urinate "to-day." The bladder is distended, occupying a surprisingly large part of the abdomen and a characteristic smell of stale urine is often very noticeable. Immediate relief is necessary if the dog's life is to be saved. Puncture of the bladder through the abdominal wall is a dangerous procedure and should be adopted only as a last resort: attempts should rather be made to empty the bladder via the urethra. The calculus can usually be located in its commonest site immediately behind the posterior end of the os penis by the use of a ball-pointed metal sound small enough to go through the channel in the os without difficulty. Pentothal sodium is the anæsthetic of choice in these cases, and only a small dose is required as a rule.

With the end of the sound in contact with the calculus the position of the latter can be accurately fixed. An incision about ½ inch long is made through the skin and into the penis in the ventral midline directly over the calculus; the urethra is opened and the stone lifted out on the point of the knife. An assistant should maintain gentle pressure on the sound throughout the operation and the operator with his free hand should keep a firm grip on the penis with its skin stretched tightly over it until the urethra is entered, otherwise there is a danger of cutting down past the urethra to one side or the other. Generally gentle pressure on the bladder is sufficient to empty it through the wound; often a small shower of calculi escape with the first rush of urine. The wound in the penis is best left unsutured. The animal

urinates through both wound and penis until the would heals in about a week.

Two cases of interest may be mentioned here: the first is a large Boxer type dog which has (to date) had calculi removed from his penis four times, and once from his bladder. A certain amount of scar tissue is present at the operation site, but this appears to cause no pain or discomfort and urination is normal at present. Biochemical examination has shown that his urine has a high cystene content and this predisposes to calculus formation. The second case worthy of note was really a "practitioner's emergency". The patient was a young Pointer male and a urinary catheter was being passed to obtain a urine sample: the gum elastic catheter was a bit short for him and was pushed right to the tip of the penis in order to enter the bladder. The end was lost and it promptly disappeared, and massage of the penis was not successful in bringing it to view. Cystotomy had to be done the next day and the catheter was found neatly curled up in the bladder. Needless to say, a catheter rather too long is used now!

No special mention has so far been made of cats — some of these remarks apply equally well to cats and dogs; but there is one emergency in cats which falls into the urinary system group — this is the commonly seen distension of the bladder in males due to a urethral cast or plug. This again is very often not noticed by the owner until the cat is in a bad way — toxæmic, with a subnormal temperature and a bladder that feels like a cricket ball. Flexible catheters have not been found useful in these cases — a rigid metal catheter is necessary — and a small serum needle, or rather large hypodermic needle serves the purpose admirably. The point of th needle is cut off and the end rounded without closing the lumen. This is then introduced into the penis as far as it will go — one centimetre is a long way — and a warm 5% solution of sodium bicarbonate injected through it. This solution rapidly clears the urethra and after two or three attempts the bladder can be emptied by gentle manual pressure. The final outcome of these cases is dependent on what degree of cystitis has developed and whether paralysis of the bladder musculature occurs.

To turn now to emergencies brought about by accidents and fights. Wounds, tears, ruptures, contusions and fractures are seen in all parts of the body and an amazing variety of injuries are caused by these traumata. It would be impossible to list them all, so one or two striking cases will be described.

The first was a Staffordshire Bull Terrier that had been injured in a fight. The only significant lesion to be seen was on the left flank, where a number of puncture wounds caused by teeth surrounded a soft swelling that protruded about an inch above the abdominal surface. This case is illustrative of the fact that in lesions of this kind one must be prepared for anything. A diagnosis of hernia was made; the hernial contents were soft and doughy and gas and fluid could be felt,

so with the usual preparations an incision was made directly over the swelling in order to restore the bowel to the abdomen and close the hernial ring. The hernial contents were loops of small intestine, but in a badly mangled state, and in three places the intestine was almost completely severed, only the merest shred of mucous membrane preserving its continuity. Fortunately, the mucosa was intact, although the other coats of the intestine had retracted on each side of the pinched areas, leaving only a fragile tube with massive bruising hæmorrhagic infiltrations of the bowel for several inches on each side. Three end-to-end anastomoses had to be done, all the injured portions being excised and the stumps united. This dog made a good recovery. If the operation had not been done promptly, it is certain that perforation would have taken place in a very short time. How the bowel was so seriously damaged when the abdominal wall did not appear to have suffered much is difficult to explain.

Another case of interest was an Irish Terrier presented in a state of extreme emaciation. The history was that the dog had been involved in a fight some months before and lost condition steadily ever since; he also had an area of chronic skin trouble on the right flank that had started about the same time as the fight. This looked like a patch of ordinary moist eczema, but local medicaments had had no beneficial effects. A peculiar smell of gastric contents about the dog aroused suspicion and on examination a small puncture through the skin was discovered high up in the flank. Duodenal contents were leaking freely through this fistula and, of course, causing the skin irritation which was not helped by the continuous licking of this part. The dog was in very low condition and almost moribund, but the operation was attempted under minimal nembutal anæsthesia and the duodenum freed and closed and the abdominal opening closed. The peritoneal cavity was perfectly normal apart from the chronic, localised peritonitis sealing off the fistula. A good recovery followed, the skin trouble healing quickly and normal condition being regained in an amazingly short time. This case was an illustration that last-resort surgery is not always hopeless. The fact that this dog survived while the fistula was being formed and sealed off is perhaps partly explained by the bowel perforation being high up in the duodenum, where the bacterial flora is not rich.

Fight injuries to the head and neck region are very common, and an emergency that frequently occurs is a damaged trachea. An illustrative case seen not long ago was an aged Fox Terrier that had been set upon by two Alsatians. When brought in he was in great respiratory distress, cyanotic and gasping for breath. A puffy swelling on the underside of the neck, with the usual small punctured wounds of the skin, was found. On deeper palpation very serious damage to the trachea was felt — it had been completely severed and the two ends were palpable about an inch apart. Some air was entering the lungs through the small skin punctures — none appeared to be going through

the nostrils. After brief preparation and under very light pentothal anæsthesia a large incision was made through the skin and subcutis of the ventral surface of the neck. Immediate respiratory relief followed this "traumatic tracheotomy" and the anæsthetic state was at once less hazardous. The severed ends of the trachea were found and examined: the tear had taken place between two rings which appeared intact. The lumen was cleared of clots and debris and the two stumps united by means of catgut sutures passing round the two rings next to the tear. To accomplish this the two stumps were brought out of the wound as in a bowel anastomosis. Normal breathing through the nostrils was restored at once and a slight air leak at the tracheal repair disappeared after two days and satisfactory recovery followed.

The eyes have been mentioned when talking of foreign bodies. In head injuries another emergency affecting the eyes is common — luxation of the eyeballs, seen most often in Pekingese. Unless these cases are treated and the eye replaced with the least possible delay the sight is lost and enucleation is the final outcome. It is not easy to state a definite period and, of course, many eyes are too badly damaged to save despite immediate treatment, but it is probably safe to say that unless the eyeball is replaced within three hours the sight will be lost. General anæsthesia is essential and a lubricant such as liquid paraffin greatly assists reposition. If there has been much hæmorrhage and swelling in the orbit, fairly firm pressure on the eye is necessary to get it back; if there is not much swelling behind it, the eye almost jumps in when the inverted lids are picked up with forceps and stretched forwards. If stitches are necessary in the lids to keep the eye in the orbit, the chances are that the sight will be lost — not only because the stitches can injure the cornea, but because intra-bulbar pressure causes further damage to the eye.

A word about anæsthetics in these cases is apposite here: a general anæsthetic is usually required and the greatest care must be exercised in the use of these drugs in animals that are injured, toxæmic, shocked or in any way abnormal. So many of our operations are performed on normal animals, and we have become so accustomed to the safety and efficacy of the intravenous barbiturates, that we are sometimes liable to set up an emergency for ourselves by expecting an animal in shock to take the same dose of nembutal or pentothal. Very often a half or a third of the usual dose is sufficient for a case in shock, or a toxæmic animal and more would produce dangerous or fatal results.

A final word about transfusions in emergency cases. There is no doubt that blood transfusions would be of the greatest benefit in many of these, but unfortunately the spectre of incompatibility forms a serious obstacle to the free use of blood in dogs. At present the general practice, except in certain special cases, is to use 5% glucose-saline infusions to help restore blood volume and combat the shock so often

seen after accidents and other injuries, and in toxæmic and dehydrated animals where a major operation has to be done. Normal canine serum has recently been tried with very encouraging results, and it is hoped to adopt its use on a bigger scale when certain practical difficulties have been overcome.

The administration of the glucose-saline is easy, and it is usual in emergency operations to affix the delivery tube from the apparatus to the needle that has been used for the injection of the anæsthetic as soon as anæsthesia is complete. The transfusion then continues simultaneously with the operation and an added advantage is that (as often happens with pentothal anæsthesia) when a little more is needed the anæsthetic (or any other medicament) can be injected into the rubber delivery tube whence it is carried slowly and safely into the blood stream.

AVIRULENT ANTHRAX VACCINE: A METHOD OF STRAINING TO REMOVE GROSS PARTICLES

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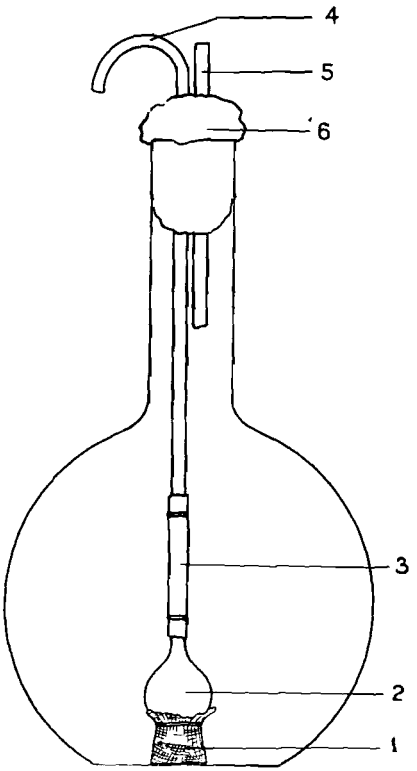
During the course of investigations on the anthrax vaccine it was found that there were large particles in the bottled product. These were pieces of the medium on which the organism was cultivated and flakes of material from the flasks used to prepare the vaccine for bottling. The pieces of medium were sucked up when the growth on the production flasks was harvested. The flakes were derived from a thin deposit which formed on the inside of the flasks used to



1 **Gauze**
2 **Thistle funnel**
3 **Rubber connection**
4 **Syphon**
5 **Tube for introducing concentrated vaccine**
6 **Cotton wool stopper**

prepare the vaccine for bottling. This film was extremely difficult to remove by any cleaning method, but when the flasks were filled and sterilized would come loose into the fluid in the flask.

It was necessary to eliminate these particles without contaminating the vaccine with other organisms, altering the immunogenic capacity of the vaccine or raising the cost of production to any extent. The method had to be applied to the vaccine during bottling. It was accomplished by attaching an ordinary thistle funnel to the end of the syphon through which the vaccine is drawn out of the flask during bottling (see diagram). The stem of the funnel was connected to the syphon by means of a short piece of rubber tubing. A single layer of gauze cloth was placed over the opening of the bowl of the funnel and secured by means of a piece of string. The gauze-covered opening of the funnel rests on the bottom of the flask. The thistle funnel should have an internal stem diameter of not less than $\frac{3}{8}$" and an internal diameter at the opening of the bowl of not less than $1\frac{1}{4}$ inches. Such a funnel, when covered with the gauze, does not impede the flow of the vaccine through the syphon or slow up the rate of bottling. Smaller funnels tend to do so. It allows the anthrax organisms through, but acts as an effective barrier to the gross particles which remain behind in the flask. The flask is assembled and sterilized with the vaccine-diluting fluid and this straining mechanism in it. The concentrated vaccine is added to the sterilized diluting fluid and strained through the gauze-covered funnel during bottling. No ill-effects have been caused by this method of straining the vaccine.

FOWL CHOLERA IN THE MALMESBURY DISTRICT OF THE WESTERN PROVINCE

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In 1933, Henning and Coles recorded, in a short paper, the available information about the occurrence of Fowl Cholera in the Union. Spreull (private communication) diagnosed Fowl Cholera in the Umzimkulu area by means of microscopical examination, together with post-mortem lesions in 1909, 1910 and 1911. In 1910, he and Jones diagnosed the disease at Sea View in the Elliotdale district. In 1926, he recognised this disease in fowls originating from the village of Vredenburg in the Hopefield district. In 1915, Curson studied another outbreak of the disease at Cape Town. In 1932, Canham isolated a bi-polar organism from ducks from Colenso, Natal. The organism in pure culture was studied by Henning and Coles, who stated that it was indistinguishable from *Pasteurella aviseptica,* and the disease it produced resembled Fowl Cholera. In 1942, Canham and Haig diagnosed endemic Fowl Cholera or " Wattle Disease " in fowls near Allerton Laboratory, Natal. From this information it would appear that Fowl Cholera is fairly widely distributed throughout the Union in either the epidemic or endemic form. Where the epidemic form is encountered it flares up apparently from nowhere and disappears " as mysteriously as it comes," to quote Henning and Coles.

On 12/2/48, the owner of " Boesmansfontein," Malmesbury district, reported a heavy mortality among his fowls. Deaths had started on 7/2/48 and losses of one or two a day were experienced until, on 12/2/48, forty birds succumbed. The history given by the farmer suggested Fowl Typhoid and a tentative diagnosis of this disease was made.

On 17/2/48, Fowl Cholera was diagnosed on the farm " Klipfontein," which became infected as a result of the movement of two ducks from the farm " Boesmansfontein " on 8/2/48.

The next infected farm was " Kanalfontein," where the disease was recognised on 18/2/48, following the transfer of two fowls from " Klipfontein " on 14/2/48.

Malmesbury Townlands became infected on 28/2/48.

On 12/3/48, Fowl Cholera was diagnosed on the farm " Karnburg," in the Hopefield district. The history obtained from the owner seemed to indicate that deaths started on this farm on 2/1/48. No connection could be traced between this outbreak and " Boesmansfontein," the two farms being 60 miles apart.

The next area to become infected was " Schoonspruit," on 13/3/48. This farm adjoined the Malmesbury Railway Reserve, where the disease was diagnosed on 18/3/48. The information gained would appear to indicate that the first deaths took place on 5/3/48.

" Weltevrede," a farm about eight miles from Malmesbury, was the next place to show infection. This farm was on the railway, and it is more than possible that fowls were removed by Natives from the Railway Reserve to this farm. The diagnosis of this outbreak was made on 30/3/48.

The adjoining farm to " Weltevrede," " Nooitgedacht," became infected on 9/5/49, while another nearby farm, " Constantia," showed the disease on 26/6/49.

Cooper (1948) states that on 3/3/38, Cholera was diagnosed on a property at Steenberg Station, near Muizenberg. No connection could be traced between this outbreak and that of the outbreak in the Malmesbury district.

Diagnosis: On 12/2/48, a tentative diagnosis of Fowl Typhoid had been made, but the following day, when all birds were being cleared from infected farms, two ducks, which had appeared healthy, were found dead in a crate half an hour later. A post mortem showed that the disease was not Typhoid. On the arrival of the remainder of the birds at an abattoir in Cape Town, a further examination of sick and dead birds was carried out and bi-polar organisms were found, thus suggesting Fowl Cholera as the cause. The livers and spleens of the two dead ducks were sent in glycerine to Allerton Laboratory for further examination.

Laboratory Tests: Smears made from the spleen showed numerous bi-polar organisms. The spleen and liver were mashed up in saline and injected into fowls, pigeons and rabbits. All the birds and rabbits were dead in from 18 to 23 hours. Smears from the heart-blood showed numerous bi-polar organisms. The organisms obtained grew fairly well in pure culture on blood agar, and many of them showed the typical bi-polar staining with Giemsa. Biological tests with the pure organisms gave the following results:—

Non-motile gram negative organisms, some of which showed typical bi-polar staining.

Acid, but no gas, was present in glucose, maltose and saccharose tubes; no mannite was used. Methylene blue, negative. Methyl red test, negative. Indol reaction, positive. Nitrates reduced to nitrites. Voges Proskauer test, negative.

Morphologically, culturally and biochemically this organism was indistinguishable from *Pasteurella aviseptica,* and the disease it produced resembled Fowl Cholera.

Symptoms: Affected birds died within a few hours after the onset of symptoms. They showed a high temperature, were dull and sleepy,

the feathers were ruffled, the tails drooped and there was a total loss of appetite. There was a marked thirst and, shortly before death, a watery greenish diarrhœa which was frequently blood-stained. The combs were very red, but shortly before death turned a dark bluish purple. Dyspnœa was a common symptom, and ducks showed a weakness in the limbs. Forced exercise of a sick bird resulted in death in about half an hour's time. Under natural conditions the incubation period was up to about seven days.

Post Mortem: The lesions seen varied, but the following alterations were present to a greater or lesser degree. Acute hæmorrhagic enteritis, acute pneumonia, tracheitis, fibrinous exudate in the thoracic cavity and pericardial sac, epi- and endocardial hæmorrhages, tumor splenis with punctiform white necrotic foci in spleen and liver. The liver contained an abnormal amount of blood. The general musculature was pale. Smears made from the liver and spleen showed very numerous bi-polar organisms.

Origin of the Outbreak: The origin of this outbreak has never been traced with certainty. No connection between the farm "Karnburg" or "Boesmansfontein" and the property near Steenberg Station, in the vicinity of Muizenberg, can be proved. More interesting still is the old report of Spreull (1926) that Fowl Cholera was diagnosed by him in the village Vredenburg, Hopefield district, where the disease was so virulent that it decimated the fowls in the village. Cooper (1948) makes the statement, which is probably correct, that he is satisfied that Fowl Cholera has been present in the Western Province for many years. His suggestion that farmers in the area use large quantities of Fowl Typhoid vaccine is also probably correct. The supposed effectivity of the vaccine is probably due to the natural disappearance of the disease already mentioned. Wattle Disease, or what is really endemic Fowl Cholera, is present in many parts of the Union and it would be interesting to know whether this condition is also present in the Western Province. The suggestion is whether, under conditions prevailing in the Malmesbury area, some of these endemic cases of Fowl Cholera suddenly took on an acute form and thus started outbreaks of epidemic Fowl Cholera. The farm "Karnburg" is about six miles from Saldanha Bay, which, in turn, is not far from Vredenburg, the village where Spreull (1926) discovered the disease.

Mortality: This disease caused a greater mortality among ducks than among fowls. One duck farmer lost all his ducks in six days. "Boesmansfontein" had 40% deaths among the fowls and turkeys and 100% deaths among ducks. The disease stopped as quickly as it started.

Control Methods

After removal of all birds, an infected farm was quarantined for three months. The birds were removed by special transport and slaughtered at an abattoir under veterinary supervision.

The viscera of the slaughtered birds were destroyed and the carcases kept in cold storage for four months and then sold as ships' stores.

All farms, where infected birds were found, were slaughtered out with the consent of the owners, except the birds on the farm " Schoonspruit," where the owner refused to have the birds killed.

Summary

(1) A description of an outbreak of Fowl Cholera in the Malmesbury district of the Western Province of the Cape is given.

(2) The possible origin of the disease is discussed.

(3) The mortality and control methods are discussed.

Addendum

Since the completion of this article, news has come to hand that Fowl Cholera has again broken out in the Malmesbury district. It has occurred on the farm " Rosenburg," which adjoins the old infected farm of " Schoonspruit," which was not cleared of birds.

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THE USE OF INTRAVAL SODIUM IN HORSES

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Middelburg, Cape

Simple operations such as hernia reduction, the shearing and filing of teeth, diagnostic punctures, etc., are frequently impossible to perform on the standing horse owing to the difficulty of adequate control. A short acting general anæsthetic is, therefore, frequently required. This communication describes the use of "Intraval Sodium" (May and Baker brand of soluble, thiopentone) on twelve horses. Intraval sodium is a short acting barbiturate which, by intravenous injection, has proved a safe and reliable anæsthetic in small animal practice. The drug is issued as a powder in 1 gm. ampoules with 20 cc. distilled water supplied and is dissolved just before use. The dose recommended is 1 gm. per 200 lb. live weight. The speed of injection is important as there is evidence that if it is performed too slowly the anæsthetic effect is much diminished.

Cases

1. *Riding horse.* Wt. approx. 600 lbs. Dose 2 gm. in 20 cc. i.v. Rate of in jection slow. Animal collapsed, but rose in 5 minutes. No operation performed, injection experimental.

2. *Mule.* Wt. approx. 500 lbs. Dose 5 gm. in 20 cc. (experimental overdose as animal was due for destruction). Animal collapsed in convulsions, then relaxed. Rose after 35 minutes. Very weak in hindquarters, but made a complete recovery in a few hours. No operation performed.

3. *Riding horse.* Wt. approx. 600 lbs. Dose 3 gm. in 20 cc. i.v. Animal down for 30 minutes. Castration performed. Anæsthesia satisfactory.

4. *Riding horse.* Wt. approx. 500 lbs. Dose 2 gm. in 20 cc. i.v. Castration performed ,but anæsthesia unsatisfactory as animal continued to struggle. Rose in 20 minutes, weak in hindquarters.

5. *Thoroughbred foal, 4 months old.* Wt. approx. 150 lbs. Dose 0·5 gm. in 10 cc. i.v. Umbilical hernia reduced and clamp applied. Anæsthesia satisfactory.

6. *Thoroughbred foal, 7 months old.* Wt. approx. 300 lbs. Dose 0·75 gm. in 15 cc. i.v. Animal remained standing with legs spread out. Exploratory puncture of swelling near back carried out without difficulty. Dose too small.

7. *Percheron foal, 1 month old.* Wt. approx. 200 lbs. Dose 1 gm. in 20 cc. i.v. given rapidly. Inguinal hernia reduced. Anæsthesia satisfactory.

8. *Thoroughbred yearling.* Wt. approx. 400 lbs. Dose 3 gm. in 20 cc. i.v. Nasal exostosis removed. Anæsthesia satisfactory. Recovery after 45 minutes.

9. *Thoroughbred foal.* Wt. approx. 400 lbs. Dose 3 gm. in 20 cc. i.v. given rapidly. Animal dropped and remained down for 20 minutes. Facial wound stitched. Occasional struggling, but anæsthesia satisfactory.

