VOLUME I. NUMBER 4.

THE JOURNAL

OF

THE SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION.

Official Publication of
The South African Veterinary Medical Association.

OCTOBER 1930.

Printers:
The Good Hope Printing Works, 195, Koch St., Pretoria,

1930.

CONTENTS.

JL. S.AFR. MED. ASSN.
1 (4) 1930.

PAPERS AND COMMUNICATIONS.

The Veterinary Profession in South Africa.
(2) The Struggle for Legal Recognition.

Dr. H. H. CURSON, F.R.C.V.S., Onderstepoort, Pretoria.

It matters not how strait the gate,
How charged with punishments the scroll,
I am the master of my fate:
I am the captain of my soul.

HENLEY.

INTRODUCTION.

In narrating the endeavours that have been made to secure legal recognition for veterinarians, no mention will be made in this paper of the position in Natal. Fortunately for the pioneers of the profession in that Colony, the members of Parliament, being generally men of education and vision, realised the immediate need for raising the status of our calling and thus made sure that only men of sound training would be permitted to attend to the requirements of stock farmers. Further, it is intended in a subsequent communication to relate the vicissitudes of the Natal Veterinary Board, the body instituted by Act 21/1899 to regulate veterinary affairs.

As no attempt was made in the Orange River Colony[1] to introduce a veterinary bill, discussion therefore centres on the Transvaal and Cape Colony. It will be convenient to take the latter first.

CAPE OF GOOD HOPE V.M.S.

The main object of the Cape of Good Hope Veterinary Medical Society, inaugurated 1/11/05, was "to introduce before Parliament a bill with a view to protecting the general public against those who were not in possession of any diploma or other document to show that they were qualified to carry on the art and science of veterinary surgery and medicine."[2] A draft bill was drawn up in 1906 and handed to Messrs. van Zijl and Buissinne, attorneys and parliamentary agents at Capetown; but as a result of certain alterations, suggested by the Council, Royal College of Veterinary Surgeons, London, it was not ready for presentation to Parliament by the end of the year.

In subsequent years, although favourably commented on by certain members of the Cabinet, the bill was never submitted to Parliament chiefly owing to the belief that it would fail to pass.[3] That such a

(1) The veterinarians in the Orange River Colony, being relatively few in number, joined the Transvaal Veterinary Medical Association. After 31 years Northern Rhodesia is the second territory in the Sub-Continent to make provision for registration of veterinarians. (Vet. Rec. 26/7/30).

(2) Vet. Rec. 20/4/07, p. 685.

(3) The death of D. Hutcheon (Director of Agriculture) on 14/5/07 was a great loss to the profession at this critical period.

pessimistic view should have been taken is surprising, since early in 1907 the Minister of Agriculture (Hon. A. J. Fuller(4)) welcomed the bill, stating "firstly, it is essential that the public should be protected from the operations of quacks; secondly, the measure will encourage only the best class of veterinary practitioners coming into the country."(5) In the Report of the Council of the Cape V.M.S. for 1908(6), the view is expressed, in the event of the four colonies amalgamating, that "it would be advisable to combine with the Transvaal Society and Natal (if there be one) with the idea of effecting the object we have so long had in view." In 1910, however, when the question of a joint medical and veterinary bill for the Union of South Africa was raised by the Transvaal Veterinary Medical Association, the Cape was antagonistic, maintaining "that an Ordinance separate from that of the medical profession would be quite as potent. The only apparent advantage of the proposals, economy, is likely to prove disadvantageous considering the relative positions of both professions upon . . . dairy inspection, meat inspection and other matters appertaining to public health. . . ."(7) As will be described, a veterinary bill for the Union of South Africa was drafted the same year by the T.V.M.A., but whether financial support was given by the Cape and Natal Societies is not known.