The following experimental injections were carried out on condemned horses belonging to the Grootfontein College of Agriculture:

10. *Riding horse.* Wt. approx. 800 lbs. Dose 3 gm. in 20 cc. i.v. given rapidly. Animal dropped after 30 seconds. Spasms and convulsive galloping movements of the hind legs for 2 - 3 minutes, but the only control necessary was to hold the head to prevent injury. Respiration at first fast and irregular, later deep and steady. Complete muscular relaxation, but corneal reflex persisted. After 11 minutes tried unsuccessfully to rise and assumed a sitting position. Stood after further 11 minutes, but was weak in the hindquarters and fetlocks knuckled over.

11. *Riding horse.* Wt. 650 lbs. Dose 3 gm. in 20 cc. i.v. given rapidly. Down in 20 seconds. For first 3 minutes head flung about, galloping movements of the limbs followed by tonic contractions and shivering, respirations rapid. Followed by muscular relaxation and slow, deep respirations. Corneal reflex persisted. After 9 minutes head raised and animal rolled itself into upright position. Rose after 21 minutes, but fell twice before it could stand. Weak in hindquarters and knuckling over of hind fetlocks.

12. *Percheron mare.* Wt. 1,100 lbs. Dose 3 gm. in 20 cc. i.v. given rapidly. Down in 30 seconds. Preliminary kicking, galloping movements and head thrown out. Excitement died down and respiration steadied after 5 minutes. Corneal reflex persisted. Rose after 11 minutes. Showing slight weakness of hindquarters. Dose too small.

Conclusions

There is scope for the use of Intraval Sodium particularly in young horses and for minor operations that cannot be performed in the standing position. It will be noted that, except in the case of the mule (No. 2) a dose of 3 gm. was never exceeded. Although not yet attempted, ether inhalation offers a possible means of deepening and continuing the anæsthesia where necessary.

Acknowledgement

I wish to thank Messrs. May and Baker, of Port Elizabeth, for the supply of Intraval Sodium, and Mr. J. H. Stapelberg, Lecturer in Animal Husbandry, Grootfontein Agricultural College, for supplying the horses and assisting in the experiments.

GEWOONTES VAN WILD

G. MARÉ,
Veeinspekteur

Daar bestaan alle rede om die herhaalde uitbrekings van Bek- en Klouseer in die Oos-Transvaalse Laeveld, langs die Nasionale Krugerwildtuin, aan wild toe te skrywe, en gevolglik is dit duidelik dat 'n studie van die trek- en ander gewoontes van wild noodsaaklik geword het.

'n Aanvang met die studie is in September 1946 geneem in die gebied langs die Wildtuin tussen die Sabie- en Olifantsriviere in die Bosbokrandse wyk.

Die metode van studie is kortliks as volg:—

Geskikte plekke was gesoek waar wild daeliks by hul suipplekke en weiveld dopgehou word. So dikwels as moontlik word die verskillende wildsoorte wat by 'n bepaalde plek drink, getel. Die vermeerdering en/of vermindering in getalle word met klimaat, reënval en weidingsomstandighede vergelyk. Die bewegings van wild word sover moontlik dopgehou en veral word gelet of die trekkery by wyse van massabewegings of deur insypeling geskied.

Hierdie artikel is 'n opsomming van waarnemings wat gedoen word op rooibokke en blouwildebeeste, die twee soorte wat die meeste voorkom.

Rooibokke

Rooibokke boer in kuddes wat wissel van etlike honderde tot 'n paar, en selfs alleenlopende ramme. Elke kudde beweeg in 'n bepaalde omgewing met 'n radius van 3 - 4 myl en slaap gewoonlik op dieselfde lêplek. Die slaapplek is gewoonlik op 'n bult, waar daar taamlik ruie doringbome is, veral knoppiesdoringbome wat ruig en nie baie hoog groei nie. In dele waar daar baie leeus en ander roofdiere is, word hierdie slaapplekke sorgvuldig gekies, blykbaar omdat leeus sku is om hul prooi op sulke plekke te vang.

Gewoonlik vreet die rooibok in hierdie streke nie in die nag nie, maar vroeg in die oggend verlaat hulle die slaapplek. As die water naby is, sal hulle met 'n groot draai wei sodat hulle die water eers omstreeks 8 vm. bereik. Op 'n koel dag kom hulle eers later by die water. As hulle by 'n pan drink, volg hulle nie dieselfde roete terug waarmee hulle gekom het nie, maar wei met 'n ander swaai, om teen sononder weer hul slaapplek te bereik. Waar hulle in 'n rivier drink in die somer wanneer voedsel volop is, volg hulle dieselfde pad terug waarmee hulle gekom het tot bo-op die walle om vandaar weer met 'n ander halfmaanbeweging terug te wei na hul slaapplekke.

In die begin van die lente wanneer die oewers van die riviere nie

ruig is nie, sal hulle sodra hulle klaar gedrink het, eers op en af langs die rivier op die jong riete wei. Solank daar water in die panne is, drink rooibokke by voorkeur daar, vermoedelik omdat die water brak is. Op die plaas Castleton byvoorbeeld is daar 'n standhoudende watergat waarvan die water baie brak is, en rooibokke gaan liewer daar water drink as in die Sandrivier wat baie nader is.

Skaarste aan weiding dwing rooibokke nie om buite hul gewone veld te gaan nie, al word hulle ook baie maer. Dis alleenlik wanneer daar nie meer water is nie dat 'n trop verder sal ronddwaal op soek na water, maar hulle keer terug na die gewone boerplek. Hierdie waarnemings word jaarliks op die plaas Toulon aan die suide van die Sandrivier gedoen.

As hulle in 'n rivier drink, keer hulle altyd terug na die kant vanwaar hulle gekom het, en sal nie deurgaan na die anderkant nie. Baie kere is dit in die Sandrivier opgemerk waar die water baie vlak is, dat twee kuddes gelyktydig na die water kom van teenoorgestelde rigtings en by dieselfde kuil drink, maar sodra hulle klaar gedrink het, keer elke kudde terug in sy rigting vanwaar dit gekom het.

Die rooibokke vreet gras, riete en boomblare, en ook graag doringboombas en is baie lief vir peule. In die winter wanneer die peule afval, word letterlik elke peul sodra dit val, opgetel. In Februarie/Maart wanneer die maroelas afval, word hulle altyd onder die maroelabome aangetref, en is dan ook gewoonlik baie vet.

Soetgras word by voorkeur bewei en die gras word baie kort gehou sodat dit geen kans kry om lank te groei nie. Waar die gras in die somer baie vinnig groei, beperk hulle hulle net tot sekere kolle, waar die gras kort op die grond gevreet word terwyl die ander dele ruig groei. Dikwels vind 'n mens in dieselfde streek dat sekere dele tot op die grond afgevreet is, terwyl 'n ander plek net langsaan die veld hoog uitgegroei is.

Rooibokke vermy gewoonlik leegtes en droë sandlope wat ruig is, alhoewel die veld daar soet mag wees, weens vrees vir roofdiere.

Onder rooibokke bestaan daar 'n goedgeorganiseerde kuddeformasie.

Vir elf uit die twaalf maande van die jaar is die volgroeide geslagte geskei. Die ooi-kuddes word altyd egter vergesel van 'n paar ramme wat as kuddeleiers optree. Die paringseisoen begin gewoonlik teen die helfte van April en duur ongeveer dertig dae. Op 12 April 1948 op Toulon is gesien dat rooibokke begin paar. Sodra die paringseisoen begin, meng die volgroeide ramme met die ooie. Die vorige seisoen se lammers, wat nou vier tot vyf maande oud is en reeds in hul vierde maand gespeen is, vergader nou in 'n aparte lammer-kudde en loop nie meer by die ooie nie. Die ooi-kuddes word nou deur die ramme verdeel en loop in kleiner troppies. Elke paar ramme probeer soveel moontlik ooie onder sy leierskap te kry; party ooie word letterlik deur die ramme gedwing om by hul kudde aan te sluit. Gedurende

hierdie stadium is daar altyd hewige gevegte onder die ramme, en is daar 'n gedurige heen-en-weer hardlopery van die ramme om ooie bymekaar te maak. Sommige ramme word nou heeltemal uit die kuddes verjaag. Hulle sluit hulle nou by die lammers aan, of loop alleen. Paring geskied gewoonlik onder ruie bome waarheen die ooi deur die ram gejaag word. Na ongeveer twee dae met een ooi gaan die ram na 'n ander ooi. Die ooi wat klaar gedek is, word nie toegelaat om die troppie te verlaat nie; sodra sy in die rigting van 'n ander kudde beweeg, hardloop die ram voor haar om en blaas en brul en dreig om te stoot totdat sy omdraai.

Teen die helfte van Mei begin die ramme hulle onttrek van die ooie en begin weer aparte kuddes vorm, en nou sluit die lammers weer by die ooie aan, om weer groot kuddes te vorm.

Van nou af tot die lamtyd begin teen die helfte van November, bly die ooie in groot kuddes. Wanneer die lamtyd begin, breek die ooie weer op in klein groepies. Lammertjies word met uitsondering so vroeg as die 4de Oktober gebore. Die eintlike lamseisoen begin gewoonlik so teen die helfte van November en hou aan tot die helfte van Desember.

Die ooie soek ruie plekke op om te lam, en die eerste lammertjies vir die seisoen word deur hul moeders in die ruie plekke weggesteek. Sodra daar al 'n klompie lammers gebore is ,word hulle deur die moeders in klein groepies na die oop veld gebring waar hulle dan saam met die moeders loop.

Teen die middel van Desember wanneer die ooie bykans uitgelam het, word groot kuddes ooie met lammers aangetref met enkele volgroeide ramme daartussen as leiers.

Die aantal van die twee geslagte wat gebore word, is omtrent dieselfde. Gedurende Maart word die meeste lammers gespeen en vorm hulle 'n aparte lammer-kudde. Die horings by die ramlammers is dan gemiddeld omtrent twee duim lank.

Op die ouderdom van ongeveer sewentien maande bereik die rooibok-ooi geslagsrypheid en lam sy vir die eerste keer op die ouderdom van twee jaar. Die ram begin eers paar op die ouderdom van 29 maande. Op die ouderdom van 18 maande is die lengte van die ram se horings amper 14 duim. Die getal kartels in die horings verskil al op hierdie ouderdom van ses na nege.

Die Blouwildebees

Die lewenswyse van blouwildebeeste verskil baie van dié van rooibokke. Hulle trek baie rond en het geen vaste verblyfplek gedurende die jaar nie, met uitsondering van alleenlopende ou bulle wat gewoonlik op dieselfde plek aangetref word.

Seisoensbewegings Oos- en Weswaarts is baie duidelik. In die voorjaar wanneer die eerste reëns, wat gewoonlik in die westelike dele eerste val, is daar grootskaalse bewegings weswaarts na die groen

plekke. Die blouwildebeeste stroom letterlik na die plase waar verspreidé buie geval het, vreet die gras op en trek na die volgende plaas. Soveel as 600 tot 800 is al in een trop opgemerk. As die reën taamlik algemeen is, breek die groot troppe op in kleinere troppies van 20 en meer en versprei dan in alle rigtings oor die area.

In die najaar vanaf Maart/April is die beweging in die teenoorgestelde rigting, naamlik ooswaarts. Die beweging geskied nie in massa nie, maar sypeling van klein groepies wat aanhoudend oorwaarts trek, totdat net enkele klein troppies en alleenlopende ou bulle agterbly, waar hulle dan tot die volgende jaar bly.

In hul weswaartse beweging sal hulle deurdring tot waar gras en water te vind is en stuit slegs as hulle teen die digbewoonde naturellegebiede kom.

In die winter mag hulle ook soms die Wildtuin verlaat, maar alleen wanneer daar geen water in die Wildtuin is nie. Hulle sal dan ook net tot by die eerste water kom en onmiddellik terugkeer. In Junie 1947 het groot troppe van die oostelike rigting gekom wat in die Sandrivier op die plase Flockfield en Malamala kom drink en dadelik na hulle gedrink het oorwaarts teruggekeer en nie deur die Sandrivier gegaan het nie.

Wildebeeste is grasvreters. In die winter wanneer gras skaars is, tel hulle ook peule en droë blare onder die bome op.

Hulle drink elke dag en enige tyd van die dag, selfs in die nag ook, water as daar water in die omgewing is. Wanneer water skaars word, grawe hulle diep gate in die sandbeddings om water te bekom. Die wildebees drink ook by voorkeur in panne. Pannetjies wat nog net dik, modderige water bevat, geniet voorkeur bo skoon rivierwater.

Wildebeeste begin gewoonlik teen middel Mei te paar. Gedurende die paartyd hardloop die bulle altyd heen en weer van een kudde na 'n ander en vind daar hewige gevegte plaas en word party van hulle heeltemal uit die kuddes verdryf. Anders as rooibokke vorm wildebeeste nie aparte geslagskuddes nie. Gedurende die kalf-seisoen skei die bulle egter tot 'n geringe mate van die koeie, maar 'n algehele skeiding vind nie plaas nie.

Wildebeeste kalf van omstreeks die middel van Desember tot die middel van Januarie en speen hul kalwers op vyf tot ses maande ouderdom. In uitsonderlike gevalle waar koeie blykbaar nie beset raak nie, hou die kalf aan met suip tot die volgende speentyd en is dan amper agtien maande oud.

Verse word vir die eerste maal gedek op 29 maande ouderdom.

CASE REPORT

RUPTURED AORTA CAUSED BY *SPIROCERCA LUPI* INFESTATION

W. C. VILJOEN and W. H. B. BUHR,
Umtata

History: On 23/7/49, a 2-year-old Ridgeback dog was presented for post-mortem examination, following death under conditions suggestive of poisoning. According to its owner, the dog had enjoyed good health until three days before death, when it showed arching of the back and a preference for cold surfaces to rest on. The following day it started to whine, which became a more prominent symptom as death approached. In addition, a progressive weakness and dyspnœa set in.

Post Mortem: The condition of the dog was fair to good, but the mucous membranes were pale. The liver showed extensive autolytic changes. The pleural cavity was completely filled with coagulated blood, and the point of hæmorrhage was located in the aorta opposite the eleventh rib. There was a bloody infiltration of the tissues in this area. The aorta showed a rupture with ragged edges about 15 mm. in diameter. Opposite the rupture the œsophagus was more swollen and under the mucosa there were three nodules, the largest of which measured about 3 x 5 cm. Each nodule had an opening through which reddish worms protruded. Other worms were found free in the lumen of the œsophagus and in the centre of these nodules. In addition, the nodules contained evil-smelling dirty-yellowish fluid. The worms were about 2½ inches long, red in colour and coiled spirally. They were identified as *Spirocerca lupi*.

Histologically the changes were mainly of the chronic inflammatory type, being the result of irritation by the worms. The *muscularis mucosae* of the œsophagus showed fibrosis. The muscular layers showed hyalin degeneration. Abundant granulation tissue was present and the parasites were encapsuled by fibrous tissue and other cellular elements, especially neutrophiles, plasma cells and eosinophiles. In some areas fibrous tissue had replaced muscular tissue.

The aorta was thickened and the intima broken. Extensive hæmorrhages extended from the break to the media. Fibrin formation was prominent. The media showed induration and contained the parasite. The pronounced cellular reaction was predominantly of the plasma cell type. There was perivascular infiltration of plasma cells of the vasa vasorum, and the capillaries showed degenerative changes.

Diagnosis: Granuloma of the œsophagus, panarteritis causing rupture of the intima.

Acknowledgements: Sincere thanks are due to Drs. Ortlepp and Le Roux who confirmed the identification of the worm and examined the lesions microscopically.

DR. MAUD BALES MEMORIAL BURSARY TRUST

Mrs. E. M. Bales, of Johannesburg, mother of our late colleague, Dr. Maud Bales, has established a trust fund in memory of her daughter. A sum of £2,000 has been lodged with trustees, and the interest accruing will be available from 1950 for an annual bursary which will be awarded to students of the Faculty of Veterinary Science, Onderstepoort.

Extracts from the Deed of Donation and Declaration of Trust are given below for the information of members:—

It was agreed between the parties concerned, *inter alia*:—

"6. To pay as a Bursary the income from the Trust year by year to a student at the Faculty of Veterinary Science, Onderstepoort, Transvaal, selected by the Council of the South African Veterinary Medical Association (hereinafter referred to as the "said Council") in each year. The object of the Bursary shall be to assist a student who, without financial assistance, would be unable or find it difficult to take the Veterinary Science Course. The Bursary may be awarded to a student either at the commencement of his or her course of study at Onderstepoort, i.e. after he or she has completed his or her first year at any South African University, or in any subsequent year of study at Onderstepoort. The said Council shall take the following factors into consideration in the selection of such student:—

(a) Scholastic and academic career;

(b) Financial position of the student;

(c) General character and personality.

7. The said Council may recommend that the income from the said trust be divided between two or more students selected by the Council for any one year, or may decide not to award the Bursary for that year. In either case it shall be subject to the confirmation of the Trustee, and in the case of no award being made the funds available shall be carried forward for use in future years.

8. It shall be competent for the Council to renominate the same student for the Bursary year by year, to continue his or her studies, and if the circumstances of the student are such that without the future award he or she will be unable to complete the course, such student shall be considered first for the award in the subsequent year, regard being taken to the progress of such student and he or she having proved worthy of the award.

9. The award shall be paid by the Trustee to the student upon advice of selection from the said Council, who shall furnish the Trustee with full particulars thereof."

The further sections of the Deed make provision for all kinds of eventualities, and define the powers, etc., of the Trustees.

Applications for the Bursary will have to be made to the Hon. Secretary, S.A.V.M.A.

CORRESPONDENCE

THE GOOD OLD DAYS !

The Encyclopaedia Britannica, III Edition, 1797, under " Veterinary " says, " see Farriery " — " Veterinary " on further reading, did seem a bit premature.

" Farriery — the act of preventing, curing or palliating the diseases of horses. The practice of this useful art has been hitherto almost entirely confined to a set of men who are totally ignorant of anatomy and the general principles of medicine. It is not therefore surprising, that their prescriptions should be equally absurd as the reasons they give for administering them. It cannot indeed be expected that farriers, who are almost universally illiterate men, should make any real progress in their profession. They prescribe draughts, they rowel, they cauterize, etc., without being able to give any other reason for their practice but because their fathers did so before them. How can such men deduce the cause of a disease from its symptoms, or form a rational method of cure when they are equally ignorant of the causes of diseases and the operations of medicines. The miserable state of this useful art has determined us to select from the best authors such a system of practice as seems to be formed on rational principles."

The rational principles referred to appear to consist mainly of blood-letting and purging — " young horses should be bled when they are shedding their teeth, but the cases that chiefly require bleeding are colds, fevers of most kinds, falls, bruises, hurts of the eyes, strains and all inflammatory disorders. It is right to bleed a horse when he begins to grow fleshy at grass and generally proper to bleed before purging, two or three quarts are usually enough at one time."

What with bleeding before purging and the purge consisting of — " Take of Barbadoes aloes ten drams, jalap and salt of tartar each four drams, grated ginger two drams, oil of cloves 30 drops, make them into a ball with syrup of buckthorn " — it is surprising that the horses of that age managed to recover at all, let alone draw heavy coaches or race.

The invincible Eclipse foaled in 1764, sired 344 winners, died in 1789 from " inammation of the bowels ", probably due to the irritant effect of such drastic purges.

To my mind horses have a great deal to be thankful for since the advent of an enlightened profession.

P. W. THOROLD.

LAMZIEKTE : HONOUR TO WHOM HONOUR IS DUE.

It was recently publicly stated, that in 1918 Sir Arnold Theiler discovered the cause of Lamziekte, and the means to counter it by supplying the cattle with sufficient phosphates in the form of sterilised bone meal.

The use of sterilised bone meal as a preventative was discovered some years prior to 1902 (when I arrived in S.A.). At that time (1902) it was extensively used with excellent results especially in high grade herds. The discoverer was Dr. Hutcheon, S.V.O., Cape Province, and a

well known factory was manufacturing it in bulk in 1902 ; its use was solely due to Hutcheon's personal observations.

Of course it is true that the causal organism was not determined until much later, I thought, by Dr. Robinson.

It is further stated that the use of bone meal has been recommended to stock owners for over 20 years, the period is nearer 50 or 60 years.

Yours faithfully,

R. PAINE, F.R.C.V.S.

POSITION WANTED.

British Woman Veterinary Surgeon, 1942 graduate, seeks position with prospects in South Africa. Small animal practice only. Highest references. For particulars apply : Hon. Secretary, S.A.V.M.A.

INTERIM TUBERCULOSIS SCHEME
(Union of South Africa)

The above scheme has now been approved by the Hon. the Minister for Agriculture. Any veterinarian who wishes to participate may apply to the Sub-Director of Veterinary Services of the Province for particulars.

SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION.

Minutes of Council Meeting held at 2.15 p.m. on Thursday, July 14, 1949, at Prudential House, Pretoria.

Present : A. M. Diesel (Vice-President), H. P. Steyn, R. Clark, G. Pfaff, C. F. B. Hofmeyr, M. H. V. Brown, M. de Lange (Hon. Treas.), A. D. Thomas, S. W. J. van Rensburg, R. A. Alexander, W D. Malherbe (Hon. Sec.).

The President was away overseas.

1. *Minutes of Meeting on May 12, 1949.* As these had been circulated they were taken as read, and adopted.

2. *Matters arising from these Minutes*:

(a) *Restriction on Sale of Drugs*:

(i) A letter from the Natal Branch, expressing appreciation of Council's efforts, was read and its contents noted.

(ii) Correspondence with the Otley-Jardine Organization was read. Co-operation had been undertaken by both sides. Lists of ethical and non-ethical products supplied by the firm, were to be considered by the de Lange committee.

(iii) Sales of restricted drugs by chemists. As no reply had been received from the Pharmacy Board, the matter was held over.

(b) *Dr. Maud Bales Memorial Bursary Trust*: The Secretary reported that both the President and he had read the draft Trust Deed, and that its provisions met the suggestions put forward by Council. The attorneys were now proceeding with preparation of the necessary documents.

(c) *International Veterinary Congresses*: Financial support. The matter had been referred to the Under-Secretary for Agriculture who had promised his good offices to obtain assistance from the Union Treasury. The Association was committed to a maximum disbursement of £50. Dr. Diesel was requested to discuss with Dr. de Blieck (Secretary of the Permanent Committee for International Congresses) what exactly was expected from the S.A. National Committee.