After Union (31/5/10) the Cape body almost ceased to exist, with the result that any effort towards the passing of a veterinary bill had to be initiated by the more energetic T.V.M.A. As a consequence of the Bloemfontein Conference in December 1917, where the C. of G.H. V.M.S. was represented by Mr. J. Spreull, then S.V.O., Transvaal, a general meeting of the Society was held on 9/1/18, when it was decided to hand over the sum of £150 to the T.V.M.A. "for the purpose of promoting a Veterinary Surgeons Bill (S.A.)."(8)

A copy of the complete Cape veterinary bill is not available,(9) but one of the most important provisions was with regard to the registration of unqualified practitioners (See Appendix i p. 16). Unlike the British Act of 1881, not only was 5 years practice prior to the passing of the measure laid down, but the candidate was also required to pass an examination conducted by qualified veterinary surgeons (as provided by Act 21/1899 in Natal).(10)

(4) He was succeeded by Hon. C. P. Crewe in June 1907.

(5) Vet. Rec. 2/5/08, p. 779.

(6) Vet. Rec. 2/10/09, p. 216.

(7) Vet. Rec. 2/7/10, p. 9. Mr. C. E. Gray of the T.V.M.A. while in Capetown in March 1911 met the Council members of the Cape Society and explained certain points of the Union draft bill.

(8) Letter dated 9/8/18 from Hon. Sec.-Treasurer C. of G.H. V.M.S. (J. W. Crowhurst) to Hon. Sec. T.V.M.A. (D Kehoe).

(9) There is probably a copy in the files of the R.C.V.S. London.

(10) Vet. Rec. 9/2/07, p. 491.

TRANSVAAL V.M.A.

Within a year of the formation of the Transvaal V.M.A. (16/2/03) a bill for the protection of the veterinary profession had been drafted. In introducing the proposed measure at a council meeting on 30/1/04, Capt. Irvine-Smith, the president, stated "it was not the intention of the Ordinance to reserve the Transvaal as a monopoly for the M.R.C.V.S., on the other hand, they wished to establish a precedent by offering reciprocity to all comers, no matter of what nationality, so long as they held a diploma entitling them to practise in the country in which it was granted."(11) (See Appendix ii p. 16). It is understood that during Stewart Stockman's term of office as P.V.O., Transvaal (1903-1905), Sir Richard Solomon, Attorney-General, was prepared to place the bill before the Legislative Council, but Stockman apparently did not favour the proposed measure, for when the matter was discussed at a general meeting of the T.V.M.A. in 1904, a motion to proceed with the bill was defeated by Stockman and his supporters by a single vote.

In 1906 the T.V.M.A. approached the Commissioner of Lands (Dr. A. Jameson), who was also responsible for the Department of Agriculture, regarding the introduction of the Veterinary Surgeons Bill, but the reply was to the effect that it would be more satisfactory to wait for an elected legislature.

Next came Responsible Government (1906-1910), and on 30/9/07, Mr. Christy, A.P.V.O., Transvaal, and retiring president of the T.V.M.A., stated at a general meeting of the Association that considerable pains had been taken to sound the views of members of the Legislative Assembly, but that "opinion was unanimous, it was not advisable at present to bring forward the Ordinance, as there was every likelihood that it would be thrown out."(13)

Next year, apparently as a result of observations made on the Bill by the Secretary of the Transvaal Medical Council, the Hon. Secretary of the T.V.M.A. (J. Chalmers) at a general meeting on 27/6/08, suggested the appointment of a sub-committee "to take up the whole matter and draft a small ordinance on the lines of that of the Natal Government."(14) Messrs. Chalmers, Christy, Gray and Hollingham were accordingly appointed, and a **printed** copy of the revised Bill was despatched to all members of the T.V.M.A. along with the minutes of the general meeting of 26/9/08. At the following general meeting (19/12/08) Messrs. Gray and Theiler were appointed to interview Generals Botha (Prime Minister) and Smuts (Colonial Secretary)

(11) Vet. Rec. 12/3/04, p. 577.

(13) Vet. Rec. 11/1/08, p. 489.

(14) Vet. Rec. 10/10/08, p. 224. History repeats itself, for at the general meeting of the S.A.V.M.A. in August 1929, similar views were expressed with regard to a Union Veterinary Bill.