(d) *Artificial Insemination*: Arising from discussions in the Pretoria Branch, the Committee of this Branch presented proposals that provision should be made at the forthcoming General Meeting for an exhaustive discussion of this subject and that every effort should be made for members of the profession to be enabled in the near future to obtain post-graduate instruction in sterility work and artificial insemination. The question was receiving widespread attention and had been brought to a head by the presence of bovine infectious sterility in the Union. These proposals were agreed to unanimously by Council. Council further felt that artificial insemination in practice was fraught with grave dangers of spread of disease and that for that reason Veterinary

control was essential. Council learned that the Minister's departmental committee was shortly to gazette control measures in connection with A.I. Council decided, finally to request that the Pretoria Branch sub-committee (receiving proposals in connection with A.I.) should draft a scheme for consideration by Council, and that members of the S.A.V.M.A. should be provided with information on the subject prior to the General Meeting.

(e) *Natal Anti-tuberculosis Association.* As nomination had been received from the Natal branch, the matter was left over.

(f) *Southern Rhodesia Veterinary Association.* This Association had decided to continue as an independent one but Council agreed with them that a friendly interchange should be maintained and that visits should be made to each other's annual conferences by delegates.

(g) *Dates of General Meeting*: As it had long been felt that two days were entirely inadequate, Council decided that three days should be set aside viz. October 4-6. It had not been found feasible to hold the meeting in September as previously decided. Various details in connection with arrangements were decided upon in principle.

3. *New Members*: J. L. Stewart accepted for submission to General Meeting.

4. *Municipal Veterinarians*: The Pretoria Branch had been in communication with municipal veterinarians in connection with a suggestion that they should meet as a group during the General Meeting period. The General Meeting programme committee was asked to arrange for such a meeting in consultation with the municipal veterinarians.

5. *Poultry Practice and B.W.D. Testing*: A suggestion from the Committee of the Pretoria Branch that time should be set aside for a full discussion of this question at the General Meeting was unanimously accepted.

6. *Deputation to Minister*: On Resolution No. 3 of the 1948 General Meeting. As the Minister was due shortly to return to Pretoria the following members of the originally appointed deputation were to interview him as soon as possible, Dr. Diesel (leader), Dr. Pfaff and Dr. Hofmeyr.

7. *Classification of Veterinarians* in alphabetical section of telephone directories. Correspondence was read between the Cape Western Branch and the Cape Town Telephone Manager. As the parent body had also previously been unsuccessful in obtaining this concession, it was decided to pass this matter to the Veterinary Board for an expression of opinion.

8. *National Health Council*: Letter from S.A.V.M.A. representative read asking whether Council wanted anything put on the agenda. The secretary's reply (in general terms) was approved.

9. *Unregistered Practitioner*: It was decided to request the Veterinary Board to ask for an inspection by the Health Dept. for poisons and habit forming drugs.

10. *General*:

(a) *Refresher Courses*: It was suggested that refresher courses on selected subjects should be held in conjunction with General Meetings. Decided that this be brought up for discussion at the next General Meeting.

(b) *Secretariat of Association*: After discussion it was decided that the principle of having a paid Secretary-Treasurer should be discussed at the General Meeting.

(c) *Registration Fees General Meetings*: Left over for discussion at General Meeting.

(d) *Insurance against professional accidents and litigation*: It was decided that the Secretary should make inquiries about this type of insurance and report back to Council.

The meeting was adjourned at 5.15 p.m.

W. D. MALHERBE,
Hon. Secretary

J. H. MASON,
President.

SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION.

Minutes of Council Meeting held at 2.15 p.m. on Friday, September 9, 1949, at Prudential House, Pretoria.

Present: A. M. Diesel (Vice-President), R. Clark (Editor), M. de Lange (Hon. Treasurer), C. F. B. Hofmeyr, G. D. Sutton (Hon. Treas. Elect), J. G. Boswell, G. Pfaff, H. P. Steyn, S. W. J. van Rensburg, R. Alexander, C. J. van Heerden (Hon. Life Vice-President), P. S. Snyman, A. D. Thomas, W. D. Malherbe (Hon. Secretary).

The President was still away overseas.

1. *Minutes of Meeting on July,* 1949. As these had been circulated, they were taken as read, and after a minor alteration, adopted.

2. *Matters arising from these Minutes*:

(a) *Restriction on Sale of Drugs*: The Pharmacy Board reply on the sale of sulphonamides, penicillin products and preparations with sales restricted to veterinarians, was read and considered. The matter was referred for more detailed consideration to the De Lange Committee with Dr. Parkin (whether legislation was required and if so, in what form). A member who had complained was to be appraised on the position by the Secretary.

(b) *Dr. Maud Bales Memorial Bursary Trust Deed*: The terms of the Deed of Donation and Declaration of Trust were read. It was decided to publish a statement in the Journal on these terms and to appraise the Registrars of the S.A. Universities of them for inclusion in their calendars. The Finance Committee was asked to consider the terms, and to reply to the Trustees. The

Secretary was asked to convey the thanks of Council to Mrs. Bales for this fine memorial.

(c) *International Veterinary Congresses*: The Union Government had paid £50 as South Africa's share of printing and other expenses, for half of which (by agreement) the Association was responsible. The Treasurer was requested to remit £25 to the Union Treasury.

(d) *Unregistered Practitioner*: An inspection by an official of the Health Department had been carried out for poisons and habit-forming drugs. It was learned that the person concerned had now changed his occupation.

(e) *Professional Insurance*: The Secretary had made preliminary inquiries. After discussion it was decided to ask the Branches to collect information and views and report back.

3. *New Members*: J. W. Rainey and K. A. Ross accepted, for submission to the General Meeting.

4. *Resolution Cape Western Branch* re Slaughtering Regulations under Public Health Act. Held over.

5. *Complaint by Member re Interference with Practice*: Decided to submit copy of letter to D.V.S. (Field) for further action and to write member in order that agreement may be reached.

6. *Notification*: Election of Association Representatives on the Veterinary Board. Drs. Pfaff and Thomas had been elected.

7. *Reciprocity with R.C.V.S.*: Letter from member read. After discussion it was decided to hold over the matter until the return of the President.

8. *General*:

(a) *Secretariat of the Association*: A letter from the D.V.S. was read. It was in this pointed out that officers of Onderstepoort could no longer continue the work of the Association on the present basis due to the pressure of their Divisional work. After discussion the matter was referred to Finance Committee for consideration of ways and means.

(b) *National Health Council*: Report Dr. Pullinger. A report on the third Annual Meeting of the National Health Council was read and considered. Secretary was instructed to convery the thanks of Council to Dr. Pullnger.

(c) *Notification of the Election of Council for* 1949: *President*: J. H. Mason ; Vice-President: A. M. Diesel ; Hon. Secretary: M. de Lange; Hon. Treasurer: G. D. Sutton; Members: R. Alexander, W. D. Malherbe, G. Pfaff, S. W. J. van Rensburg.

(d) *U.K. Supplementary Veterinary Register*: The Secretary informed Council that two unqualified practitioners in S.A. had applied for registration on the above Register. The letters of objection were approved.

(e) *Application for Assistance* to widow of deceased member. Finance Committee was requested to consider this.

(f) *Tables of Attendance of Council Members.* A suggestion of a member that members at the time of voting for Council should have available a table of attendances at Council Meetings, was considered. Decided to discuss at the General Meeting.

(g) *Scale of Professional Fees*: As it was felt that the basis of charges varied too much from place to place Council decided to ask the Branches to submit suggested scales of fees, for consideration of a Council subcommittee, who would report back to Council.

(h) *Bureau of Standards*: Dr. Hofmeyr read correspondence with the **Bureau** who intimated that the Profession was welcome to ask for representation on any of the committees preparing "codes of standards". From discussion it appeared that as far as could be judged representation was already on a satisfactory basis.

(i) *Financing of the Book Fund*: Dr. Sutton pointed out the need for readier availability of money to pay accounts in view of the new situation created by import control. Council referred the matter to Finance Committee for consideration.

(j) *Guests at Dinner and Dance*: It was decided to invite the Minister for Agriculture, Secretary for Agriculture, members of the Public Service Commission, the M.O.H. Pretoria (Hon. Associate member) and their ladies to the Dinner and Dance on October 6.

(k) Next Meeting, Thursday September 29, 1949.

The meeting was adjourned at 5.45 p.m.

W. D. MALHERBE,
Hon. Secretary

J. H. MASON,
President.

SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION.

Minutes of Council Meeting held at 2.15 p.m. on September 29, 1949, in Prudential House, Pretoria.

Present: J. H. Mason (President), A. M. Diesel (Vice), P. J. du Toit (Hon. Life Vice-President), R. Clark (Editor), G. Pfaff, P. S. Snyman, C. F. B. Hofmeyr, S. W. J. van Rensburg, R. Alexander, A. D. Thomas, J. G. Boswell, M. de Lange (Hon. Treasurer), W. D. Malherbe (Hon. Secretary).

Apology: H. P. Steyn.

1. Minutes of meeting on September 9, 1949. Adopted.

2. Arising out of these minutes :—

(a) *Restriction on the Sale of Drugs*: Held over.

(b) *Resolutions Cape West Branch*: Re Slaughtering Regulations under Public Health Act. By invitation of the President, Drs.

M. C. Robinson and I. P. Marais attended in order to explain what was involved in the resolutions. After discussion Council found that from information at its disposal it appeared that the present practice in connection with meat inspection seemed to be an amicable arrangement which worked quite well, and that the resolutions could not be supported.

(c) *Reciprocity with the R.C.V.S.*: The letter previously read was considered and the matter fully debated. The weight of opinion favoured leaving the matter as at present. A committee of the Veterinary Board was considering legislative power to control any undue influx in the future from overseas.

(d) *Secretariat of the Association*: Dr. van Rensburg explained on behalf of the Finance Committee, that although a full-time secretary was desirable, the Association's annual income was entirely inadequate, and that an increase of membership dues would have to be proposed. Council approved Finance Committee's recommendation that in the mean time additional money (not exceeding £100) be made available for additional clerical assistance.

(e) *Welfare Societies*: After discussion of new information it was decided to ask those drafting the new Veterinary Act to go into ways and means of curbing undesirable activities.

(f) *Resolutions of International Veterinary Congress* (1949): It was learned that certain resolutions affecting S.A. were to be discussed at the General Meeting. Copies of all the resolutions had been sent to all members.

(g) *Bureau of Standards*: It was brought to the notice of Council that a certain member, if representing the Association, had a useful contribution to make on two committees. The Secretary was asked to put forward the necessary representations.

3. *New Members*: J. K. Thomson, of the Sudan, accepted for submission to the General Meeting.

4. *Resolution No. 3 of the 43rd General Meeting*: Report of Sub-Committee. Dr. Diesel on behalf of the deputation who saw the Minister, reported on the interview. Noted.

5. *Auditor's Report*: This was discussed in detail, and accepted.

6. *Arrear Subscriptions*: It was agreed that the President would write to three members with subscriptions five years in arrear.

7. *Standing Committees* 1949-50: The following were elected:—

Finance Committee: S. W. J. van Rensburg, R. Alexander, B. S. Parkin, A. D. Thomas, G. D. Sutton (Hon. Treasurer).

Editorial Committee: R. Clark (Editor), G. de Kock, J. I. Quin, E. M. Robinson, P. S. Snyman, G. C. van Drimmelen.

Library Committee: D. Coles, E. M. Robinson, G. D. Sutton.

General Purposes: A. M. Diesel, R. Alexander, P. S. Snyman, A. C. Kirkpatrick, P. J. J. Fourie.

Book Fund: G. D. Sutton, A. D. Thomas, M. de Lange.

8. *General*:

(a) *Natal Antituberculosis Association*: The Natal Branch's nomination of Dr. Zwarenstein to serve as the Association's representative, was approved.

(b) *Letter from Faculty re Reorganisation of the Veterinary Course*: It was felt that this was a matter that needed study and that the views of all members be sought by circular, embodying Faculty's proposal.

(c) *Post Graduate Courses*: Natal Branch letter read. Held over.

(d) *Jockey Club*: It was decided to send copies of correspondence between the Jockey Club and the Witwatersrand Branch re the "warning off" of veterinarians who attend night race meetings in an official capacity at Vereeniging to all members.

(e) *Veterinary Board*: It was decided to write letters conveying the thanks of Council to Dr. A. C. Kirkpatrick and Col. C. J. van Heerden for valuable work done (as the Association's representatives) during their terms of office which expired recently.

(f) A vote of thanks was passed to Dr. Hofmeyr for his energetic assistance as a member of Council for the past year.

(g) *Petrol Control*: The Secretary was requested to put forward representations for sympathetic consideration of the needs of private practitioners if petrol control be instituted.

The meeting was adjourned at 5.30 p.m.

W. D. MALHERBE,
Hon. Secretary.

J. H. MASON,
President.

PERSONAL NOTES

Dr. G. Martinaglia is being congratulated on being elected to a Fellowship by the Council of the Royal Sanitary Institute.

The recent transfers in the Veterinary Division are as follows:—

L. R. Hurter to Nongoma.

T. Veenstra to Estcourt.

J. S. van Heerden to Onderstepoort.

J. M. de Wet to East London.

P. J. Goosen to Kroonstad.

H. F. T. Hellberg to Vryburg.

N. C. F. Steenkamp to Gobabis.

J. P. van der Merwe to Piet Retief.

J. Zwarenstein to Durban.

M. J. N. Meeser to Lydenburg.

The following have been appointed to Onderstepoort: J. M. W. le Roux, B. C. Jansen, K. E. Weiss and P. W. Thorold.

The following members are in private practice in the town mentioned: K. Dalzell (Durban), D. Burgess (Cape Town), J. J. Hamman (Oudtshoorn), M. J. S. Kropiwnicki (Westminster), J. A. Schutte (Brits), W. du T. Malan (Bethal), H. E. Williams-Jones (Durbanville), J. F. Brownlie and Col. W. P. S. Edwards (Sea Point), L. Chisholm, B. Moring and C. v. N. Jonker (Johannesburg), A. J. du Plessis (Cradock), A. I. Robertson and M. M. Greathead (Cowies Hill), I. L. Hansmeyer and A. L. Wessels (Brakpan), P. N. Humphreys (Oslo Beach), A. B. la Grange and J. W. Pols (Pretoria), G. F. J. van Rensburg (Bethlehem), P. P. C. Wacher (Durban), T. C. W. Wessels (Winburg), J. P. Moll (Volksrust), R. W. Muir and E. O. le Riche (Kimberley), B. H. Pappin (Germiston), D. G. Steyn (Benoni), H. J. J. Terblanche (Standerton).

Recent appointments to the Field Service include: P. L. Uys (Potgietersrust), A. J. Vlok (Rustenburg), T. A. T. Louw (Dundee).

Dr. and Mrs. V. E. Osborne are managing the stud farm of Mr. Conrad at Grassmere.

W. E. Pearson has taken up an appointment at the Veterinary School at Vom, Northern Nigeria.

THE RINDERPEST CAMPAIGN: TANGANYIKA: 1939-1940

(Composed at the Rinderpest Field Laboratory, 1940, on the eve of the return to the Union of South Africa.)

By the late D. T. MITCHELL

Rinderpest: the clarion call re-echoed through the South,
The message dread, with bated breath, was passed from mouth to mouth
And greybeards told their children of the stench that reached to heaven,
From the carcases of cattle that had died in '97.

The Chiefs of all the States involved were called in swift conclave
To arrange concerted action their cattle they might save.
They travelled fast on trains by night and through the air by day,
For they knew, without swift action, a heavy price they'd pay.

Then from the South and West and North, men left their snug abode
To trek through mud and flooded rivers along the Great North Road.
Or through Luangwa Valley, where the pale glossinae flit,
Mosquitoes swarm in camp or trail to stab you when you sit.

These men formed the units, whose job it was to go
To villages amongst the hills or swamps and plains below,
Beyond Rhodesia's border with vaccine, pluck and zest,
To fight the unseen enemy, the dreaded Rinderpest.

Vaccine flowed in gallons from the spleens of cattle slain
To save their fellow creatures from suffering and pain.
And immunise them safely, and thus a belt was made —
Protected by injection, whereby disease was stayed.

How centres of infection, smouldering and dormant still
Amongst the huts and shambas, on many a tree-clad hill.
And down the bushy valleys, where the grass too thickly grows,
Were diagnosed, eradicated, only a "unit" knows.

For fear of recrudescence within the space of years
And save the Southern farmers their terrors and their fears,
The disease was driven Northward, over the "central rail,"
Where efficient future action keeps it safe "beyond the pale."

Their task is nearly finished and the staff are moving back,
To the jobs they left behind them when they first began to pack.
Their names — what do they matter? They did it on their own.
It was duty, they responded, for the honour of their HOME.

REPRINTS.

Will contributors please note the conditions re reprints as printed on the back cover of the journal. Reprints can be obtained at cost price if ordered when articles are submitted. A limited number of "tear-out" copies are available free.

BENEVOLENT FUND.

The following donations to the Benevolent Fund, received during the past two years, are gratefully acknowledge: Dr. J. Quinlan, £21 1s. 3d.; Dr. W. J. B. de Villiers, 12s. 6d.; Dr. P. Harvey, £4 1s. 6d.; Dr. R. K. Loveday, £1 1s.

By votive cards, from the following:Drs. J. Zwarenstein, J. L. Dickson, A. M. Diesel, W. Ryksen, G. P. Bishop, C. H. Flight, J. Nicol, J. S. van Heerden, B. H. Pappin, H. P. A. de Boom, W. D. Malherbe, A. C. Kirkpatrick.

OBITUARY.

Percival James Robertson who died at the age of 60 in June, 1949, started practice in Newlands in 1919. In a short while he had built up a large clientele who had the greatest respect for his sound clinical judgement and admiration for the intense interest he took in his work.

He was registered under Act 16 of 1933 and in the same year built the Blue Cross Veterinary Hospital which acquired a reputation for good work under his direction until his retirement in 1946. His death occurred shortly after his return from a protracted tour of the United States.

He is survived by his widow, Mrs. Madge Robertson, to whom our deepest sympathy is extended. J.G.B.

DEATHS.

We regret to announce the deaths of Drs. S. J. van der Walt and C. H. Wadlow. The profession tenders its deepest sympathy to their relatives.

INSURANCE AGAINST PROFESSIONAL RISKS.

The practising veterinarian, in common with other professional men, runs a constant risk of having to face claims against him in respect of accidents and mishaps which may take place in the course of his work. This principle is well recognized by the medical profession, and practically no practitioner operates without professional indemnity insurance cover.

The question of similar cover for veterinarians has received the attention of the Council of the S.A.V.M.A. and the following letter is published for general information :—

" Glenvaal Limited,
5 Equity Building
88 Fox Street,
Johannesburg,
4th November, 1949.

Professional Indemnity Insurance.
Veterinary Surgeons' Association.

Further to your recent discussions with the writer on the question of providing a special indemnity for members of the above Association,

we now have pleasure in advising you that we have been successful in obtaining through our Lloyds Underwriters the required quotation.

The Policy would be drawn up to indemnify the member for any sum which he may become legally liable to pay for compensation and/or litigation expenses in respect of any claim/s, which may be made against him during the periods in which he is conducting his normal professional duties. It would cover professional neglect, omission, fault or error or alleged professional neglect whenever or wherever such was committed during the conduct of his practice.

His liability for loss incurred by the owners of animals as a result of following the treatment of animals would also be fully protected. The protection would be extended to include such losses as those resulting from the administration of a wrong vaccine, or in the course of operation, the breaking of a horse's back whilst being cast for such operation. Losses as a result of treatment given in all good faith would also be included in this indemnity.

We enclose for your guidance a draft showing the suggested wording of this contract ; this of course can be amended if so required.

Providing a reasonable number of members enter this scheme, we can indicate an annual premium of £3 3s. per member, for an indemnity limited to £2,500 in respect of any one claim. A higher limit can be provided if this is deemed necessary.

Accident Insurance.

It will be possible to provide Accident Cover for members which can be arranged in conjunction with the Professional Indemnity.

The scale shown in Appendix A and B illustrates the amount of compensation which would be payable. A special Injection Clause extending the cover to include disability resulting from a vaccine causing infection to the surgeon himself, would also be incorporated in the Policy.

Members can select either Scale 1 or Scale 2. The Professional Indemnity only can be arranged if desired.

It will be necessary for each Veterinary Surgeon to complete an application for both the Professional Indemnity and the Accident Insurance.

We hope that our proposals will meet with the favourable consideration of your Committee and we look forward to hearing your views on this scheme. In conclusion, we should like to mention that a similar scheme is working most satisfactorily in the United Kingdom.

We are,

Yours faithfully,

Glenvaal Limited."

Members wishing to take advantage of the above offer should communicate with Glenvaal, Ltd., direct for fuller information and for the necessary forms.

EDITORIAL

THE RETIREMENT OF DR. DE KOCK

Dr. Gilles de Wall de Kock, Director of Veterinary Services, retired on 30th November, 1949, at the age of 60.

Born in Pretoria, he was educated at the South African College, Cape Town, and at Stellenbosch.

In 1909 he was granted a bursary by the then Responsible Government of the Transvaal and proceeded to the Royal Veterinary College, London; obtaining the M.R.C.V.S. in 1913. He first came to Onderstepoort in February, 1914.

With the foundation of the Faculty of Veterinary Science in 1920, Dr. de Kock was appointed Professor of Anatomy, but he very soon took over the chair of Pathology, which he occupied till his retirement.

In 1923 he was granted overseas study leave and obtained the degree of Doctor of Veterinary Medicine at Berne in the same year. In 1928 he was awarded a doctorate of science by the University of the Witwatersrand.

During his long service Dr. de Kock made many valuable contributions to Veterinary Science, notably in his studies on the blood and on neoplasms. His enthusiasm and teaching ability left their mark on all his students and to him goes the honour for the high status of veterinary pathology in South Africa to-day.

Towards the end of his career Dr. de Kock took the leading part in organising and directing the large-scale campaign against nagana in Zululand, which is now nearing a successful conclusion.

On the 30th November, 1949, the Division of Veterinary Services lost a great Director and the Faculty an honoured and well-loved Dean, but the profession still retains two old friends in Dr. and Mrs. de Kock. We wish them long life and all happiness.