"with a view of having the Ordinance introduced into the Legislature."(15) General Smuts, who previously had agreed to sponsor the Bill(16) "provided it was concise and not too long," replied that it would be advisable to wait until Union took effect "and then to introduce an Ordinance for the whole of South Africa."(17) In view of the fact that it was proposed soon after Union to introduce a consolidating medical act, Dr. Theiler, having discussed the matter with the Colonial Secretary, suggested(17) the possibility of amalgamating the medical and veterinary bills on grounds of ease and economy. He further proposed that the views of the Cape and Natal veterinary societies be obtained. Not only did the honorary secretary (J. G. Bush) T.V.M.A. communicate with the Cape and Natal societies, as indicated above, but he also arranged a conference of delegates at Pretoria on 18/5/10 in order to discuss the matter of a veterinary bill for the Union.(18) While Natal was in full sympathy with the incorporation of the medical and veterinary ordinances, the Cape was definitely antagonistic. Both bodies, however, failed to send a delegate to the conference, thus nullifying its deliberations.

At Union the policy of the T.V.M.A. is indicated by the following motion, proposed by Mr. Christy (and carried) at the general meeting of 25/6/10:(18) "That the Cape and Natal Societies be informed that this Association is resolved to proceed with the matter of introducing a Veterinary Ordinance: further that we are prepared to guarantee a certain sum towards the cost, and we ask whether they are prepared to do the same. That failing support, we are determined to proceed with the matter unaided, and that we suggest that in view of the forthcoming official meeting of Principal Veterinary Surgeons, each of these gentlemen should be authorised to represent his own veterinary society.(19)

At this meeting the Transvaal draft bill (apparently that of 1908) was accepted as the basis of the Union draft. The bill had already been printed and distributed, and the other associations had been asked to forward their views on it by 26/9/1911.(20) For this draft see Appendix iii p. 16. At this time the sub-committee in charge of the bill consisted of Messrs. Theiler and Christy who, having secured the support of the Cape V.M.A., proposed (31/12/10) that the Minister of the Interior (General J. C. Smuts) be approached with a view to intro-

(15) Vet. Rec. 30/1/09, p. 509.

(16) Vet. Rec. 26/12/08, p. 415.

(17) Vet. Rec. 23/7/10, p. 59.

(18) Vet. Rec. 24/9/10, p. 184.

(19) The conference of P.V.Ss was held at Pretoria in August 1910 to submit recommendations for re-organisation of Veterinary Services for the Union. It is significant that they urged the creation of a Vet. College at Onderstepoort and affiliation with the T.U.C.

(20) Vet. Rec. 28/1/11, p. 480.

ducing the Bill.(21) Whether this was done is not clear, but unfortunately it was an unsuitable time, for with the stream of consolidating bills, e.g. stock diseases. (Act 14/1911) following unification, there was no hope of a veterinary bill receiving attention. Again among the state members of the profession, as a result of reorganisation and transfer, there was at this period very little enthusiasm, with the result that after Union neither the Cape nor Natal societies were active. In fact but little seems to have been done prior to the outbreak of war in August 1914, and naturally during the early stages of the struggle the matter was out of the question.

Renewed interest, however, in the veterinary bill was shown at the first general meeting (20/10/17) held since August 1914.(22) A resolution, which led to a meeting of veterinary delegates at Bloemfontein on the 10th and 11th of December, was adopted, for it was felt that united action was imperative. Representatives accordingly assembled at the S.V.O.'s Office in the Free State capital as follows: T.V.M.A. ... ... Messrs. P. Conacher (Chairman) and J. G. Bush. C. of G.H.V.M.S., Mr. J. Spreull. N.V.M.A., Mr. F. J. Carless. Orange Free State Mr. A. Grist.