SUMMARY OF PRESIDENTIAL ADDRESS

In the presidential address Dr. J. H. Mason gave his impressions of a recent trip to Britain. The increase in veterinary research was enormous and the Government there was spending money very freely in an endeavour to rid the country of diseases of economic importance — contagious abortion, mastitis and tuberculosis in cattle. The use of the living avirulent abortus vaccine was general and was having a very appreciable effect in lowering the incidence of abortion. Mastitis was being reduced to a minimum by the injection of penicillin in wax up the teat canal and a good start had been made in eliminating tuberculosis on the accredited herd plan. This disease was detected by the single intradermal test, using purified tuberculin, leading to a big saving in time, work and money. Artificial insemination of cattle was now taken for granted and was under the control of the Animal Health Division of the Ministry of Agriculture. It was an outstanding success. The service, as run in Britain, was liked by the farmers and eventually must lead to the improvement of the cattle population by eliminating inferior bulls and cows. Further, diseases transmitted by coitus would be controlled.

These methods were brought forward, not as new knowledge to South African veterinarians — they were well known here and used to a greater or less extent — but rather to stimulate interest, in the hope that more practical use would be made of them when they were required. The outstanding need in South Africa was for a greatly augmented staff to carry out the work of dealing with those diseases that could be eradicated. That South Africa is fully alive to these problems is shown by the programme of the Congress at present in session at the Veterinary Institute at Onderstepoort. A large part of the three-day meeting is being devoted to symposia on contagious abortion and artificial insemination.

It is pleasing to record that a start will be made on the eradication of tuberculosis in cattle. A scheme has been drawn up by the Department of Agriculture, after consultation with the veterinary profession

and other interested bodies. At the present moment, this scheme is not grandiose. Experience will show up its weaknesses and these will be strengthened till eventually, with the good will and co-operation of all interested, there is no reason to doubt that tuberculosis will be eliminated or, at least, considerably reduced. In this eradication scheme it is to be hoped that the Government will make full use of the private practitioner. He has an important rôle to play and should be encouraged to play it.

At the present moment, Onderstepoort is preparing abortus vaccine to the limit of its capacity and until more staff and accommodation are provided, there is little hope that greatly augmented supplies will be available. Technically, the present vaccine is difficult to make and staff and money should be made available for fundamental research into other methods of preparation.

The veterinary profession in South Africa is in the position to play a major part in reducing the incidence of many of the diseases that at present afflict the stock industry of the country.

PAPERS READ AT THE 44th GENERAL MEETING

THE FUTURE OF THE VETERINARY PROFESSION IN SOUTH AFRICA

On the eve of his retirement from the post of Director of Veterinary Services, Dr. Gilles de Kock fittingly spoke on the future of the veterinary profession in South Africa.

He recalled that in his sectional presidential address to the South African Society for the Advancement of Science in 1944 he had urged the amalgamation of the Divisions of Animal Husbandry and Veterinary Services into a Division of Animal Health.

The veterinarian would in future have to play a bigger part in advising owners on matters of nutrition, animal management, fertility and breeding.

To-day, more than ever, a re-orientation of the veterinary profession was indicated so that it could accept the challenge to play a vital part in the world food situation. As Beveridge had stated in 1948: " To-day, veterinary practice, education and research are concerned more with the food-producing animals than with horses, dogs and cats. With this change there has also been a change of emphasis towards considering the *herd* rather than the *individual* and the *prevention* rather than the *treatment* of disease."

The economic conditions of the animal industry of the Union were such that the application of curative treatment to food-producing animals was limited due to the large areas served by veterinarians and the low value of much of the stock. The emphasis was therefore on *diagnosis* and *preventive measures*. This necessitated close collaboration between the practising veterinarians and laboratory diagnosticians. Largely owing to the lack of staff and facilities there was frequently considerable delay in obtaining the results of laboratory investigations.

Dr. de Kock went on to deal with the different spheres of veterinary endeavour. His remarks can be summarised as follows:—

Private Practitioner.

Dealing with the control of infectious diseases in general and with the Interim Anti-tuberculosis Scheme in particular, Dr. de Kock stated that " ways and means should be considered how State and private practitioner can collaborate for the benefit of the stock owner."

Field State Veterinarians.

" They should be relieved of those duties which can be entrusted to trained stock inspectors. Their part in field investigation is of fundamental importance to the laboratory worker and much closer

collaboration should be established through regional laboratories." The field veterinarian would have to take an active part in the coming campaigns against tuberculosis and brucellosis; infertility and mastitis. Investigations would have to be carried out into such problems as plant poisoning and parasitism. Immediate steps should be taken to eradicate such diseases as East Coast fever, rabies, dourine and nagana, while every endeavour must be made to prevent the introduction of diseases into the Union.

Research.

Dr. de Kock stressed that fundamental research formed the very basis of the profession. Modern research required teams of specialists and expensive apparatus and should therefore be carried out in a central institute. The scope is unlimited, but owing to the shortage of staff and accommodation only problems of great and immediate economic importance could be tackled.

As an example the speaker referred to the question of strain differences among the virus diseases of animals. At Pirbright in England a team of research workers was engaged on this problem in connection with foot and mouth disease alone. "A small incomplete team of research workers at Onderstepoort is expected to solve almost similar problems in respect of a series of virus diseases, e.g. horse sickness, bluetongue, heartwater, lumpy skin disease, and infectious sterility. It stands to reason that they should be provided with similar facilities to expedite their researches."

The Faculty.

The reorganisation committee of the Faculty is continually improving the curriculum. Subjects such as meat and milk control and animal husbandry should be expanded either by extending the course or by post-graduate study.

Municipal Veterinarians.

Dr. de Kock called for further research and the improvement of teaching facilities so that veterinarians could play their rightful part in the production of wholesome and safe meat and milk.

The Conservation and Control of Wild Life.

In this connection the speaker quoted from a resolution adopted by the Nairobi Conference in 1947:

> "In view of the part played by wild animals in the spread of diseases of domestic species (rinderpest, foot and mouth disease, swine fever, rabies, tuberculosis, etc.) provision should be made for the veterinary control of game areas, either by very close collaboration between Game and Veterinary Departments, or by posting veterinarians to Game Departments on the staffs of National Parks."

Dr. de Kock also appealed for closer collaboration between the

veterinary and medical professions. He ended by exhorting the veterinary profession to keep courage in the face of present difficulties, quoting:

" Moed, mense, hou moed,
Die kwaad sal verander in goed,
Die môrelig kom uit die duister."

Discussion

Dr. Diesel thanked Dr. de Kock. Once again the shortage of veterinarians in the Division had been stressed. Veterinary science was becoming increasingly specialized, and education the world over was taking cognizance of the fact.

Dr. Alexander emphasized that every veterinarian was a specialist. The laboratory had to supply the knowledge and the tools to the practising veterinarian, without which he could not succeed. He considered that the Faculty had no place in a government institution and should be independent and directly under a university.

Prof. Coles explained that the re-organization committee of the Faculty had gradually introduced many changes. Lectures were now almost completed by the end of the fourth year, leaving the final year comparatively free for practical work and the assimilation of knowledge. We had to face the possibility of an extension of the course to six years.

Dr. Hofmeyr assured Dr. de Kock of the willingness of the private practitioner to assist in the control of disease.

Dr. Nelson (Cape Town) agreed with the great need for more specialization in municipal hygiene.

Dr. de Kock, replying to Dr. Alexander, stated that after visiting veterinary colleges overseas he was still much in favour of the Onderstepoort faculty-cum-research-station set-up.

IMPRESSIONS OF THE XIV INTERNATIONAL VETERINARY CONGRESS HELD IN LONDON FROM 8th AUGUST TO 13th AUGUST, 1949.

Dr. J. I. Quin dealt with the general organization of the congress, which was attended by approximately 1,200 delegates from some 48 countries. The speaker was particularly impressed with the strong delegations from the Scandinavian countries and urged that more South African veterinarians should be given the opportunity of visiting Sweden, Norway and Denmark in order to study the remarkable advancements in veterinary science which had been made, especially in regard to animal fertility.

Dr. Quin emphasized that the main theme of the congress was centred on the rôle of the veterinary profession in the production of more foods of animal origin which were so sadly lacking in many countries to-day.

The South African veterinary films had been enthusiastically received and there was a great demand for copies of these films.

Dr. A. M. Diesel continued as follows:—

I propose to give you my impressions under the following three headings, viz.:—

I. Quarantine Measures.

II. The Veterinary Departments of some other countries.

III. Tuberculin Testing of Cattle in Britain.

I cannot in this short talk hope to cover all aspects of the veterinary developments which I was able to appreciate, even though I was only away for one month. I am, however, preparing a memorandum which will set these out in detail.

Quarantine Measures.

Organized and well-aranged quarantine measures, for preventing the spread of stock diseases, both nationally and internationally, are as necessary to-day as they always were and have not as yet been replaced by the developing prophylactic agencies of modern science.

Lord Boyd Orr, the Director-General of F.A.O., speaking on the subject of " The World Food Situation," at one of the Plenary Sessions intimated that there were 3,000,000,000 people in the world to-day. It would be possible to feed them properly, he said, by bringing mechanical production into use, by animal preservation, and by utilizing land not yet in use. Every country was short of animal products and the elimination of disease was very necessary. This he considered could be done by —

(a) Eradicating the major killing diseases such as rinderpest (which caused the death of one million head of cattle in India each year);

(b) preventing the chronic diseases such as tuberculosis;

(c) preventing the deficiency diseases.

Papers presented at the International Congress on the subject of Quarantine.

Three papers were presented at the sectional meeting on the subject of quarantine. These papers were:—

(a) The Importance of Quarantine Control on Importations of Animal Products — Dr. R. N. Wardle, Australia.

(b) The Importance of Modern Quarantine Stations and of Import and Export Control of Animals and Animal Products — Dr. Ivan Christenson, Sweden.

(c) Control of Animal Health by Statutory Measures — Mr. J. O. Powley, United Kingdom.

These papers are available to anyone who is interested in the subject. Incidentally both Dr. Wardle and Dr. Christenson mentioned that swine

fever had been introduced into their respective countries by the importation of uncooked pig products and that the process of eradication of the disease had been very costly, and had caused much hardship and inconvenience.

As the result of the information conveyed by the papers and by the discussions which followed, the following two resolutions were eventually adopted by Congress:—

Resolution No. 5: "Whereas many infections and parasitic diseases of animals, some of which are also communicable to man, may be spread by animal products used for human food, and whereas the introduction of these diseases into a country reacts against maximum production of food so urgently needed in the world to-day; this Congress resolves that veterinary controlling authorities in all countries should be urged to co-operate to the utmost to prevent the spread of these diseases, particularly to those countries in which they do not exist."

Resolution No. 6: "The XIVth International Veterinary Congress learns with satisfaction that steps are being taken by certain international organizations to examine questions of transportation of animals, animal products, vegetable products and equipment in so far as they relate to the transmission of infectious diseases of livestock."

The Application of Quarantine Measures in Disease Control.

(a) *Discussions on Rabies, Rinderpest and Foot and Mouth Disease.*

The discussions on each of these three subjects stressed the fact that vaccination alone would not control these diseases and that hygiene and quarantine measures had to be combined with vaccination programmes.

(b) *Foot and Mouth Disease Quarantine Measures.*

(1) *Great Britain.*

Every cattle owner in Britain is compelled by law to keep a permanent record of all cattle movements to and from his property.

When an outbreak of foot and mouth disease occurs in Britain the Ministry's organization comes into immediate operation whatever time of day or night the disease may be diagnosed. The infected herds are at once valued and destroyed. Infected stock are buried and non-infected stock slaughtered and the meat used for human consumption. The property is kept free from foot and mouth susceptible stock for about six weeks. All cattle over a two-mile radius are at once examined and a standstill order proclaimed over a five-mile radius. In addition over a radius of 15 miles around the infection, restrictions are imposed on the movement of animals and products, and none are allowed out of the area. Sometimes the area taken is wider than 15 miles.

The Ministry will not permit the Milk Marketing Board to keep more than 30 bulls at any one A.1 centre to avoid the possibility of slaughtering a collection of valuable animals should foot and mouth disease occur. The fencing round A.1 centres must be kept stock-proof.

(2) *Holland.*

When an outbreak of foot and mouth disease occurs on a property that property is immediately placed under quarantine and restrictions applied for three months after it has been officially certified that the cattle have recovered from the disease. Hygiene measures are taken and contact stock are vaccinated. Immunity commences after five days and is completed in 12 days, but the standstill order remains for 30 days. Vaccination is practised in respect of all susceptible classes of stock.

(3)) *Switzerland.*

When an outbreak of foot and mouth disease occurs the infected stock are destroyed and the contact stock vaccinated.

(c) *Importation of Dogs and Cats.*

(1) *United Kingdom.*

Except dogs from Ireland, the Channel Islands and the Isle of Man, all dogs brought into the United Kingdom have to undergo a six months' quarantine on veterinary premises approved by the Ministry. Special import licences are issued for bona fide imported performing dogs or cats — the special conditions to be observed are endorsed on the licence. There are 25 private quarantine stations in England, Scotland and Wales, which together can accommodate 1,200 dogs and 125 cats.

Many of the kennels are run by private veterinarians who usually employ a non-professional manager for this work.

Very little trouble is normally experienced in respect of the dogs, but cat influenza is troublesome at times and Mr. Fawcus claims good results in preventing the disease by the use of a phantomyser which generates a disinfectant in vapour form in the cat boxes. The apparatus is made by Messrs. Aerosols Ltd., of 65, Old Brompton Road, London, S.W.7.

Charges by the owners of the quarantine stations vary from about £1.1.0 per week to £2 per week, depending on the size of the dog.

There has been no rabies in England since 1922. In the last two years eight cases have occurred in quarantine stations — all in dogs.

(2) *Holland.*

No quarantine is imposed on dogs entering Holland from any part of the world. Health certificates and certificates of non-contact with the disease only are demanded. Holland has been free from rabies for many years.

(3) *Sweden.*

Quarantine for four months only is required — no accidents have as yet been reported.

(d) *Rabies Control in Kenya.*

Lying to the north-west of the territory is a fairly large block of Kenya where rabies is regarded as endemic. Dogs moved from this area into the rabies-free area must be quarantined at Kabete for six months.

(e) *Control of Contagious Bovine Pleuropneumonia in Kenya.*

At the commencement of an outbreak, Compliment Fixation Test is applied in order to pick out all acute cases. The cattle are then vaccinated three times. Four or five months later the Compliment Fixation is again applied in order to pick out any chronic cases. This procedure is said to work well in small herds, but in big herds the Compliment Fixation Test, relatively speaking, fails to detect too many cases.

THE VETERINARY DEPARTMENTS OF SOME OTHER COUNTRIES

I — The Animal Health Division of the British Ministry.

Head Office Staff: The Animal Health Division of the British Ministry of Agriculture comprises a Research and Field Section. The head of the Division (now Professor Dalling — formerly Sir Daniel Cabot) controls both Research and Field Sections, and his designation is that of Chief Veterinary Officer. He has three Deputy Chief Veterinary Officers under him. Each controls a branch. Branch I takes in the whole country, i.e. England, Wales and Scotland. Branch II covers England and Wales. Branch III covers Scotland and a portion of Branch I. Branch I deals essentially with the highly contagious and infectious diseases, e.g., foot and mouth disease, swine fever, sheep scab. Branch II deals with the voluntary schemes, e.g., tuberculosis, contagious abortion. Scotland is more or less self-contained from a control point of view.

On the head office staff there is also one Chief Superintending Inspector, who is responsible for staff discipline, staff movements, etc. There are also three Superintending Inspectors who control respectively imports and exports, tuberculosis eradication, and artificial insemination and poultry.

There are about 12 Divisional Inspectors on the head office staff also.

Field Section: There are 78 Divisions, each representing roughly a county. Each Division is in charge of a Divisional Inspector. He has under him a number of Veterinary Inspectors, depending on the amount of work in the area. Each Veterinary Inspector has a small laboratory, microscope, etc. The Divisional Inspector also controls the work done for the Ministry by the private veterinarians or local veterinary inspectors as they are called. Incidentally the Ministry paid during the year 1949 £36,000 in fees to the part-time local veterinary inspectors in only a portion of Britain, i.e. to about 120 - 150 local

veterinary inspectors. The Ministry works on a panel system with these local veterinary inspectors and has a special panel for special diagnoses.

Only certain ports are licensed for importations and through them all introductions of stock and products have to take place (ports of entry). There are seven or eight such ports. A Port Veterinary Inspector, with Divisional status, is in charge of each port of entry.

Britain has three quarantine stations where large stock are held prior to export in order to satisfy importing countries as to the safety of the stock from the point of view of communicable diseases such as foot and mouth disease, tuberculosis, contagious abortion, etc. Each such quarantine station is in charge of a Divisional Inspector with no other duties.

Research Section (Veterinary Investigation Services — Veterinary Investigational Officers): In Britain there are eight or more regional laboratories each in charge of a Veterinary Investigational Officer with assistants. They come under the control of the Ministry's main laboratory at Weybridge and undertake routine examinations of blood samples for contagious abortion, investigate problems with the private veterinarians, and take part in organized schemes of investigation by the central laboratory at Weybridge.

II — The Division of Veterinary Services, Ministry of Agriculture of the Netherlands.

The Division is controlled by a Director. In each of the eleven provinces there is a Senior Veterinary Inspector who is assisted by several lay assistants. These lay assistants are specially trained and must pass an examination. The number of such lay assistants which are employed depend on the amount of quarantine work in the area.

Each practitioner can be called on to deputise for the Senior Veterinary Inspector on the payment of fees which are arranged on a daily tariff basis. For such semi-State services the practitioner cannot be paid by the exporter or by the farmer. The practitioner can be called on by law to do this State work and he cannot object — if he does, he might not get future State work. In practice, however, the Veterinary Division will accept any good reason as to the practitioner's inability to do the work and would then call on the next nearest practitioner.

Tuberculin Testing of Cattle in Britain

The Single Intradermal Comparative Test is practised in Britain.

A line is taken in the middle of the neck, parallel with the shoulder. Avian tuberculin is injected about four inches from the top of the neck and mammalian about four inches from the avian, which should leave another four inches between the latter injection and the lower edge of the neck.

The middle of the neck is regarded as the region of greatest sensitivity. In young cattle where there is not enough room to separate

the sites sufficiently an injection should be made on each side of the neck.

The Comparative Test is of value in assessing the non-specific reactions and is particularly a safeguard against throwing out animals which give swellings which are not tuberculosis. The Test is read only at the 72nd hour.

Doubtful cases are tested with tuberculin of half normal strength and if the mammalian swelling is in excess of the avian a reading is taken at the 96th hour. Testing is done with mammalian tuberculin at a strength of 3 mg. per cc. and avian 0·8 mg. per cc. This is known as "Herd Test" tuberculin and is applied to all herd tests and tests of introduced animals. For retests of inconclusive reactors to the Comparative Tests, mammalian at 1·5 mg. per cc. and avian at 0·4 mg. per cc. is used.

In the Single Intradermal Test no swelling is regarded as positive which, in the absence of œdema, shows an increase of less than 2 m.m. Swellings of 3 m.m. increase should be regarded as doubtful and 4 m.m. or more as positive. Any swelling showing œdema should be regarded as positive.

I have a copy of the technique and interpretation of the test as published by the Animal Health Division. I will have further copies made if anyone is interested in receiving a copy. Lesions of skin tuberculosis seem to be fairly common in Britain. The lesions usually take the form of nodules in the subcutaneous tissue, but they may involve the skin and are occasionally confined to the skin. When several nodules are present they occur in chains. They are separated from one another and vary in size from a small pea to a hen's egg. A description of these nodules is attached to the Ministry's published statement on the technique and interpretation of the test.

The presence of one or more animals in a herd giving a positive reaction to avian tuberculin and a negative reaction to mammalian is accepted as establishing the existence of non-specific infection.

Clinical evidence of Johne's disease or of skin tuberculosis is also regarded as establishing the existence of non-specific infection.

RECENT INVESTIGATIONS INTO THE PHYSIOLOGY OF THE RUMEN.

Dr. Clark gave a brief summary of the recent work done at Onderstepoort. This comprised four papers already handed in for publication in the *Onderstepoort Journal* together with work still in progress. The completed studies were:

1. *The Effects of Starvation on the Activity of the Ruminal Flora* (Oyaert, Quin and Clark).

It had been found that during 96 hours' starvation the total volume of the ruminal contents was only slightly diminished, but that the

ingesta became progressively more watery. Both sugar fermentation and cellulose digestion were markedly retarded after 48 hours. Sheep on a poor diet resumed feeding at the normal level immediately after starvation whereas, on a high protein diet, the post-starvation appetite was low and only reached normal levels after three to five days. The sheep regulated their protein intake in accordance with the adaptation of the ruminal flora. This did not apply to the same extent to cattle.

2. *The Effects of Sulphanilamide on the Activity of the Ruminal Flora* (Oyaert, Quin and Clark).

It had been found that recognised therapeutic doses of sulphanilamide (0·7 gm. per kilo body weight twice daily) introduced directly into the rumen suppressed both cellulose digestion and appetite. Furthermore, the maximum blood concentration of sulphanilamide attained was 6 mgm. per 100 cc., which is below the accepted requirements. The absorption of the drug was further retarded when the rumen was paralysed by atropine. These findings raise the question as to the advisability of administering sulphanilamide to ruminants *per os*. Further work is required on the water-soluble sulphonamides.

3. *The Failure of the Ruminal Musculature to Respond to Carbamylcholine-chloride when Paralysed by Potassium Cyanide* (Clark).

Small graded doses of potassium cyanide were given to sheep with permanent ruminal fistulæ so as to cause partial ruminal paresis. The grade of paresis attained was judged by pressure recordings. The subsequent subcutaneous injection of small doses of carbamylcholine-chloride (0·5 mgm.) caused an immediate total and prolonged paralysis of the rumen together with acute respiratory and circulatory embarrassment. The speaker warned against the use of carbamylcoline-chloride in cases of ruminal stasis due to prussic acid poisoning.

4. *The Toxicity of Urea to Sheep under Different Conditions* (Clark, Oyaert and Quin).

The introduction of as little as 10 gm. urea into the rumen of sheep could cause acute intoxication characterised by ruminal atony and sudden death due to circulatory failure. The toxicity of urea was found to depend on the activity of the ruminal flora as determined by the basic diet and the absence of available carbohydrate. Sheep on a low protein and sugar diet were highly susceptible. The toxic symptoms were associated with the liberation of ammonia within the rumen and a consequent alkalinity of the contents and could be prevented or alleviated by the administration of acid.