With the exception of Mr. Carless all were members of the T.V.M.A., Mr. Spreull in addition being a member of the Cape Society. The draft bill "as last amended" (see Appendix iii p. 16) was first discussed, but it was decided, after study of the "Medical, Dental and Pharmacy Bill," to discard it and in its place to introduce a measure on the lines of the new medical bill. This having been drawn up, Col. Bush obtained the consent of the Natal and Orange Free State delegates with regard to the T.V.M.A. being authorised to proceed with the introduction of the bill. The Cape representative, however, preferred to await his Society's approval. In connection with finance, Col. Bush proposed (and Mr. Spreull seconded) that the delegates should ascertain from their associations "what proportion of the total cost they were prepared to contribute" i.e. towards the passage of the bill. Finally, a Financial Committee consisting of Messrs. Bush, Spreull and Crowhurst (Honorary Secretary and Treasurer of the C. of G.H.V.M.S.) was appointed.(23)

(21) Vet. Rec. 15/4/11, p. 673. It is difficult to understand why the Minister of Interior should have been mentioned, for veterinary matters have usually been considered to fall under the Minister of Agriculture. As a matter of fact by Govt. Notice 907 (U.G.G. 11/11/10) the licensing of veterinary surgeons in Natal under Act 21/1899 had been transferred from the Colonial Secretary to the Minister of Agriculture.

(22) At the same meeting a resolution was adopted instructing Council "to keep closely in touch with all draft legislation which may affect the Veterinary profession."

(23) At a meeting of the Cape Society (9/1/18), "It was decided to allocate the sum of £150 to assist the T.V.M.A. in endeavouring to promote the passage through Parliament of a veterinary surgeons bill." (Letter 9/1/18 from Hon. Sec.-Treasurer to J. Spreull). The money was received by Mr. Kehoe, Hon. Sec. T.V.M.A., on 10/9/18. At the meeting of 9/1/18 Messrs. Fern,

At a council meeting at the S.V.O.'s Office, Pretoria, on 28/12/17 the draft bill drawn up at Bloemfontein was adopted. Col. Irvine-Smith at the same time suggested that the support of the Transvaal and South African Agricultural Unions be obtained prior to the Minister of Interior (Sir Thomas Watt), who was sponsoring the medical bill, being approached to interest himself on behalf of the veterinary profession. With the exception of a small amendment proposed in the first instance by the T.A.U., both agricultural unions were in favour of the bill.(24) The Parliamentary Committee, consisting of Messrs. Conacher and Bush, then visited the Minister of Interior at Capetown on 31/1/18, but his reply was that the matter was one "to be dealt with by the Minister of Agriculture (Hon. H. C. van Heerden)." This gentleman was thereupon interviewed, the result being "that he would try" to introduce it "next session," i.e. early in 1919.(25)

As can be understood, enthusiasm among the members of the profession now ran high. The bill was published in the Veterinary Record of 25/5/18 and 1/6/18 (see Appendix iv p. 16), and at the annual scientific gathering of the T.V.M.A. at Onderstepoort on 12th and 13th August, Mr. S. Amos received authority to collect funds in Natal for assisting the passage of the measure. He himself headed the list with £25, but the total amount collected has not been ascertained.(26) In the meantime the Council of the Royal College of Veterinary Surgeons had been requested to report on the bill. A committee duly dealt with the matter and its recommendations were adopted by the Council, R.C.V.S., on 4/10/18. On the 9th October, 1918, a deputation consisting of Messrs. Irvine-Smith, Bush and Conacher, interviewed the Minister, who repeated his statement of January. As for the promise nothing came of it. It is remarkable, however, that at a council meeting of the T.V.M.A. held at Pretoria on 7/3/19, i.e. during the session in which the Minister had proposed to introduce the measure, the matter apparently was not referred to; although at subsequent council meetings (1/9/19 and 11/10/19), when it was too late, the Hon. Secretary was instructed to communicate with

Forrest, Lyons and the Hon. Sec.-Treasurer were present. Whether the N.V.M.A. contributed at this time is not known, but early in 1924 certain funds, approximately £12, were transferred to the S.A.V.M.A. (See Minutes 19/4/24). As it has been stated that all monies of the N.V.M.A. were paid to the S.A.V.M.A., it is worth noting that in 1929 £17:10:4 was contributed by old members of N.V.M.A. to Royal Vet. College Building Fund. (Vet. Rec. 5/10/29).

(24) It was accepted on 16/1/18 by the S.A.A.U. at a Congress at Capetown. In July 1919 the S.A.A.U. requested the Minister of Agriculture to proceed with the bill. This he promised to do in 1920. Col. Irvine-Smith has done much good work for both these bodies.

(25) Recorded in minutes of general meeting T.V.M.A. Pretoria 28/1/18.

(26) It was at this meeting that the Hon. Sec. Mr. Kehoe suggested that the time was ripe for a South African V.M.A. Mr. D. T. Mitchell succeeded Mr. Kehoe (who returned to Ireland at the end of September 1918) and brought the matter to fruition.

the Minister! At the annual general meeting held at Onderstepoort on 28th and 29th July 1919, Mr. Conacher (President) stated that a deputation had been informed by the Minister of Agriculture prior to the last session(27) " that it might be possible for the bill to be put through as a Government measure, but that in any case in the immediate session (i.e. 5/9/19-17/9/19) the bill could not be dealt with." As there was some difference of opinion as to whether the measure should be introduced as a Goverument measure or a private measure (Col. Bush having obtained Mr. Rooth's assurance that he would undertake the task), a Parliamentary Committee consisting of Messrs. Montgomery, Gray, Bush, Irvine-Smith and Viljoen was appointed. This on 9/10/19 interviewed the Minister of Agriculture, who stated he hoped " to secure a safe passage for the bill through Parliament during the next Session " (i.e. 1920).

At this time agitating the minds of the profession was the question regarding the institution of a local Faculty of Veterinary Science; (28) and it is significant that at the same meeting (July 1919) the proposal was defeated by 16 votes to 4, the deciding factor being the absence of any legal protection for graduates of the Faculty. Indeed at a council meeting on 10/2/20 at Pretoria, Prof. Viljoen, remarked during a discussion that " one of the conditions of the establishment of the new Faculty was that a veterinary bill providing protection for all veterinarians must be passed." Unfortunately at the beginning of 1920, when the new Faculty came into existence, a change of ministry took place as a result of which a new Minister of Agriculture (Hon. F. S. Malan) was appointed.

The council meeting referred to above was the last held by the T.V.M.A., the subsequent gathering of council (March 1920) consisting of the same members,(29) acting on behalf of the South African Veterinary Association. The only reference made to the bill at this meeting was that a new Parliamentary Committee should be appointed. This was accordingly done, the members being Messrs. Gray, Spreull, Conacher, Viljoen and Quinlan.

South African Veterinary Medical Association.

Coinciding with the inauguration of the S.A.V.A.(30) early in 1920 was the establishment of the Faculty of Veterinary Science in the

(27) Mr. Conacher was apparently referring to the deputation of 9/10/18. The "last" session occupied the period 17/1/19-20/6/19.

(28) A Government Commission consisting of Messrs. Hofmeyr, Theiler, Gray, Viljoen, Montgomery, and Fantham, presented majority and minority reports in connection therewith in 1919.

(29) In terms of a resolution passed at the meeting of 1/9/19 "existing officers of the T.V.M.A. became for the time being officers of the S.A.V.A." The first general meeting of S.A.V.A. was held on 1/4/20 in Johannesburg.

(30) Title changed to S.A.V. Medical A. at a general meeting 11/4/22.