Dr. Clark then continued with a description of the work still in progress. He recalled that Hoflund, Quin and Clark (1948) had reported the sudden death of sheep kept on a low protein diet when dosed with casein. The symptoms were identical to those following urea dosing. It would appear that protein and urea were rapidly broken down in the rumen with the liberation of ammonia, but that in the

absence of a ruminal flora adapted to a high rate of nitrogen metabolism, the utilization of the ammonia could not take place at a corresponding speed. The acute symptoms described were therefore thought to be due to ammonia poisoning, but this could not be established as the intravenous injection of ammonia water had failed to reproduce the condition. It had also been found that the introduction of other alkalies such as sodium carbonate and sodium hydroxide into the rumen caused ruminal paresis, but not the muscular spasms and circulatory collapse nor the sudden death. It could, therefore, only be postulated that, under the conditions described toxic nitrogenous metabolites (possibly amines) were formed within the rumen.

The speaker then mentioned the outbreaks of apparent "geilsiekte" (prussic acid poisoning) which failed to respond to sulphur therapy which he had encountered. Was it possible that some of these cases were due to a sudden change from a low to a high protein diet? "Geilsiekte" usually occurred in the spring on young, rapidly growing pasture after the animals had been on poor quality grazing throughout the winter. The conditions inducive to "protein poisoning" were therefore present.

Reverting to the question of the effect of the reaction of the ingesta on ruminal motility, Dr. Clark showed tracings illustrating the paresis caused by the dosing of alkali. That this was a central effect was proved by the fact that the intravenous injection of dilute alkali (sodium hydroxide or ammonia water) resulted in the immediate cessation of ruminal movements. The vagal centre governing ruminal motility would therefore appear to be affected by changes in the acid-base balance of the blood.

The question that arose was: Did an alkaline reaction ever develop spontaneously within the rumen, thus causing ruminal stasis? This would not be easy to prove as it had been found that samples of ingesta taken per stomach tube were invariably more alkaline than those taken from the posterior portion of the organ through the fistula. This was probably due to admixture with saliva. Furthermore, owing to the colour of the material, only electrode pH meters could be used.

The speaker then advocated the experimental use of acetic acid in cases of ruminal stasis and digestive disorders in ruminants. Experiments had shown that the ruminal ingesta was very strongly buffered on the acid side although the addition of small amounts of alkali caused relatively large changes in pH. There was, therefore, little danger of causing hyperacidity of the ingesta by dosing acid. Furthermore, it had been shown that both the fermentation of sugar and the digestion of cellulose were inhibited by an alkaline medium. The dosing of sugar alone under such circumstances would, therefore, not result in the normal production of organic acids. The dose tentatively recommended was 50 cc. of glacial acetic acid (approximately equivalent to a bottle of vinegar) in some 2 litres of water to a cow. One pound of cane

sugar could be added with benefit. A single case of ruminal atony and inappetence in a cow with anaplasmosis had been very successfully treated in this way.

Discussion

Dr. Steyn congratulated Dr. Clark on the work that had been done and said it opened up many new possibilities. Referring to " geilsiekte," he agreed that many cases of sudden death were erroneously attributed to prussic acid poisoning, but he still considered this to be the cause of most of the large mortalities in certain seasons.

Dr. Quin stated that the study of ruminal physiology was receiving wide attention overseas and that much remained to be done.

THE BRUCELLOSIS SURVEY IN SOUTH AFRICA.

G. C. VAN DRIMMELEN,
Onderstepoort.

Robinson (1935, 1941, 1945) and many others have stated that contagious abortion caused by brucellosis in cattle is widespread in South Africa. It is difficult to estimate if the disease is still on the increase. In recent years the veterinary department has been inundated with correspondence on the subject and demands for vaccine. Whether this is due to a greater interest in the health and fecundity of livestock or to a spread of infection cannot be ascertained. The activity of a relatively larger number of veterinarians engaged in private practice has certainly increased the demand for diagnostic tests.

The expressed intention of the Veterinary Division to proceed immediately with a nation-wide anti-brucellosis campaign has created the urgent necessity to examine the present position in this country. It is the purpose of this report to make a brief contribution.

Historical

Proof of the Brucella abortus infection in South Africa was first reported by Mr. G. N. Hall in 1913. The early experiences with this disease here were described by Robinson (1918), who believes that the disease was imported from Europe. Contagious abortion was found to be widespread, but was not yet considered beyond control by means of quarantine.

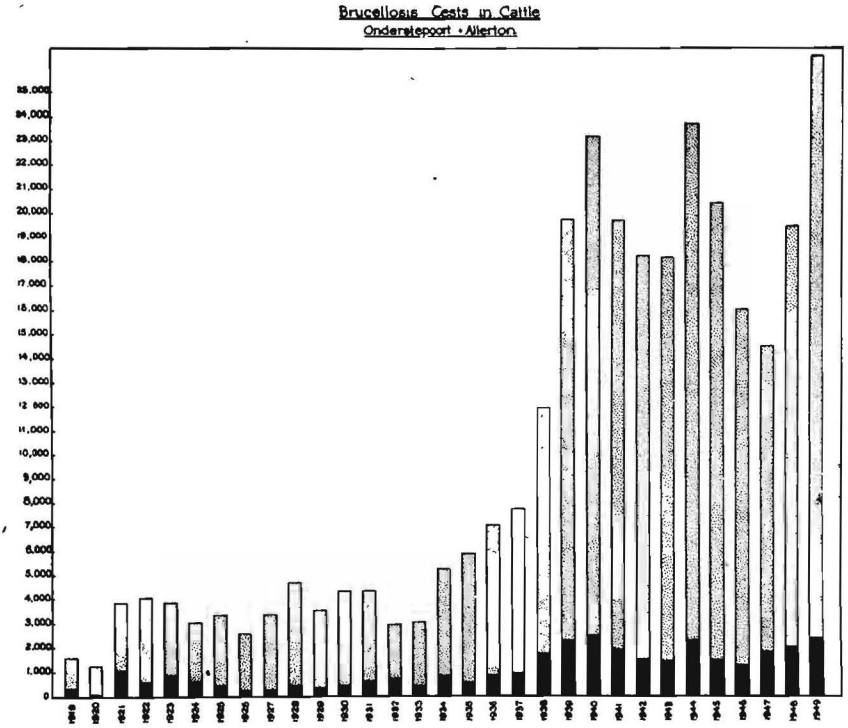
For 35 years diagnostic tests for contagious abortion in cattle have been carried out at Onderstepoort. The tube agglutination test has been found the most satisfactory method and the standard recommended by Dr. Stableforth was adopted.

The graph gives an indication of the results.

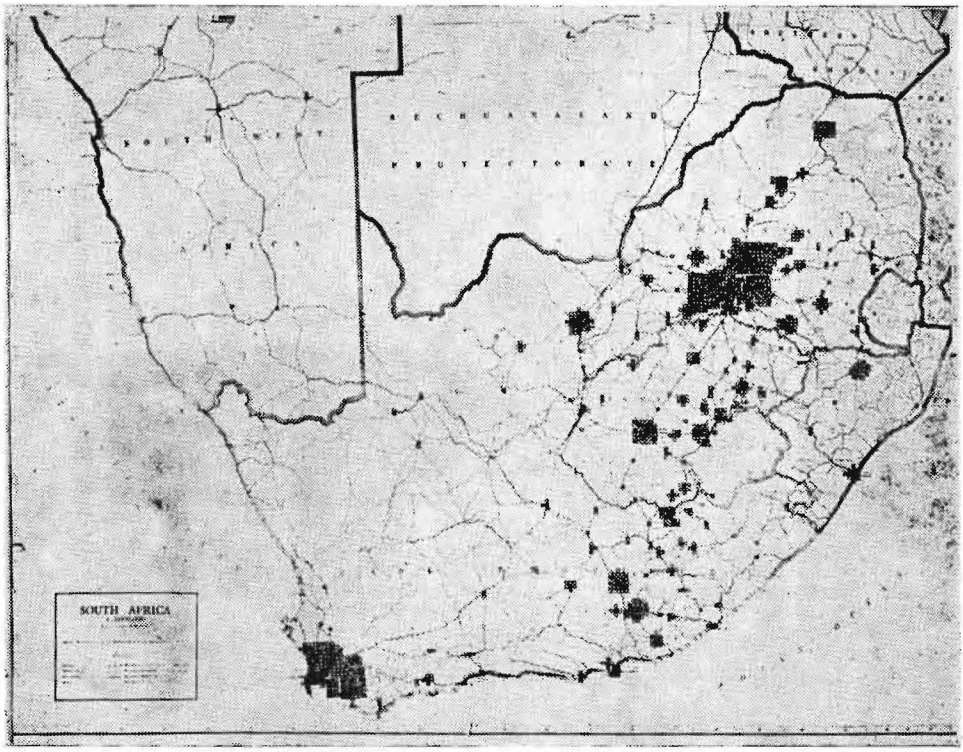
Obviously the tests carried out do not form a representative sample of the sera of cattle, since they were done chiefly for the maintenance of clean herds on isolated properties or for export requirements and only occasionally for confirming suspected symptoms.

The distribution of reactors and non-reactors tested in 1948 - 49 gives no reliable clue to the distribution of less and more severely infected regions. (*See fig.* 1. *Map of South Africa showing consignments of specimens tested and consignments containing positive reactions.*)

From the general experience of cattle farming in South Africa, some regions, notably the Bushveld and Bechuanaland, are suspected to be the most severely infected. These ranching areas are usually believed to be more completely infected than the areas of more intensive farming. The common occurrence of cases in the Northern Transvaal



Graph showing the number of blood samples tested for brucellosis by the tube agglutination method and the number of positive reactions recorded (black part of column).



Map showing the origin of the consignments of blood samples received in September, 1949, and the consignments containing reactors (blackened squares).

(up to 70% of animals in a herd) was mentioned by v. d. Wath (1939). Recent experience shows, however, that the majority of new outbreaks are reported in dairy herds. This may be because of the more frequent presence of clean herds in dairy areas. On introduction of infection such herds suffer dramatically and these outbreaks attract more attention than old infections do. It has been shown that Brucella anti-bodies are to be found in a large percentage of bulk milk supplies reaching urban communities, e.g. 50% Pretoria and 25% Kimberley (Van Drimmelen, 1948; Wolfsohn, 1949). In Johannesburg 70 out of a 144 bulk milk samples showed positive ring tests and 14 of 41 positives tested produced brucellosis in guinea-pigs (Robinson and Loveday, 1949). In urban areas clinical cases are not uncommon (figure 2).

Photograph of clinical lesions of brucellosis (confirmed by bacteriological tests) in a milk cow with a history of abortion, retained afterbirth and possibly the source of infection which produced undulant fever in a veterinarian.

The annual reports of the Director of Veterinary Services state

very little about distribution of brucellosis in this country. Its presence is referred to in the Government Veterinary Officer's reports.

Brucellosis-free areas in South Africa, if present, are very limited in extent.

Brucellosis in Other Animals

Very little information has been collected in South Africa. More specimens from game and other animals should be examined, but this must be postponed until facilities for testing can be increased.

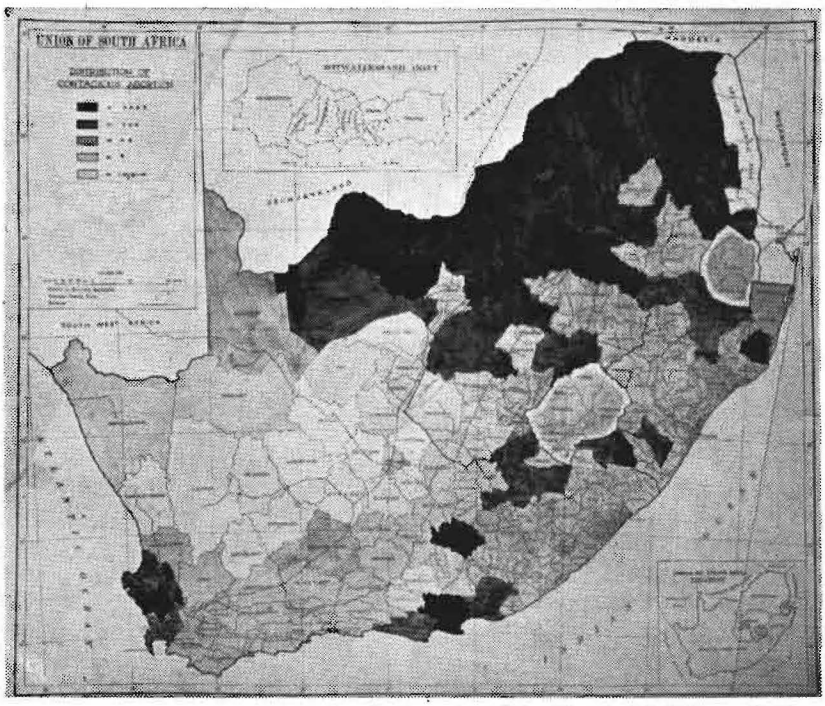
In two and a half years some chance tests have suggested a serious position as shown in Table I. Thanks are due to the colleagues who have taken pains to submit the samples for these very important findings.

TABLE I.

Species	Areas	Number tested	Positive reactions
Cattle	Transvaal	3791	555
{ Results of one }	Cape Prov.	3094	404
} month (approx.) {	O.F.S.	1940	271
} to show distribu- {	Natal	190	39
{ tion of reactors }	S.W.A.	152	8
Pigs (Sows)	Pretoria	183 (295	5 (7=2·3%
	Durban	49 from	2 from
	Johannesburg	63 abattoirs)	0 abattoirs)
	Winburg	5	2*
	Rouxville	4	0
Goats	Omaruru	12	5***
Sheep	Otjiwarongo	9	3**
Equines	Keetmanshoop	27	8
	Kuruman	35	2
	Christiana	17	4
	Kimberley	41	1
	Herbert	3	0
	Vryburg	4	0
	Danielskuil	15	0

* The reactions in this case were of a low titre, but the fact that subsequent experimental results showed that six pigs, dosed some *per os* and some on the conjunctiva with massive doses of brucella abortus, failed to develop agglutinating anti-bodies in the blood suggests that these reactions are evidence of infection.

, * The symptoms of abortion was the motive for submitting the specimens from the sheep, the goats and some of the pigs.



Map of South Africa showing incidence of contagious abortion in the Union.

The Species of Brucella Organism in Animals

The distribution of the three different species has not been worked out for South Africa. Brucella abortus is the organism most commonly found. Brucella melitensis has been encountered by Sonnenschein and Karsten in cattle, sheep and goats in South West Africa (Karsten, 1939). The identification of the organism seems to have been made on cultural (H_2S + Malachite Green and Thionin) tests only. By serological tests Pullinger (1939) was unable to confirm this result. A peculiar feature of South African Br. abortus is its less strict dependence on CO_2 for primary isolation. Confirmation of isolation of Br. melitensis from animals in South Africa has not appeared yet. Brucella suis has not been encountered. (It is known that some Brucella strains occur in the south of France which biologically act like Br. melitensis, but show all the other properties of Br. abortus.)

Vaccination in South Africa

The wholesale vaccination policy has been criticised by those who object to keeping persistent vaccinal reactors. This objection cannot hold good if regular tests are not carried out and if the tested herds are

not protected from contact with infection. In any case, the new modification of the milk test (Van Drimmelen, 1949) will, as soon as its reliability is confirmed, greatly assist in differentiating infected from vaccinated reactors on the spot.

Vaccination of cattle is our main anti-brucellosis measure and the survey is necessary to carry this out properly. We have overcome the shortage of vaccine for the present (partly due to the fact that an unlimited supply of South African-made brandy bottles was available for use in production). As the vaccine keeps only a few days after being removed from cold storage it is issued immediately after production. The standard tests of a batch of vaccine occupy three months. The tests are regularly put through and the methods are thus backed up by records showing concentration purity, viability counts, transportation tests, safety (low virulence) and immunizing properties in guinea-pigs. The few complaints which have been received necessitate the following statement. The duration of protection against abortion in herds, where no chronic infection to supply natural boosting doses exists, is probably not very long. The vaccine may sometimes produce high temperatures and considerable local swellings. Experiments with large doses in rabbits have produced abscesses from which the Brucella S19 was recovered in pure culture, but this has not been found in other animals. The lesions eventually cleared up completely.

The doses issued last year numbered 116,692. Conservative estimates have placed our requirements at much over a million. This shows how important it is to make the best use of the vaccine available. The information obtained from chance discussion suggests that some areas order relatively more vaccine than others do. The amounts of vaccine despatched to the different districts probably bears little relation to the incidence of infection.

Human Brucellosis

Dr. Fraser, of Gordonia, had 40 cases of Mediterranean Fever on record in 1898. McKenzie described cases in 1903 and Sir Edward Thornton (1936) mentions that the first serological diagnosis was made in the South African war by Dodgson. Since the Public Health Act of 1919 the Karroo has shown about twice as many cases as the rest of the Union (total 232 for 1919 - 1936).

Strachan (1932), who wrote a thesis on Malta fever in South Africa in 1911, believes that the disease was responsible for the severe outbreaks of "camp fever" in the early days of Kimberley. All his cases were associated with goats and he diagnosed a large number of human cases in Philippolis and the Northern Cape districts. His diagnosis was serologically confirmed by Col. Birt and others in 1906.

Bevan (1921) first recorded the Brucella abortus infection in a human being.

Campbell and Greenfield (1937), who worked with a strain of Br. melitensis which was stated to have been isolated from a human case

by Dr. Pijper, reported on several undulant fever cases, from nine of which they cultured the organism and classified these strains as Br. abortus (4 cases), Br. melitensis (2 cases), Intermediate types (3 cases).

Barnetson (1939) tested about 2,000 human (Wasserman) sera, finding positive reactions in 5·7% from the Union and in 24·9% from South West Africa. Several reactors were from Johannesburg.

Sera of natives in Rhodesia have shown one reactor in a 1,000 specimens (Alves, 1936), and in Tanganyika eleven in 270 specimens (Wilson, 1935).

Brucellosis in Other Countries

In some countries like the United States, Sweden and Denmark work on contagious abortion has made great progress. A very interesting review of the present knowledge was drawn up by a number of scientists for the 25nd meeting of the United States Livestock Sanitary Association at Denver (Smith *e.a.*, 1948). This should be carefully read by everybody who has anything to do with cattle in South Africa.

All countries with advanced control schemes go in for testing and attempts at eradication, but general vaccination forms the basis of any plans that are being undertaken at present. The vaccinal reactions form the big obstacle to successful combination of these two methods. Smith (1948) stated that the distinction between vaccinated and infected cattle was at present one of the most important research problems tackled in the U.S.A., where only 5% of cattle are believed to be infected. In the corn states, infection in pigs complicates matters.

In Sweden and Denmark large areas are entirely free from the disease. The work is greatly reduced by employing the bulk milk ring test and testing blood samples of cattle only where suspicious reactions are found. Bulls and A.1 centres figure prominently in recent work on the spread of Br. abortus in Denmark.

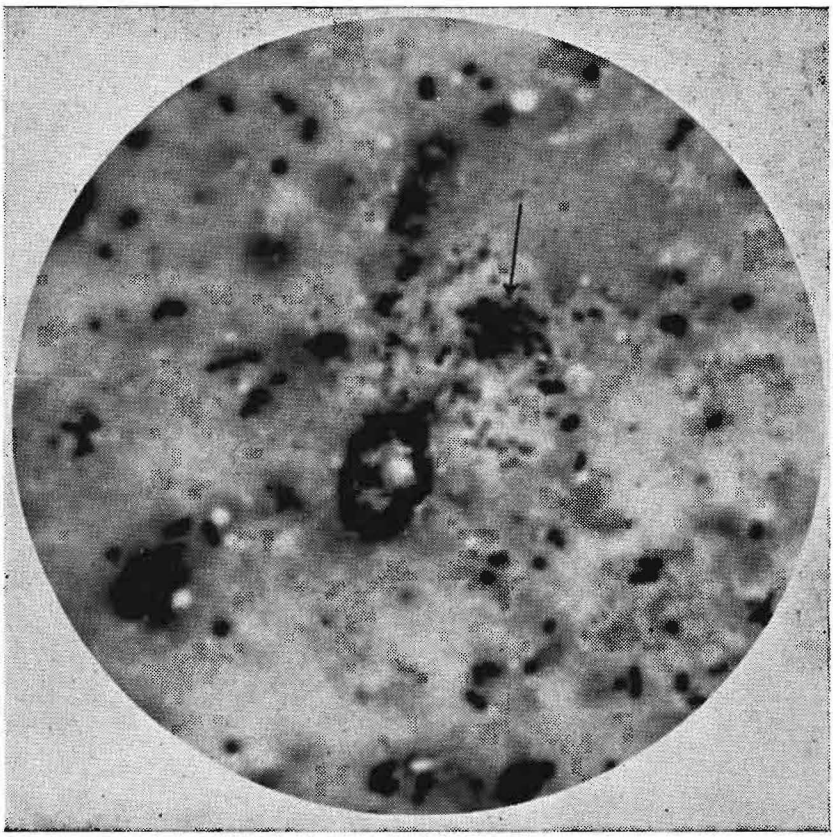
It appears that voluntary schemes are the only successful control measures with Brucellosis, which makes a propaganda campaign most important.

Differential Diagnosis

Inoculation of all heifers will not entirely dispense with Brucellosis. Some disappointment is frequently shown when abortion and sterility occur in vaccinated animals. A careful diagnosis will become more important as the practice of vaccination spreads.

Examination of the fœtal membranes is only sometimes possible (figures 4 and 5).

FIGURE 4



Microphotograph of Gram-stained smear fresh placenta of infected cow showing organisms in degenerated cell. The organisms can be recognised as Brucella abortus because they are the only bacteria present.