Transvaal University College, which is a constituent college of the University of South Africa.(31)

Reference has already been made to Professor Viljoen's remarks at the council meeting (T.V.M.A.) on 10/2/20 regarding the importance of legal protection in connection with the new Faculty. Sir Arnold Theiler, who was Dean of the Faculty, again stressed this in commenting on the bill (letter 31/3/20) to the Secretary for Agriculture. Sir Arnold, while not entirely approving of the draft of 1918, since due recognition of the function of the Faculty had not been acknowledged, nevertheless admitted the necessity of a legal measure, and wrote as follows: " The success of a South African Veterinary College is in a large measure contingent upon the passage of a Veterinary Surgeons' Act for the proper protection of members of the profession." And again: " It is assumed that any legislation framed for the protection of the veterinary profession will be in conformity with the recommendations of this Committee."(32)

The Minister of Agriculture (Hon. F. S. Malan) **now that the State was concerned in veterinary education,** had intended introducing the bill as a **government** measure in 1920, but, no doubt, as a result of Sir Arnold Theiler's observations, apparently decided not to proceed until the profession had come to some agreement on the matter.

As a result, however, of Sir Arnold Theiler's observations the bill was discussed at the general meeting S.A.V.M.A. held at Onderstepoort on 9/9/21, amendments were made, and the entire draft was then typed and issued to members. (See Appendix v., p. 16). In the following November the Minister (now Sir Thomas Smartt), stated he would endeavour to introduce the bill the next session; and in order to assist him a deputation from the S.A.V.M.A. consisting of Messrs. Irvine-Smith, G. de Kock, E. W. Hunt, S. Woollatt, Venter and J. Moor (the last two being M.L.A.'s) met at Capetown on 8/3/22. An interview was arranged and " ultimately the Minister gave instructions for the bill to be printed and circulated for introduction to the House." Apparently this was not done.

On Professor de Kock's return to Pretoria, he gave the members of the Faculty of Veterinary Science, on 17/3/22, a summary of his visit to Capetown. In consequence of this, the meeting agreed to request the Secretary for Agriculture to refer the bill to the Faculty before its introduction into Parliament. Here is an example of that unfortunate spirit so common in our professional history. The bill had been revised the previous year, members of Faculty, all but one of whom were members of the S.A.V.M.A., had participated in the discussion on 9/9/21, and Dr. du Toit had even expressed gratification

(31) From October 1930 the T.U.C. will exist as an independent university, that of Pretoria.

(32) See footnote (28).

at the unanimity displayed!! In April the bill (see Appendix vi., p. 16) was accordingly referred to Faculty and on 10/4/22, a subcommittee, consisting of Professors Viljoen, de Kock, and Green, was appointed to draw up a memorandum for submission to Faculty.

After several discussions and much unnecessary delay the comments of Faculty, arranged as two annexures, were eventually despatched to the Secretary for Agriculture on 23/5/22, by which time it was impossible for the Minister to introduce the bill, had circumstances otherwise been opportune.(33)

It is significant that among the members of Faculty themselves there had been considerable diversity of opinion especially regarding administration of the bill. The majority of members preferred the method outlined in the draft bill as presented by the S.A.V.M.A. (Annexure I.), whereas a minority favoured more far-reaching amendments which would place a considerable part of the administration in the hands of the Minister (Annexure II). It was, however, not until the end of 1924 that " the draft bill, **amended in accordance with Annexure I.** . . . was submitted to the Law Advisers for revision." See Appendix vii., p. 16. Certain amendments were again suggested and these were submitted to Onderstepoort early in January 1925, for " consideration and further amendment of the draft bill where necessary." (Letter of 8/1/25 from Secretary for Agriculture).

In the meantime the S.A.V.M.A. had not been idle, for early in 1924 the Minister had again been requested to introduce the bill, but as indicated above the matter had been allowed to languish. Further, at the general meeting of 19/4/24 a Parliamentary Committee, consisting of the President and Honorary Secretary (Messrs. Irvine-Smith and Kirkpatrick), Director of Veterinary Education and Research (Sir Arnold Theiler) and Principal Veterinary Officer (Mr. J. D. Borthwick), was elected and, in addition, the following motion was adopted: " That pending the passing of the proposed Veterinary Surgeons' Act, the P.V.O. be requested to submit all appointments under the Public Health Act, referred to him for approval, to the Council of the S.A.V.M.A. for an expression of their views."(34) Five months later (25/9/24), in the course of an address at a general meeting of the Association, the new Minister of Agriculture (General J. C. C. Kemp) " hoped to be able to introduce it " (i.e. the bill), next session, as " he appreciated fully the necessity for such a measure." As