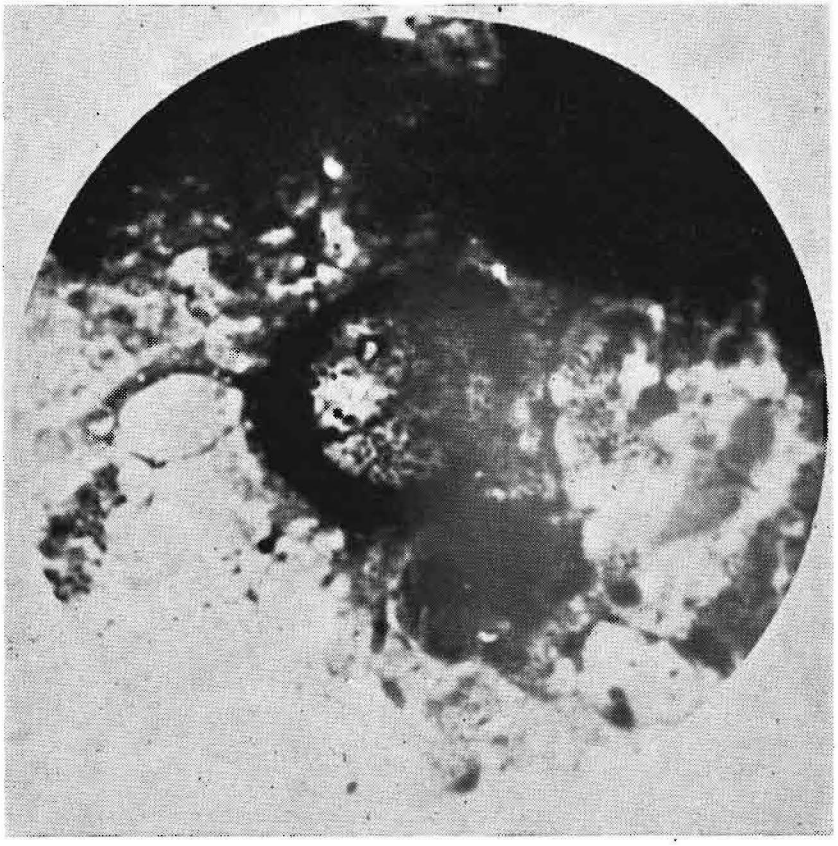
The agglutination test is of value in vaccinated animals, depending largely on how young they were when vaccination was carried out.

The Milk Ring test modified by diluting the milk to be tested in negative milk (Van Drimmelen, 1949) may be tried to distinguish infected from vaccinated animals.

Apart from Trichomoniasis the following contagious diseases have to be considered as causes of abortion in cattle:—

Vibria fœtus infection (late abortions).
Tuberculosis (reactors).
Colon-typhoid infections.
Pyogenic infections.
Streptococcus infections.
Other febrile diseases.

FIGURE 5



Microphotograph of Gram-stained smear from two-hours-old placenta of infected cow showing organisms in grouping highly suspicious of Brucella bacteria liberated by autolysis of a cell. The organisms can, however, NOT be recognised because the material is heavily contaminated with Gram-positive and Gram-negative cocci and bacilli in irregular arrangement.

The whole mechanism of *abortion* is often misunderstood. There is no sharp distinction between *sterility* and *abortion* in mammals, whereas in poultry science the difference between sterility, fertility and hatchability is sharply defined. Brambell and his co-workers have shown by careful observations that the existing estimates of *prenatal mortality* percentages in mammals have to be revised. Instead of the 10 to 20% loss usually mentioned, about 45% of zygotes appear to be lost before birth (Brambell, 1948). Whether *abortion* takes place depends as much on the nature of the infection as on the stage of pregnancy, the species and external factors such as nutrition or internal conditions including heredity. Abortion of the fœtus is more common in advanced

pregnancy, and resorbtion of the embryo is rare except in early pregnancy (Brambell, 1948).

There is an important difference between "physiological" and mechanical abortion. Oestrogens and drugs like colchicine appear to result in death of the fœtal membranes as well as the embryo, whereas injury from mechanical interferences allows the membranes to survive for a time, and in experimental animals these may even remain and be delivered at full term. Infection probably tends to have the latter effect and the consequences of abortions are more serious if the uterus takes longer to clear up. Stilboestrol is used for the treatment of retained afterbirth in cattle, and it would be interesting to see a record of the results in contagious abortion cases.

The Actual Survey Work

Only the most important facts should be selected in order to be able to tackle this immense undertaking.

The cattle census figures should give an indication of the number of cows and heifers of breeding age which could become infected. Where possible a rough classification of intensively kept cattle and those at range should be made.

The next step is an estimate of the presence or absence of infection in the herds. Owners do not readily admit having the disease, so that many old infections are not discovered. An annual classification of the herds in each district under the headings proposed last year (Van Drimmelen, 1948) should be a useful start.

Thirdly, a record of the calf percentage at each farm would give a clue as regards the negative side. This would tend to develop the economic aspect of the survey in the eyes of the stock owner. In any case, a few things should be put on record before undertaking herd vaccination, e.g.: (1) Previous vaccinations; (2) number of cows served last year; (3) number of calves born last year; (4) number of abortions noticed. This could most successfully be done on printed, addressed and stamped cards which could be packed with the vaccine consignments sent to veterinarians and completed by them before posting back. Such cards could easily be indexed.

Wholesale testing of cattle is not economical at the moment and cannot be recommended here. Herds-tests for clean farms should, however, be persevered with. On most farms testing should be done only to confirm the suspicion of infection.

The use of the Brucella Ring Test for bulk milk supplies can give much information in a short time. This could be tackled with the available facilities, by two itinerant assistants with co-operation from the municipalities. In this way full information in 50 to 100 towns could be recorded in one year. In addition a scheme such as this would make available an ample supply of coloured antigen to allow for general use of the Milk Test in private practice, where it would help to eliminate infected animals from vaccinated herds.

Vaccination is at present much more important than isolating and typing the organisms and the examination of specimens. The educational value of brucellosis survey work in this connection will be most helpful. The relation of brucellosis to the problems of sterility, abortion and public health is economically of great importance. We can contribute to make the co-operative effort in connection with these problems a success and our efforts will directly benefit not only a section of the people in part of the country, but almost every single person in South Africa.

The encouragement and advice received from Professor J. I. Quin, Director of Veterinary Services, and Professor E. M. Robinson, Assistant Director of Veterinary Services, are gratefully acknowledged. The assistance of Mr. G. du Plessis and the help of Miss G. E. Laurence and Mr. Theo Marais in connection with the drawings and photographs is warmly appreciated.

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A NOTE ON THE CULTIVATION AND DIAGNOSIS OF TRICHOMONAS FOETUS

P. W. THOROLD.

Cultivation.

The cultivation of Trichomonas fœtus offers numerous difficulties, chief among them being the choice of a suitable medium and the maintenance of bacteria-free cultures. In this case a number of media were tried before one was found in which the organisms readily multiplied. C.P.L.M. (Cysteine, Peptone, Liver and Maltose) medium for Trichomonas vaginalis, Plastridge's medium, broth and serum did not support growth. Wittes' peptone broth and L.E.B. (Locke's egg blood) gave variable results. The best yield of Thichomonads was found to be in a medium with particulate matter or on an inspissated serum base.

Bacterial contaminants such as Streptococci, Staphylococci, Corynebacteria and Bacterium coli were controlled by the addition of either penicillin (1000 units per ml. medium) or streptomycin (50 mgms. per ten ml. medium). One set of cultures was contaminated with Bacillus mycoides, the anti-biotics, also crystal violet 1/100000 and trypaflavine 1/500000 were of no avail. Although these cultures were heavily contaminated with B. mycoides the Trichomonads continued to multiply up to eight to ten days and viable organisms were present after three weeks.

Bacteria-free cultures were obtained by the V-tube method, utilising a semi-solid medium. The inoculum was placed halfway down one arm, the tube incubated at 37°C for six to eight hours and material then withdrawn from the other arm and placed in a suitable medium. The semi-solid medium consisted of:—

Ringer soln.	100 ml.
Bouillon	10 ml.
Serum	2 ml.
Agar	2 mgms.

Serum was added after the other ingredients had been autoclaved and cooled to 50°C.

The medium used for stock cultures was prepared as follows:—

One hen's egg well shaken up in 200 ml. Ringer solution, heated in a water-bath for 15 - 20 minutes, being well stirred all the time, then autoclaved at 20 lbs. for 30 minutes, pH is adjusted to 7·5. If a clear medium is desired the egg mixture is filtered and then autoclaved. Nine ml. of the egg mixture or filtrate and one ml. of serum is then

run on to an inspissated serum or serum agar slope and half a ml. of sodium thioglycollate added. In the absence of thioglycollate growth occurs only at the bottom of the tube, whereas with the thioglycollate it occurs higher up.

The cultures are incubated at 37°C and appear to reach their maximum density ($3 \cdot 5^6$–4^6 per ml.) five to seven days after inoculation, sub-cultures are made every seven days. Two to three days after inoculation the numbers of Trichomonads, in hanging-drop preparations of the medium, can be seen to have increased and numerous dividing forms are noted.

Diagnosis.

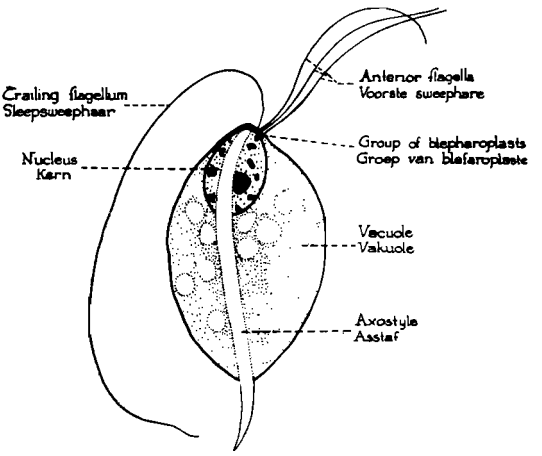
A definite diagnosis depends upon the demonstration of one motile Trichomonad complete with undulating membrane. Where an aborted fœtus is available direct microscopical examination of material from the fœtal membranes and fluids, the fœtal stomach and pharynx, will show if Thichomonads are present.

In a herd where there are cases of vaginitis, pyometra, a history of irregular œstrous cycles and early abortions, bull perhaps showing a mucoid discharge from the sheath or no symptoms and reduced libido, Trichomoniasis may be suspected. Due to the sporadic occurrence of the organisms frequent examinations are usually necessary, the consensus of opinion is that the best time to examine the cow is from three to seven days before œstrus. The most likely females in a herd for diagnosis would be susceptible heifers that have just been bred to a suspected bull. These animals should be examined 16 - 19 days after breeding or a few days before any of the subsequent œstrums. Preputial swabs or washings should be taken from the bull and if these are negative a semen sample should be collected with either the artificial vagina or by rectal massage.

A method which has been used successfully at Onderstepoort is to inject ten ml. of saline deep into the vagina of the cow or into the prepuce of the bull by means of a short length of rubber tubing attached to a syringe, then withdraw the saline and examine for viable organisms. To simplify examinations in the field an enrichment medium, such as egg filtrate (see cultivation above), can be injected into the vagina instead of saline, a drop examined and the remainder tubed and incubated for two to three days at 37°C or forwarded to the laboratory. The Trichomonads remain viable in saline for three to four days at room temperature (22°C) in the dark, at higher temperatures and in the light they rapidly succumb. Where a long time will elapse between the taking and examining of specimens and where no suitable medium is available, a few drops of iodine should be added to the washings, which kills and preserves the organisms; here care must be exercised, as contaminating protozoa may easily be mistaken for T. fœtus.

Two protozoa which may be confused with T. fœtus:—

Monocercomonas ruminantium



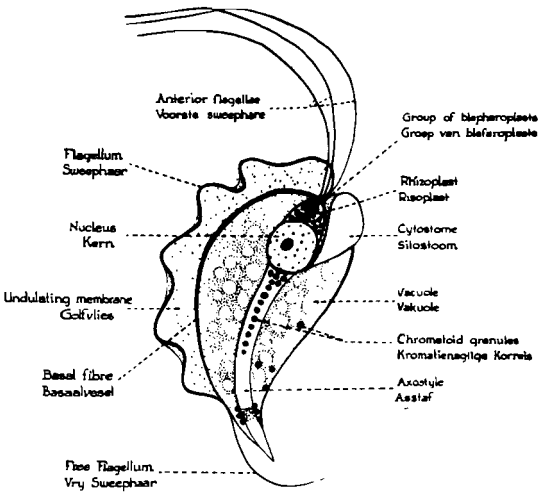
Occurrence: Vagina and prepuce of cattle.

Absence of undulating membrane and cytostome is characteristic.

Voorkoms: In die skede van die koei of bees.

Kenmerkend is die afwesigheid van die golfvlies en sitostoom.

Crichomonas foetus



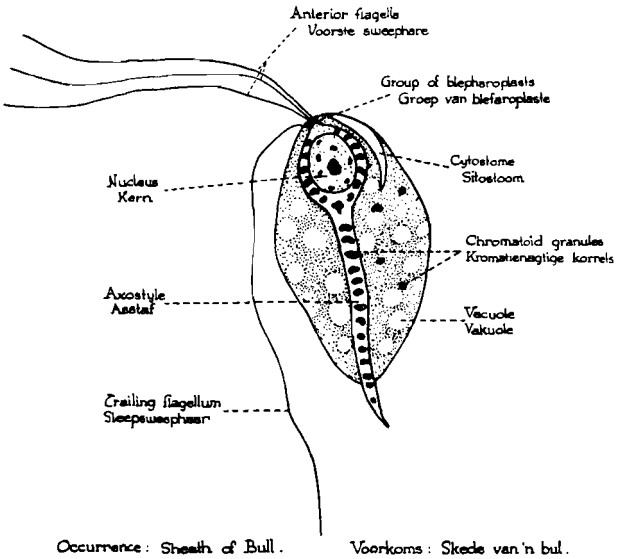
Occurrence: Genital tract of cattle.

Presence of undulating membrane and cytostome is characteristic.

Voorkoms: Geslagsorgane van beeste.

Kenmerkend is die teenwoordigheid van die golfvlies en sitostoom.

Eutrichomastix ruminantium.



Occurrence: Sheath of Bull.
Absence of undulating membrane and presence of cytostome are characteristic.

Voorkoms: Skede van 'n bul.
Kenmerkend is die afwesigheid van die golfvlies en teenwoordigheid van die sitostoom.

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THE PATHOLOGY OF INFECTIOUS STERILITY IN BOVINES

(Talk and Demonstration given by M. DE LANGE)

The early changes in the bull are those of a catarrhal inflammation of the genital tract and accessory glands. At this stage the ejaculate contains, apart from spermatozoa, leucocytes and desquamated epithelial cells. The inflammatory process soon extends to the interstitial connective tissue, with induration and enlargement of the epididymis and accessory glands. This is often accompanied by periorchitis resulting in adhesions of the tunica vaginalis. The epithelium of the tubules of the epididymis is desquamated, the tubules become occluded and even obliterated by the inflammatory process in the surrounding stroma. Thus the passage of spermatozoa through the organ ceases. The sperm accumulate in the tubules distal to the occlusion, which become invaded by leucocytes, resulting in a milky white or yellowish fluid resembling pus. In old cases this sperm debris may become calcified.

The damming back of spermatozoa as well as the enlargement of the epididymis leads to atrophy of the testis, with retardation and eventual cessation of spermatogenesis. As the epididymis enlarges the testis becomes smaller and the total volume of the scrotal contents remains almost unchanged.

The inflammation is almost entirely interstitial with marked increase in fibrous tissue and very little pus formation. This feature may assist the clinician in differentiating the disease from other inflammatory processes such as tuberculosis, brucellosis, corynebacterium infections through trauma, etc., which are usually accompanied by the formation of moderate to large quantities of pus.

Very little work has, at this stage, been done on the pathology in females, mainly on account of the difficulty experienced in obtaining suitable material.

The talk was illustrated with a number of macroscopic and microscopic preparations.

SOME PROBLEMS IN CONNECTION WITH THE THOROUGHBRED BROOD MARE

J. G. BOSWELL,
Johannesburg

Introduction

This article is based on work done at the Equine Research Station, Newmarket, England, Sweden and in Kentucky, U.S.A., from February to July, 1949, while holding a scholarship granted by the Jockey Club of South Africa.

Examination of the Mare

When a mare is presented for examination one should first of all obtain a correct history, age, number of foals, maiden or barren, length of œstrus and di-œstrus.

Instruments required include a vaginal speculum, good torch, twitch, towels, floating soap, rubber gloves as well as sleeves if preferred, and three buckets of clean warm water — one for the speculum which has been previously sterilized by boiling, one for rough washing and one for rinsing. No antiseptic is added to the water.

Good restraint of the mare is imperative especially in maiden and barren mares on which the twitch should be used. Mares in œstrus or in foal are usually less troublesome. Allow the mare to stand with her hindquarters in the doorway of a loose box with a good man at the head. If one uses the right hand for examination then the tail is drawn to the off side and held by an assistant.

The vulva is firstly examined externally for size, shape and the angle it forms with the rectum, which should be 70°. An angle of 45° which one sometimes finds in racing mares is an indication that the mare may be sucking air into the vagina with subsequent risk of infection.

The vulva should now be cleaned with warm water and soap and the speculum inserted.

Coital exanthema shows up as pustules on the mucous membranes, and although not a serious condition, keeps a mare from service for at least two to three weeks. Next one should take notice of the general colour of the vagina. It is pale during di-œstrus, anœstrus and pregnancy. The mucus is tenacious. During œstrus it is a rich pink in colour with mucus which is slippery to the touch. A dirty discoloration with air bubbles attached to the mucous membrane and a flocculent discharge indicates infection. Among the more common bacteria which are isolated from the genital tracts of mares are Equine hæmolytic streptococci, B. coli, Salmonella abortus equi, Corynebacteria, Shigella and Klebsiella.

The cervix during pregnancy and anœstrus is cold, pale and erect, whereas during œstrus it is pink, œdematous, flaccid and lies on the floor of the vagina. According to Day it has the appearance of a rose in full bloom. If infection is suspected a swab can be taken from the cervix at this stage, which completes the vulvo-vaginal examination. The hand and arm are then lubricated with soap and water and inserted into the rectum. The body of the uterus is first palpated and then each horn in turn. During di-œstrus the uterus is flaccid, whereas during œstrus and early pregnancy it is turgid, full of tone and can be likened to rubber tubing filled with fluid. At the 16th day of pregnancy the enlargement in one horn is about the size of a bantam's egg; at 21 days the size of a hen's egg or golf ball and at 42 days the size of a goose egg. The fœtus can move from one horn to the other. In infected mares the uterus is enlarged with no tone but has a " doughy " feeling. In old mares the uterus is sometimes tremendously enlarged. The ovaries and Fallopian tubes are then examined in turn. Unlike cows, mares rarely suffer from conditions of the Fallopian tubes.

In immature mares the ovaries are small, hard and inactive.

On the first day of œstrus one can usually feel one or occasionally two or more follicles, 1 - 2 cm. in size. On the second to third day the follicle is 2 to 2 cm., and on the fourth day it usually reaches a size of 4 cm. and becomes softer and feeling like a flabby blister. This is the best time for the mare to be served. Should there be a follicle in each ovary, which would result in twins, one of the follicles can be punctured as described later. Follicles under 2 cm. in size usually recede. As spermatozoa are viable for 96 hours or longer, the chances of conception are good if the mare is served when the follicle is 4 cm. in size. If the mare is served after ovulation the conception rate is poor.

After ovulation there is a depression in the ovary which is very sensitive on palpation. The corpus luteum, which is raised above the surface of the ovary, can only be felt until the third day.

If all mares were examined rectally and served at the correct time, only one service would be necessary, and stallions could serve from 40 - 60 mares in a season. In cases where mares cannot be examined per rectum it is the custom on some stud farms in the United States to serve a mare when ready and only a second time if she is still in œstrus four days after the first service.

Ovaries with multiple cysts feel like a small bunch of grapes. In such cases the œstrus period is very long. Large cysts the size of a football are sometimes found, puncture of which is described later. When neoplasms are present the ovary is enlarged and hard.

A Few of the More important Causes of Infertility and their Treatment

The following factors influence the pituitary gland:—

(a) *Warmth.* After a severe winter, if mares have long winter

coats, they will not show signs of œstrus until the weather becomes warmer and they shed their coats.

(b) *Light.* Burkhardt has shown that pony mares will come into œstrus early in the season if kept in a stable with an ordinary electric light burning.

(c) *Nutrition.* Mares should be in good condition, not over fat yet not in low condition. The ration should be sufficient in vitamins, especially A, C and E, which can be supplied by feeding carrots which contain all three. Alternatively one should give small quantities of fish oils and wheat germ oils. In some countries such as our own, it is necessary to add an ounce of calcium carbonate to the ration. The mare that is losing her winter coat and is coming up in condition on a good ration of oats, bran and grain feed will not suffer from infertility due to nutritional causes. In Newmarket it is found that mares usually come well into œstrus at the flush of the new grass, about the middle of April.

Verminosis adversely affects fertility. In Kentucky, mares are given 2 gm. of phenothiazine daily for the first twenty days of each month throughout the year, except for a month before and a month after foaling.

(a) *Presence of the Male.* So important is this factor that Burkhardt has experimented by running small Shetland stallions with the thoroughbred mares. In cases where owners are worried about the risk, as a case of a Shetland serving a Percheron mare has been recorded, the stallion can be vasectomized. The above experiment is particularly useful in anœstrus mares.

The presence of the male stimulates the pituitary gland and hence the production of the follicle-stimulating hormone. The mare has more F.S.H. and less luteinising hormone than the cow. It is for this reason that one of the greatest causes of infertility in mares is failure of ovulation due to lack of L.H. To ensure ovulation one may inject 1,500 units of chorionic gonadotrophin intravenously within 24 hours of service.

Delayed puberty or immaturity is often seen in mares that have just come out of training. The average mare is mature at four years, but many are still immature even at six years, with small hard ovaries and anœstrus. In such cases the four factors of warmth, light, nutrition and the presence of the stallion should be used. The mare should be examined per rectum two or three times a week, and if there are any signs of a small follicle, the uterus should be irrigated with 20 to 40 ozs. of warm saline which will stimulate the development of the follicle. Silent heat is another common trouble in which case a mare actually develops follicles but through lack of œstrogen does not show the usual external signs and behaviour of œstrus. Such mares should also be examined every two or three days, and when a follicle is developing 10 - 15 mgms. of stilboestrol should be injected subcutaneously; signs of œstrus will usually develop within 48 hours.

Multiple ovarian cysts are associated with long œstrus periods, 18 days or longer, and are really a number of small follicles which have not developed or ruptured. The best time to examine a mare with suspected multiple cysts is 3 to 9 days after œstrus. For treatment one should give one or more intravenous injections of chorionic gonadotrophin. Should the condition persist, one must resort to ovariotomy of the affected ovary.

When one large cyst is found it should be punctured by the use of Day's trochar. Good restraint is necessary with a twitch, side line, or two bales of hay behind the mare as protection. The dorsal wall of the anterior portion of the vagina is pierced with the trochar while the ovary is held in the other hand through the rectum. The trochar is then guided to the cyst, which is punctured and drained. The ovary must not be pulled or forced towards the trochar, as this will distress the mare and make the operation more difficult. If the cyst refills after two punctures, an ovariotomy should be performed.

The common neoplasm of the ovary is granulocytoma, which should be treated by removal of the ovary.

Infection of the genital tract with streptococci, B. coli, and other bacteria is frequently found. A rattling sound is emitted from the vulva; the walls of the vagina are coloured a dirty pink with air bubbles, and the uterus is enlarged.

One should firstly do Caslick's operation which consists of suturing together the upper one to two-thirds of the dorsal section of the lips of the vulva, depending on the degree of enlargement and shape of the vulva. The operation has often been described and was demonstrated at the conference. At least six weeks should be allowed after the operation before the mare is served. If swabs are then taken and streptococci found, one should first give one million units of penicillin intramuscularly every four hours for 36 to 48 hours, failing which one can use streptomycin initial dose 4 gms. and 1 gm. every four hours for 36 to 48 hours. If still unsuccessful, one can try the implantation of a 1-gram stilboestrol pellet under the skin of the neck during the winter to cause reflex inhibition of the pituitary. The pellet should be left in for about two months and then removed in the spring to allow the pituitary to become active and produce follicle-stimulating hormone.

Recto-vaginal fistula and adhesions and cysts in the vagina account for a small percentage of infertility.

Conditions which influence fertility rate are the shortness of the breeding season, not serving close enough to ovulation in mares with a long œstrus period, and low fertility of some stallions.

Abortion. At certain stages of the mares' gestation period follicles develop in the ovaries. Firstly, at about 28 days, when mares will often give a "show" to the stallion although pregnant. Secondly, at about 60 days, which is a good time to bleed mares for pregnant mare serum, but is probably the most dangerous period for spontaneous

abortion. Thirdly, there is a wave of follicles shortly before the birth of the foal. It is said that it is one of these that develops at the foal heat.

Twinning is another frequent cause of abortion, as one fœtus with its membranes usually invaginates into the other so that the latter is aborted. Mares that have aborted often show no signs in the region of the external genitals, and when there are more than one mare in a paddock it is difficult to determine which mare it was.

One must also consider general disease conditions, food poisonings and digestive disturbances. Lastly, we have the infectious abortions such as streptococcal, salmonella abortus equi, and virus abortion, all of which have so often been described by others.

General Observations. Autumn is probably the best time to visit distant studs to examine all mares. They are firstly classified into pregnant and non-pregnant groups. The latter are then divided into non-infected and infected groups. The infected ones can then be treated to give them sufficient time to recover before the season starts.

For years there has been a difference of opinion among breeders as to whether a mare should be served at the "foal heat." All mares should be examined on the sixth day after foaling for wounds of the vulva or vagina and discharges. If either are present, or if there was prolonged retention of the placenta, the mare should on no account be served. If, however, the mare is clear of wounds and discharges and it is late in the season she may be served. Suckling inhibits the supply of follicle-stimulating gonadotrophin. The foal heat is short and in shy breeders one can watch the foal: should it scour, it is an indication that the mare is in œstrus.

Oestrus. Oestrus usually lasts about five days and di-œstrus 16 days, but these periods vary greatly in different mares. In Sweden, Olsson reports that wild pony mares in œstrus only allow the stallion to serve them about the sixth day, with almost 100% results. Caslick advocates serving on the second or third day and then only four days later if the mare is still in œstrus, as spermatozoa live approximately four days from stallions of fair to good fertility. After foaling, mares should be tested every second day and especially on the 14th, 18th and 21st days. Ovulation takes place within 48 hours of the end of œstrus. Foals should be kept away from mares during testing. It is advisable to lubricate the vulva of maiden mares with liquid paraffin. Hormones other than chorionic gonadotrophin and occasionally stilboestrol are seldom used.

Stallions producing over 75% impregnations are rated as good, 65 to 75% fair, below 65% bad. The number and frequency of services that a stallion can stand depends on his fertility. Unfortunately so many mares are unsound breeding propositions. During service one should watch the stallion for the flagging movement of the tail or put one's finger on the urethra to ascertain if ejaculation has taken place.

Stallions should be handled by one man, and one man only. Changes influence them more than most people realize. The American system of receiving a second, free nomination if the mare does not become pregnant, certainly has the advantage of improving stud management.

Four things are necessary for the breeding of good thoroughbreds: (i) Good pedigrees; (ii) good land and feed; (iii) good stud management; (iv) a good practical and interested veterinarian who is within easy distance of the stud and who insists on a high standard of hygiene and is in the closest co-operation with the stud manager.

My advice to any veterinarian who is interested in this work is that he cannot learn it only by reading articles. He must get down to the hard way of examining mares and must start off with the idea that nothing is really too difficult.

I would like to thank the following, viz.: The stewards and the members of the Jockey Club of South Africa and members of the Thoroughbred Breeders' Association, who by granting a scholarship made this study possible. The keeper of the stud book, Dr. G. Pfaff, for his useful advice and the great interest he has displayed. Members of the Animal Health Trust, especially Dr. J. Burkhardt in charge of fertility research, and Mr. F. Day and Mr. R. Crowhurst, practitioners of Newmarket. Dr. J. Hammond, of Cambridge. Prof. Lagerlöff, of Stockholm. Dr. Olsson, of the National Stud, Sweden. Dr. C. Haggard, of Lexington. Dr. W. Caslick, of Paris, Kentucky, and Dr. W. Dimock, of the University of Kentucky, all for their advice and the time they have devoted to me.

ARTIFICIAL INSEMINATION

The Conference devoted the whole of the Thursday to the question of artificial insemination.

The programme opened with a film kindly loaned by the United Kingdom Information Office. This film shows the organization of an A.1 centre very clearly, including the buildings and equipment required; the collection, examination, dilution and packing of semen; the arrangements for the receiving of reports of cows in œstrus and the actual insemination of the cows on the farms. An indication is also given of the immense amount of recording which is necessary. Every cow inseminated is card-indexed and a full history kept. The showing of this film very graphically indicated to the meeting the type of organization required.

Discussion: The Future Rôle of Artificial Insemination in the Stock Industry of South Africa

As the object was to discuss the question in all its aspects, certain visitors were invited to attend, namely Professor Bonsma, chairman of the A.1 Advisory Committee to the Minister, and representatives of the South African Agricultural Union and of the Milk Producers' Union.

Dr. S. W. J. van Rensburg opened the discussion. It was the duty of the veterinary profession to take a lead in the development of A.1 in South Africa. The advantages of the procedure could be divided into three categories, viz.: (a) quicker breeding up by greater use of good bulls, (b) economic advantages through reducing the number of bulls maintained, and (c) the prevention of the spread of certain diseases.

In European countries the stimulus had been mainly economic, due to the war. In Kenya the practice had been forced upon them by disease.

The varying conditions prevailing in South Africa made a general plan impossible. The intensive dairying areas of the Reef and the Western Province presented problems entirely different from those of the bushveld ranches. The Native Reserves were a problem in themselves. Inquiries received at Onderstepoort revealed a great lack of understanding among farmers of the technique and functions of A.1.

Artificial insemination would have to be rigidly controlled, otherwise it would cause the wholesale spread of disease as well as being open to serious abuse and chicanery.

The present inter-departmental committee was temporary and

purely advisory, but would have to recommend legislation. Largely owing to the presence of infectious sterility in the Union, artificial insemination had been prohibited by Government Notice No. 1800 of 2.9.48, except under licence from the Director of Veterinary Services. This was purely a temporary measure to prevent a catastrophic spread of the disease.

Dr. van Rensburg considered that we would have to model our organization on that of European countries with years of experience. He visualized a central statutory body representing agricultural unions, breeding societies and milk producers together with animal husbandry and veterinary experts. Legislation would have to be passed defining the composition and powers of such a board, as well as the conditions under which an A.1 centre would be licensed. Regulations would have to be laid down regarding the buildings and equipment, the selection, health and care of the animals, and the training and status of the personnel.

The keeping of the essential records also presented a big problem. Under the existing milk recording system the data available was hopelessly inadequate, but if this could be rectified through A.1 centres it would prove of great value in many respects.

In the United Kingdom a bull was selected and his semen used on a certain number of cows. The bull was then laid off till the milk records of his progeny were available for comparison with that of their dams. Only bulls proved in this way were used as regular donors. Our present organization could not hope to maintain the necessary records.

Discussion

Dr. Hartig: Every station should be under a veterinarian Do not over-restrict, but let things develop.

Mr. Wood (S.A.A.U.): No great enthusiasm for A.1 in the Western Province. He saw the problem under two headings, viz., Government policy and stud breeding. The stud breeders feared the exploitation of particular bulls. The selection of bulls should be by a committee consisting of a nominee of the breed society, an animal husbandry officer and a veterinarian. The Veterinary Division should be concerned with the disease problem only.

Prof. F. N. Bonsma assured the meeting that his committee were fully alive to all the implications. Where a farmer wished to practise A.1 among his own herd it was his own affair, but the distribution of semen to other owners must be strictly controlled. Bulls must be very carefully selected to obviate the widespread dissemination of undesirable recessive characteristics.

The milk-recording system in South Africa is very unsatisfactory, only ·01% of milk cows being recorded. It would be impossible to assess the value of bulls under these conditions. The main reasons

for our deplorably low milk yield were feeding and management, not breeding.

MR. BEZUIDENHOUT (Fresh Milk Producers) thanked the Association for inviting him to attend. He was very interested and impressed by the debate and assured the authorities of the full support of the producers in the control of A.1.

MR. VAN ROOYEN (N.A.U.) also thanked the Association for the invitation. He considered that many of the difficulties with dairy cattle arose from close confinement and unnatural conditions, and advocated the dispersal of milk herds to farming areas. He considered more attention should be given to nutrition and management, and hoped A.1 would not be the only answer to infectious sterility.

DR. DIESEL: The number of bulls per centre must be limited in case of infection with scheduled diseases such as foot and mouth, anthrax, etc.

DR. QUIN quoted his experience in Denmark, where many forms of functional sterility, e.g. the occurrence of nymphomania and silent heat, were found to be hereditary. They must be careful not to cause hereditary sterility in trying to avoid infectious sterility.

DR. ALEXANDER: The veterinary profession must not only be responsible for the quality and safety of the semen issued, but also for the health and management of the cows inseminated. It would be a waste of time and money using good semen on cows sterile or of low fertility due to infections or nutritional disturbances.

DR. DE VILLIERS had used A.1 at Stellenbosch for some years with great success. He demonstrated a home-made artificial vagina made of radiator hose and motor-cycle tubing, which worked well. A dummy cow was used.

DR. VAN RENSBURG (replying): We must face the fact that A.1 is being demanded and centres must be set up, if only for the control of infectious sterility at present. Personnel would have to be trained, including veterinarians in specialized work as well as lay artificial inseminators.

To Mr. Wood: He did not think the stud breeders need fear A.1. They had already drawn up an excellent set of rules. Prices of mediocre bulls would probably drop, but really good animals should increase in price.

In conclusion, Dr. van Rensburg warned against looking upon A.1 as a cure for sterility.

TWO NEW VETERINARY FILMS

Two new films have been made by the Film Unit of the Union Education Department in collaboration with the Division of Veterinary Services. The films are "Onderstepoort" and "East Coast Fever."

ONDERSTEPOORT (800 ft., colour, sound).

The film opens with a photograph of the main block at Onderstepoort, taken in 1908, soon after it was built. The scene then moves to the Onderstepoort of to-day, and the main activities of the Institute are depicted. These include the preparation and bottling of vaccines, the technique of the experimental transmission of disease by ticks, the breeding of small laboratory animals, and many others. Special emphasis is laid on the teaching of veterinary students. This film should prove useful as a general educational film for farmers and the general public.

EAST COAST FEVER (800 ft., colour, sound).

The introduction of East Coast fever into the Union of South Africa in 1901 and its subsequent spread is shown by means of animated maps. The life histories of the vectors (*R. **appendiculatus*** and *R. **evertsi***) are shown diagrammatically, together with the technique of experimental transmission of the disease. The scene then moves to control measures in the field, including routine dipping, the control of cattle movements and the submission of spleen smears from dead animals. An infected farm is visited and the clinical symptoms and post-mortem changes of East Coast fever are portrayed. Methods of eradication such as dipping and hand-dressing as well as the clearing of infected farms are dealt with. The progress made in the campaign against East Coast fever is indicated by animated maps, and the film closes with an appeal for general co-operation between veterinarians and stock owners in order finally to banish the scourge from South Africa.

It is hoped that copies of these films will shortly be available at the Film Bureau, and also at Onderstepoort. Owing to import restrictions, copies will probably at present only be available in black and white.

AMERICAN COLLEGE OF VETERINARY PATHOLOGISTS

The above organization has been formed "to stimulate scientific progress and to encourage young men to get advanced training in veterinary pathology. The organization will also give an examination and certificate to those who have qualified in this speciality."

This information, which should be of considerable interest to the profession in South Africa, where veterinary pathology has been a strong point, is contained in a congratulatory letter to Dr. Gilles de Kock on the occasion of his impending retirement. The Secretary-Treasurer of the College is Major T. C. Jones (office of the Secretary-Treasurer, Armed Forces Institute of Pathology, Washington, D.C.).

ANTI-BRUCELLOSIS MEAT INSPECTION *

Local veterinarians in Russia are responsible for the enforcement of the brucellosis control measures laid down for slaughtering affected stock in 1949. Clinical cases are to be slaughtered on the farm on a day when no other animals are slaughtered. Reactors may be sent to abattoirs or brucella-infected fattening stations, but are slaughtered separate from healthy animals. Goats may not be sent to abattoirs. Direct observation by the veterinarian at slaughter is essential.

Meat from animals showing lesions is cooked or salted; also parenchymatous organs of all reactors. The use of blood or endocrine organs for medicinal purposes is prohibited.

* Note from abstract of "The System for Slaughter for Meat of Animals affected with Brucellosis." A.G. in *Veterinariya,* June, 1949, Vol. 26 : 33.

NOTICES

TUBERCULIN

Members are requested kindly to note that all applications for tuberculin should be made to the Senior Veterinary Officer of their Province.

„DIE VOER VAN PLAASVEE"

„Die Voer van Plaasvee," deur dr. J. W. Groenewald, Professor in Voedingsleer, Fakulteit van Veeartsenykunde en Hoof van die Afdeling Nutrisienavorsing, Onderstepoort. Prys 17s. 6d.; 300 bladsye; in Afrikaans.

Hierdie boek behandel die voeding van diere onder Suid-Afrikaanse toestande. Lede van die S.A.V.M.V. kan hul bestellings by die Sekretaris plaas.

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH
NATIONAL PHYSICAL LABORATORY

Information on Radio-isotopes

The following information may be of value to persons wishing to use radio-isotopes in research work or for medical purposes:—

(1) In terms of a resolution of the Atomic Energy Board, under Act No. 35 of 1948, the Council for Scientific and Industrial Research is the sole body in South Africa through which purchases of radioactive isotopes may be made overseas. Requests for such materials should be directed to the Director, National Physical Laboratory, P.O. Box 395, Pretoria. The Secretary-Treasurer of the Council for Scientific and Industrial Research handles the ordering and the accounts after approval of the request by a screening committee.

(2) The majority of radio elements are now prepared by the Atomic Energy Research Establishment in Britain. It is cheaper to obtain materials from Britain than from the United States of America, and transactions can be more quickly handled.

(3) The National Physical Laboratory of the Council for Scientific and Industrial Research is willing to give advice on equipment, on the planning of experiments and on techniques for assay, as well as a limited amount of training. The Biophysics Section can in suitable circumstances, co-operate in biological or medical research problems.

S. M. NAUDÉ,
Director: National Physical Laboratory.

REFRESHER COURSES FOR VETERINARIANS

In accordance with the motion passed at the last Annual General Meeting, Council proposes to organise the following two refresher courses subject to there being sufficient entries.

The courses will each be of one week's duration and will take place immediately prior to the Annual General Meeting, i.e. between August 15 and September 15, 1950.

1. *Municipal Veterinary Services.*

To be held mainly at Johannesburg with at least one trip to Pretoria. The course will consist of lectures and demonstrations in the following subjects :—

Abattoir design, meat inspection and grading, cold storage and treatment of measly carcasses, by-products and the collection of endocrine glands.

Milk control, dairy inspection, breed counts, pasteurisation and phosphatase test.

Sewage disposal.

2. *General Refresher Course.*

To be held at Onderstepoort. Will consist of lectures and demonstrations on newest developments in several branches of veterinary science. The exact course has not yet been laid down and will have to depend on what turns out to be the most important topics of the day.

The Municipal Services course will be organised by Drs. Robinson and Pfaff and several experienced officers have volunteered to help.

The Director of Veterinary Services has kindly consented to the holding of the General Course at Onderstepoort and lectures will be given both by members of the Onderstepoort staff and by outside experts.

It must be clearly understood that the holding of either or both these courses depends entirely on the support received. Members wishing to attend either course must please notify the Honorary Secretary of the S.A.V.M.A. before the 30th June, 1950.

There will be a fee of £1 1s. per course to cover the cost of roneo notes, etc. Members will be responsible for their own accommodation and transport.

BOOK REVIEW

The U.F.A.W. Handbook on the Care and Management of Laboratory Animals, edited by Professor Alistair N. Worden, Bailliere, Tindall & Cox, London. Price 31s. 6d.

This compendium drawn up by a number of workers will be found extremely useful by anyone concerned with the breeding and care of laboratory animals whether for experimental purposes, as a commercial enterprise or as pets.

The book begins with a discussion on the ethics of the use of small animals for experimental purposes and the measures to be taken for their welfare. This is followed by a description of the animal house, its equipment and its management. Due stress is placed on the importance of cleanliness and hygiene in the building and the sterilization of cages ; precautions which are so essential in keeping down unpleasant odours and preventing outbreaks of epizootics. The hanging cage mentioned in the text as being used at Onderstepoort has since been found unsatisfactory because the droppings tend to pack in the corners. Such cages cannot be used for work on dangerous diseases as it is too difficult to ensure that the floor is disinfected and that dangerous organisms will not find their way into the drainage system. The control of pests in the animal house — a problem which is sure to arise at some time or other — is dealt with fully. The accommodation required, nutrition, breeding, handling, management, anaesthesia, euthanasia and disease control of the various species of small laboratory animals, birds, amphibia and fresh water fish are described extensively. The book concludes with an appendix on the elements of statistical analysis. Extensive references are given at the end of each chapter.

SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

Minutes of the 44th General Meeting held at Onderstepoort from 4th-6th October, 1949.

Present: J. H. Mason (President), A. M. Diesel (Vice-President), G. de Kock, J. I. Quin, E. M. Robinson, L. L. Daly, J. H. B. Viljoen, K. van der Walt, M. W. Henning, S. W. J. van Rensburg, M. de Lange (Hon. Treasurer), J. G. Williams, W. G. Barnard, J. M. de Wet, J. Zwarenstein, L. R. Morford, R. Alexander, J. Quinlan, W. J. B. de Villiers, A. J. du Plessis, L. von Maltitz, J. S. van Heerden, E. C. Nelson, J. Stonier, R. E. Hartig, J. G. de Wet, J. R. Frean, J. P. Kriel, W. P. van Aardt, L. R. Hurter, P. G. Joubert, B. C. Jansen, B. T. Paine, P. S. Snyman, D. G. Steyn, A. J. Vlok, G. F. J. van Rensburg, J. L. Dickson, O. T. de Villiers, G. F. van der Merwe, C. H. Flight, J. P. van der Merwe, D. M. Walters, A. J. Louw, W. H. B. Buhr, L. W. van den Heever, T. Veenstra, R. A. Painter, Jac. Louw, M. Meldal-Johnsen, D. B. V. Barrow, W. Schatz, V. Cooper, G. L. Muller, N. C. F. Steenekamp, C. W. A. Belonje, H. Holtz, C. C. Wessels, M. C. Robinson, G. McIntyre, N. Barrie, J. G. Boswell, B. Moring, W. J. Wheeler, T. C. W. Wessels, W. O. Neitz, M. J. N. Meeser, J. H. R. Bisschop, G. van Drimmelen, D. J. Louw, M. J. S. Kropiwnicki, B. S. Parkin, C. F. B. Hofmeyr, K. A. Ross, H. F. T. Hellberg, P. R. Mansvelt, M. Bergh, L. T. Edwards, D. Coles, L. W. Rossiter, N. C. Starke, J. R. Scheuber, R. B. Osrin, J. D. Smit, N. T. van der Linde, J. S. Watt, P. J. J. Fourie, T. F. Adelaar, H. Uelson (Assoc. Member), W. G. van Aswegen, B. J. Brummer, W. J. Ryksen, J. G. Brandsen, R. du Toit, N. H. Boardman, G. P. Bishop, P. H. Brown, G. D. Sutton, J. G. Townsend, J. A. de Kock, R. K. Loveday, M. Sterne, L. D. S. Chisholm, I. S. McFarlane, S. M. Osborn, V. E. Osborn, C. E. Isaacs, E. B. Kluge, G. Pfaff, J. H. Schoeman, P. W. Thorold, J. J. Oosthuizen, J. W. A. Brookes, G. J. Stevens, J. G. van der Wath, A. D. Thomas, D. G. Steyn (Jr.), H. H. Curson, T. N. Osborn, H. Graf, P. J. du Toit, A. B. la Grange, K. E. Weiss, A. A. L. Albertyn, I. Mowat, H. N. Botha, E. O. le Riche, H. J. J. Terblanche, B. H. Pappin, F. W. B. du Casse, H. P. Steyn, T. B. Nel, R. Clark, J. A. Thorburn, J. D. Neethling, E. de V. Erasmus, F. Hempstead, S. L. Snyders, W. D. Malherbe (Hon. Secretary).

Apologies from N. J. G. da Camara, J. J. G. Keppel.

TUESDAY, 4th OCTOBER, 1949

THE PRESIDENT opened the Conference with some words of welcome to the more than usually large number of members, and to the guests, who included Dr. W. S. Monlux, of Cornell University, Dr. H. Nelson (Hon. Assoc. Member), and representatives of the S.A.A.U., S.A. Fresh Milk Producers' Association, S.A. Stud Book Association and the Minister's Advisory Committee on Artificial Insemination. He thanked the Director of Veterinary Services for once again placing the facilities of Onderstepoort at the disposal of the Association for the Conference. A motion of condolence with the relatives of the following members who had died during the past year was passed, those present standing as a token of respect: Drs. W. A. Dykins, H. Sigwart, C. H. Wadlow, P. Robinson and S. J. van der Walt.

9.00 a.m.: Films, "Onderstepoort" and "East Coast Fever." These new films made by Onderstepoort in collaboration with the Film Unit of the Union Education Department, were then shown.

9.45 a.m.: DR. DE KOCK gave his address on the "Future of the Veterinary Profession in South Africa." This was followed by a discussion.

10.30 a.m.: DR. DIESEL gave an announcement on "The Interim Tuberculosis Scheme for South Africa," which was designed to provide experience before the final scheme was laid down. Discussion followed till the tea interval, after which DR. DE KOCK spoke some words of welcome to the exhibitors of pharmaceutical products, instruments and equipment. MR. NORMAN DUNCAN, of A.E. (Pharmaceuticals), replied on behalf of the exhibiting firms.

11.15 a.m.: DRS. DIESEL and QUIN gave talks on impressions gained at the 14th International Veterinary Congress held during August in London.

12.15 p.m.: DR. CLARK gave a paper on the results of recent research into ruminal function, including the effect of pH on the motility of the rumen.

After lunch, PROF. COLES opened a searching discussion of the "Role of the Veterinarian in the Poultry Industry."

8.00 p.m.: Business Meeting at the Technical College, Pretoria:—

1. *Minutes of the 43rd General Meeting:* Adopted.

2. *Arising* from these minutes:—

(a) *Resolutions:* The Secretary reported on the outcome of the resolutions of the 1948 meeting. Resolutions 1 and 2 had been sent to the Minister. The Secretary for Agriculture had replied that the Department was aware of the position as to Brucellosis and that the matter of further facilities was engaging its attention. Concerning a separate Department of Animal Health, it was stated that this had been considered on several occasions and has "for various reasons" not been favoured.

The meeting directed the Hon. Secretary to inquire what these "various reasons" were.

DR. DIESEL, who had led a deputation to the Minister (other members Drs. Pfaff and Hofmeyr), reported on a sympathetic hearing to the presentation of Resolution 3.

Resolution 4, concerning the sale of hormones: The Minister of Health had replied that the possibility of adopting the Association's suggestion would be investigated.

(b) *Membership Australian V.M.A.:* THE SECRETARY reported that Council had put forward the name of Dr. Malherbe to be a member of the Australian Association. (This constituted a reciprocal gesture decided upon in principle at the previous General Meeting.) Notification of his election was still being awaited.

(c) *Sale of Dangerous and Restricted Drugs* to the lay public: THE SECRETARY gave an account of progress made in this connection and of rulings that had been given by the Pharmacy Board and legal advisors of the Department of Agriculture. After discussion it was decided that the matter be left in the hands of Dr. Parkin and the De Lange Committee, for further investigation and action.

(d) *Registration Fee for General Meetings:* Council's decision on a separate registration fee and dinner-dance fee was approved without discussion.

3. *Election of New Members:* The following were declared elected: W. H. Andrews, L. D. S. Chisholm, A. J. du Plessis, J. F. du Plooy, M. M. Greathead, C. v. N. Jonker, J. P. Kriel, A. B. la Grange, J. M. W. le Roux, A. S. McChlery, I. S. McFarlane, S. M. Osborn (née McLoughlin), W. du Toit Malan, B. Moring, R. W. Muir, V. E. Osborn, J. W. Pols, J. W. Rainey, K. A. Ross, J. L. Stewart, D. G. Steyn, H. J. J. Terblanche, J. K. Thomson, P. W. Thorold, G. F. J. van Rensburg, A. J. Vlok, P. P. C. Wacher.

4. *Resignations:* None.

5. *Notification of Election of Council* for 1940-50: *President:* J. H. Mason; *Vice-President:* A. M. Diesel; *Hon. Secretary:* M. de Lange; *Hon. Treasurer:* G. D. Sutton; *Members:* R. Alexander, W. D. Malherbe, G. Pfaff, S. W. J. van Rensburg. (*Sitting members:* J. G. Boswell, P. S. Snyman, H. P. Steyn, A. D. Thomas.)

6. *Amendment of Constitution* (Rule 9e): The following wording was accepted:—

"*Meetings of Council* shall be held at such places and intervals as may be agreed upon by members of Council. A *Special Meeting of Council* may be called by the President, or by three members of Council, or by ten full members of the Association, provided ten clear days' notice is given before holding the meeting. An *Extraordinary Meeting of Council* may be called by the President or in his absence by the Vice-President when a matter of extreme urgency demanding an immediate decision arises; such an Extraordinary Meeting shall be held at the earliest possible moment after the request has been made."

7. *Refresher Courses at the time of General Meetings:* DR. PFAFF proposed that such refresher courses be held for a week or two after General Meetings. As there was considerable disagreement about details, it was resolved that the matter be referred back to Council for full consideration and appropriate action.

8. *Presidential Address:* THE PRESIDENT gave his address, in which he gave an account of his recent visit to the United Kingdom. He further made reference to the P.D.S.A. (visited in England), the Dr. Maud Bales Memorial Bursary, the Tuberculosis Interim Scheme, and other matters dealt with during the past year by Council.

In conclusion he thanked Dr. Malherbe for his services as Hon. Secretary for the past few years and made him a presentation on behalf of the Association. DR. MALHERBE in his reply thanked the Association for the gift.

The Editor and other office-bearers were also thanked for their work in the past year.

9. *Secretariat:* DR. VAN RENSBURG (chairman of Finance Committee) explained to the meeting that it had become evident to Council that officers of the Veterinary Division could no longer carry on with the work of the Association on the old basis and that the time was not far off that a full-time paid Secretary would have to be appointed; for

this purpose it would become necessary to increase subscriptions. For the present the Finance Committee, with approval of Council, had appointed additional clerical assistance.

10. *Reports of Standing Committees:* DR. VAN RENSBURG, as chairman of the Finance Committee, presented the Auditor's Report for 1948-49, which had previously been examined in detail by his Committee and Council. It was adopted.

11. *Arrear Subscriptions:* These had been suitably dealt with by Finance Committee.

12. *General:*

(a) A practitioner alleged interference with his practice by a G.V.O. in the same town. The question of the relationship between private practitioners and G.V.O.s was extensively debated. It was in general felt that this was not a matter summarily or easily to be dealt with by legislative measures and that an approach to both parties in the present instance by the Association and the S.V.O. of the province should meet the case.

(b) An appeal was made by the President that Senior Veterinary Officers keep an eye on the welfare of deceased members' widows, who sometimes find themselves in straitened circumstances some years after their husbands' deaths.

The meeting was adjourned at 11.55 p.m. and refreshments were provided at a neighbouring tea room.

WEDNESDAY, 5th OCTOBER, 1949

During the morning session, the following papers having a bearing on sterility of bovines due to infections, were read and discussed:—

9.15 a.m.: Contagious Abortion: Dr. G. C. van Drimmelen.

9.45 a.m.: Trichomoniasis: Prof. W. O. Neitz.

10.15 a.m.: Infectious Sterility ("Epivag"): Prof. S. W. J. van Rensburg.

During the afternoon session Dr. Boswell gave his paper on the examination of the mare for fertility. After discussion he demonstrated Caslick's Operation and the use of the metal detector for diagnostic purposes.

In the evening an excursion to the Radcliffe Observatory was made by a small party of members.

THURSDAY, 6th OCTOBER, 1949

9.00 a.m.: Films on Artificial Insemination were shown.

9.45 a.m.: Demonstrations were given on the pathology of "epivag" by Dr. de Lange, and the whole technique of artificial insemination by Prof. van Rensburg and Drs. Starke and van Heerden.

12.45 p.m.: Dr. van Rensburg gave his address on "The Future Role of Artifiicial Insemination in the Stock Industry of South Africa."

After lunch this question was discussed at length, representatives of the farming organizations also participating. The President in conclusion thanked Prof. van Rensburg and Drs. Starke, de Lange and van Heerden for their very able contributions.

3.30 p.m. : *Resolutions.* The following were proposed and, after discussion, passed :—

Resolution No. 1: Proposed by D. COLES, seconded by DR. P. S. SNYMAN:

This 1949 General Meeting of the S.A.V.M.A. notes:

1. with great satisfaction:

(a) the progressive steps being taken by firms selling animal foodstuffs in appointing veterinary advisors;

(b) the action taken by certain firms on the Reef in establishing proper facilities for diagnosing poultry diseases;

(c) the incursion of veterinary graduates into the ranks of the breeders of pedigreed poultry;

(d) the institution of the Day-Old Chicken Producers' Association and hopes that all members of the S.A.V.M.A. will give wide publicity to this scheme, details of which may be had from the S.A. Poultry Association, Box 1795, Johannesburg,

2. with many misgivings:

(a) that not more than three State veterinarians have to cope with the problems of a poultry industry comprising some seventeen million birds, including the running of the B.W.D. test;

(b) that no further farmers can be enrolled for the official B.W.D. test, owing to the lack of adequate facilities, and this in spite of the continued spread of the disease;

(c) the fairly extensive outbreaks of Newcastle Disease in the Cape Province and the marked shortage of staff available for suppressing them.

This meeting also wishes to address an earnest appeal to all the larger Municipalities to provide proper facilities for slaughtering poultry and for the ante and post-mortem inspection of the birds. The present state of affairs is considered to be very unsatisfactory and is conducive to spreading conditions such as Newcastle Disease.

This meeting finally considers that immediate steps must be taken to provide further trained staff and facilities to extend research into the infectious and other diseases of poultry.

Resolution No. 2: Proposed by DR. DE LANGE, seconded by DR. WILLIAMS:

Congress wishes to draw the attention of the Minister of Agriculture to the serious position of infectious epididymitis and vaginitis in bovines in the Union of South Africa. It urges that all steps be taken fully to investigate all aspects of the disease, especially research, diagnosis, spread, survey, etc., and to institute control measures to obviate the spread of the disease to centres where it has so far not been diagnosed. To this end adequate provision of staff and facilities is essential.

In closing the meeting, the PRESIDENT requested the Director of Veterinary Services to thank the Department of Agriculture for allowing

so many of the State veterinarians to attend the Conference. The importance of the discussions had amply justified this large attendance.

A vote of thanks to the Chair was passed unanimously and with acclamation, and the meeting was adjourned at 4.15 p.m.

In the evening a dinner was held at the Iscor Recreation Club. The guest speakers were the Hon. Mr. S. P. le Roux (Minister of Agriculture) and Dr. H. Nelson (Medical Officer of Health, Pretoria). This was followed by dancing.

J. H. MASON,
President.

W. D. MALHERBE,
Hon. Secretary.

SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

Minutes of Council Meeting held at 2.15 p.m. on November 10th, 1949, in Prudential House, Pretoria.

Present: J. H. Mason (President), A. M. Diesel (Vice-President), A. C. Kirkpatrick (Hon. Life Vice-President), C. J. van Heerden (Hon. Life Vice-President), R. A. Alexander, J. G. Boswell, P. S. Snyman, G. Pfaff, A. D. Thomas, G. D. Sutton (Hon. Treasurer), R. Clark (Editor), W. D. Malherbe, H. P. Steyn, M. de Lange (Hon. Secretary).

Apologies: P. J. du Toit, S. W. J. van Rensburg.

1. *Minutes of Meeting* held on 29.9.49: Adopted.

2. *Arising* from these minutes:—

(a) *Restriction on the Sale of Drugs:* SECRETARY reports that Dr. Parkin is in communication with the Department of Public Health re sale of hormones, etc. As soon as certain matters are cleared up the De Lange Committee with Dr. Parkin will place recommendations before Council.

3. *Refresher Courses at time of General Meetings:* After discussion it was decided to form a sub-committee consisting of Drs. Pfaff (convener), Clark and Diesel to inquire into suitable subjects for refresher courses, how these could best be fitted in with the General Meeting, etc., and to report back to Council at its next meeting.

4. *Publicity for General Meetings:* PRESIDENT indicated that inadequate publicity is given to the activities of the Association at its General Meetings in the Press. After discussion, COL. VAN HEERDEN suggested that the Editor and Secretary should draw up a report at the time of the meeting, to be given to S.A.P.A. for publication in the lay press. Adopted.

DR. DIESEL suggested that after-dinner speakers, if they be strangers, be informed beforehand on the activities of the Association to enable them to draw up suitable speeches, which could also be reported on in the press. It was decided to bring this matter up for further discussion at a future meeting of Council.

DR. THOMAS suggested that statements on the activities of the Association (including its branches) should be submitted through the Editorial

Committee to the lay press. Adopted. Secretary to circularise this information to the various branches.

5. *Proposal by A.E. and C.I. (Pharmaceuticals), Ltd. to Award Annual Prizes to Veterinary Graduates:* DR. ALEXANDER proposed that two prizes of 10 guineas each (or books or equipment to the value thereof) be awarded to the two most outstanding students in Medicine (including Infectious Diseases) and Surgery (including Gynæcology) respectively. The examiners (external and internal) in the above subjects to be requested to recommend to Council. Secretary to communicate above proposal to the firm concerned, pointing out that the Theiler medal is already being awarded to the best all-round student in the final year and the Clinical medal to the best student in clinical subjects. Secretary to thank the firm for its generous offer.

6. *Submission of Resolutions at General Meetings:* Letter received from DR. PARKIN suggesting ways in which resolutions could be more efficiently dealt with than is the case at present, viz.:—

(a) Two members of Council to be appointed as Committee on Resolutions during Conference.

(b) Proposer and seconder of resolutions to act as *ex-officio* members of above committee to consider resolution.

(c) Committee to scrutinize and formulate the proposed resolutions.

(d) Resolutions to be submitted preferably at the business meeting and the latter, if necessary, be held later in the time table of the Conference.

Council decided to adopt the above suggestions and to thank Dr. Parkin for his proposals.

Council also feels that the holding of business meetings in the evening at the Technical College should be reconsidered. To be discussed at a future Council meeting.

7. *P.D.S.A. Cape Town: Proposed Appointment of Part-time Vet. Surgeon:* Correspondence on the above subject was read and discussed. Decided that if and when further details on the post become available, these be handed to the General Purposes Committee for consideration and recommendation to next Council meeting.

8. *Financial Matters:*

(a) *Maud Bales Scholarship* : Applicants to be considered by the Finance Committee who will then submit recommendations to Council.

(b) *Salaries of Lady Assistants:* Council accepted the Financial Committee's proposal that monthly salaries be paid by the Treasurer either by cheque or in cash, whichever is more convenient.

(c) *Life Membership:* The following become life members, having paid thirty annual subscriptions: Drs. Clemow, Henning, Harber, Keppel, Nicol, McIntyre and Parkin. Congratulatory letters to be sent by the President.

(d) *Subs., Journal:* Letter from the Editor suggesting an increase in subscriptions from 10s. 6d. to £1. The Finance Committee recommended raising subscriptions to 15s. per annum and 5s. for single copies. Agreed. The new price to come into operation as from 1951.

(e) *Union Loan Certificates:* A number of these have matured and the sum of £1,200 is now available for re-investment. Council approved that the Finance Committee invest the money in one of the City loans being floated shortly.

(f) *Financial Assistance to Dependents of Deceased Members:* Dr. Alexander explained that various cases are under investigation by the Finance Committee. One case in particular will be reported on at next Council meeting.

9. *General:*

(a) *Letter from Witwatersrand and Pretoria Health Consultative Committee re By-laws for Pet Shops:* Referred to General Purposes Committee with powers to act and for report to Council at next meeting.

(b) *Complaint of Member:* Letter from D.V.S. read. After discussion decided that Dr. Diesel to request the Provincial sub-director to discuss the matter jointly with both parties in the dispute. Dr. Diesel will inform the Secretary of the outcome.

(c) *Sutherland Strachan-Museum of Medical Sciences:* Dr. Clark asked Council's approval to launch an appeal to members, through an editorial in the *Journal,* for donations to the above Memorial. Agreed.

Also decided that the Association should donate an additional sum, to be recommended by the Finance Committee, at the next Council meeting. The President to discuss the matter with Dr. Bekker, of the Department of Pathology, Witwatersrand Medical School.

(d) *Insurance of Veterinarians by Lloyds:* Correspondence handed to Dr. Alexander with a request to write an editorial for the *Journal.*

(e) *Provincial Administration*: Proposed increase in annual licence for bitches to £5. After discussion it was decided to obtain a copy of the Draft Ordinance for submission to the next Council meeting.

The meeting closed at 5 p.m.

J. H. Mason,
President.

M. de Lange,
Hon. Secretary.

HIS MAJESTY'S COLONIAL SERVICE — NIGERIA

A VACANCY exists for a Veterinary Research Officer. Appointment will be on 3 years' probation for permanent and pensionable employment. The salary scale, including pensionable expatriation allowance, is £860 (for 3 years) to £1,300. War Service, qualifications and experience will determine point of entry into the salary scale. Where Government quarters are provided a rental of £90 per annum is charged. Free passages are provided for an officer and his wife on first appointment and on leave. Passages are not provided for children. Income tax is at local rates. The tour of service is 18 months. Leave on full salary is granted at the rate of 7 days for each completed month of resident service. Candidates must possess a veterinary qualification registrable with the Royal College of Veterinary Surgeons, and a Science degree, and must have had special training in diseases of poultry.

HIS MAJESTY'S COLONIAL SERVICE — NIGERIA

TWO VACANCIES exist for Veterinary Education Officers in the Veterinary Department. Duties will include teaching to an advanced standard two of the following subjects: Anatomy, animal husbandry, materia medica, hygiene and dietetics, parasitology and surgery. Either of the officers appointed may be required to administer and control the Veterinary School Clinic.

Appointment will be on 3 years' probation for permanent and pensionable employment. The salary scale, including pensionable expatriation allowance, is £860 (for three years) to £1,300 a year. Point of entry into the scale will be determined by war service, qualifications and experience. Where Government quarters are provided rent is charged at the rate of £90 a year. Free passages are provided for an officer and his wife on first appointment and on leave.

Income tax is at local rates.

The normal tour of service is 18 months and leave on full salary is granted at the rate of 7 days for each completed month of resident service. Candidates must possess a degree in veterinary science registrable with the Royal College of Veterinary Surgeons.

REPRINTS

Will contributors please note the conditions re reprints as printed on the back cover of the journal. Reprints can be obtained at cost price if ordered when articles ars submitted. A limited number of "tear-out" copies are available free.

SUBJECT INDEX, VOL. XX.

Page

Acokanthera venenata—Preliminary note on venenatin, a glycoside from — 45
Anthrax, Avirulent Vaccine —A method of straining to remove gross particles 136
Anthrax—Two outbreaks in equines due to contaminated oats 42
Anthrax—Use of gastric mucin in examination of specimens for — 34
Aorta—Ruptured—caused by Spirocera lupi (Case Report) 148
Arseen — Die vergelykende waarde van —, B.H.C., en D.D.T. in dipbakke 110
Artificial Insemination 200
B.H.C. — Die vergelykende waarde van arseen, —, en D.D.T. in dipbakke 110
Brucellosis—A new aid for the control of — 80
Brucellosis survey in South Africa 178
Bursary — Dr. Maud Bales Memorial — 149
Calculus — Intestinal — and rupture of small colon in horse (Case Report) 99
Carbamylcholine — Use of—in veterinary practice 36
Co-operative employment of veterinarians (Editorial) 67
D.D.T. — Suspected poisoning of rabbit by — 48
D.D.T. — Die vergelykende waarde van arseen, B.H.C. en — in dipbakke 110
Dermatophytes—A simplified method for the primary isolation of — 89
Dyspnoea—The soft palate as a cause of — in race horses 125
Emergencies — Some surgical — in small animals 128

Page

Equine Transit Tetany (Case Report) 47
Films—Two new veterinary 203
Foot and Mouth Disease—Problems in S.A. 1
Fowl Cholera in the Western Province 138
Gape Worm (Syngamus trachea)—A note on the occurrence of — in Natal 90
Horse Practice — Notes from current literature 58
Horses — Use of Intraval Sodium in — 142
Hotis Test — Combined use of — and microscopic tests for mastitis samples 16
Infertility — Infectious or Epizootic — in Cattle 9
Insemination, artificial 200
Insurance against professional risks 161
International—Impressions of the XIV — Congress 168
Intraval Sodium, use in horses 142
Mastitis — Combined use of Hotis and microscopic tests for — 16
Monstrosity — Twin — in cow 49
Obituaries :
Robertson, P. J. 161
Sigwart, H. 106
Pregnancy, results of Ascheim-Zondek test in mares 39
Presidential Address 164
Reproduction—Observation of — in Thoroughbred mare 21
Reproduction—Some problems in Thoroughbred mares 194
Rumen—Recent investigations into physiology of — 174
S.A.V.M.A. :
Minutes of Council meetings 63, 103, 152, 154, 156, 213
Minutes of General Meeting 208
Scab — Ear — in sheep and goats 93
Semen — Examination of Bull 70

Page
Soft Palate as a cause of dyspnoea in racehorses 125
Spirocera lupi infestation. Rupture of aorta caused by — 148
Sterility — Infectious of epizootic infertility in cattle 9
Sterility — The pathology of infectious — in bovines 193
Strachan — Museum of Medical Sciences (Editorial) 109
Syngamus trachea — A note on the occurrence of gape worm in Natal 90
Page
Thrombosis — of posterior vena cava of a cow (Case Report) 49
Trichomonas foetus — A note on the cultivation and diagnosis of — 189
Venenatin — Glycoside form Acokanthera venenata 45
Veterinary Profession — Future of — in South Africa 166
Veterinary Congress — Impression of the XIV International — 168
Wild — Gewoontes van — 144

AUTHOR INDEX, VOL. XX.

Page
Bekker, P. M. 110
Belonje, C. W. A. 21, 142
Boswell, J. G. 194
Brown, M. H. V. 128
Buhr, W. H. B. 148
Canham, A. S. 138
Clark, R. 36, 39
de Kock, G. 1, 166
de Villiers, S. W. 49, 99
Diesel, A. M. 168
Flight, C. H. 42
Frean, J. R. 49
Graf, H. 110
Henning, M. W. 9
Kashula, V. R. 138
McIntosh, B. M. 47
Page
Malan, J. R. 110
Maré, G. 144
Mason, J. M. 164
Nixon, W. J. 48
Quin, J. I. 36, 168
Quinlan, J. B. 125
Starke, N. C. 70, 125
Stephan, S. A. R. 90, 138
Sutton, G. D. 34, 136
Thorold, P. W. 89, 189
Van Drimmelen, G. C. 80, 178
Van Rensburg, S. W. J. 70, 125
Van den Heever, L. W. 16
Van der Merwe, G. F. 93
Van der Merwe, S. W. 110
Veldsman, D. P. 45
Viljoen, W. L. 148