(33) Reference to the S.A.V.M.A. (in the draft bill of 1921) was deleted in both Annexures I and II, since that body was not registered under any Act, and was "merely a private professional association." The T.V.M.A. was registered under Ord. 56/1903 (which dealt with the incorporation of societies), and still remains so since the Registrar has not been notified that the T.V.M.A. has ceased to exist.

(34) This step was taken for the P.V.O., although empowered to grant or refuse approval of veterinarians under Act 36/1919, had authorised an unqualified man to perform veterinary duties in an abattoir.

has been explained, soon afterwards the draft bill was submitted to the Law Adviser, whose recommendations (received by the Director of Veterinary Education and Research early in January 1925), were incorporated in the draft bill in September 1925. By this time the Minister was not hopeful of being able to sponsor the bill during the following session, although six months previously, i.e. at the April general meeting of the S.A.V.M.A., the President intimated that he had consulted the Minister who advised that the bill should be in readiness " so that, if there were a possibility towards the end of the session he, the Minister, would introduce it."

About this time, however, there developed what may be called the Lawrence case, which clearly indicated that legal protection for graduates of the local Faculty and reciprocity with other veterinary bodies was essential. Mr. D. A. Lawrence, a Rhodesian, who had obtained a bursary from the Southern Rhodesian Department of Education in order to study at the Faculty of Veterinary Science, Pretoria, on seeking employment in the Veterinary Division of his native country, was informed that the South African degree was not recognised. This naturally led to negotiations between the Union and Southern Rhodesian governments, as a result of which the ban was removed and the aspirations of our profession more widely appreciated, especially by those in authority. Early in 1926 the Government arranged to have the bill (see Appendix viii., p. 16) translated into Afrikaans (35) and printed, but sad to relate, its introduction into Parliament was left to a private member, Advocate van Hees, who succeeded only in getting it through the first reading when it was withdrawn!

The bill was again discussed at the April 1926 general meeting of the Association, a Parliamentary Committee was elected and authority was given for the despatch of a deputation to Capetown whenever necessary. At the second annual meeting six months later, the Minister of Agriculture, in referring to the need for legislation, added that " the profession could rely on him giving it his full support." During the discussion, the Vice-President (Dr. de Kock) stated that Mr. van Hees had again promised to introduce the bill next session, but as there were certain clauses which appeared undesirable to members of Parliament, he thought they should be considered by the Parliamentary Committee which was re-elected.

Early in 1927 the President (Dr. P. J. du Toit), on his return from Europe, interviewed Mr. van Hees, who stated that his intention

(35) The cost of printing 800 copies was £58:12:9. The translation was done by officials of the Department of Agriculture, whereas such work is generally undertaken by the Department of Justice. It is understood that the bill was withdrawn on account of the Dutch version being incorrectly translated. Mr. G. Pfaff (Hon. Sec.-Treasurer S.A.V.M.A.) informs me that from 1918-20 the T.V.M.A. spent £43:10:11 on the Bill, and from 1920-30 the S.A.V.M.A. £62:5:10.

that session was to wait until the medical bill had passed the third reading, and then to explain that the veterinary draft was based on it. In this way he hoped to have clauses identical or almost identical in the two measures passed with little or no opposition. The medical bill, however, did not pass as anticipated and it is presumed the veterinary bill was withdrawn for this reason, although it was reported that the Dutch translation had been faulty. Enquiries were addressed to Mr. van Hees regarding the bill but for some unknown reason, no reply was obtained. Dr. de Kock thereupon (March) visited Capetown and through Advocate te Water ascertained that the bill had been returned to the Law Adviser for revision. It is here that the Council, S.A.V.M.A., appears to have erred, for apparently no definite steps were taken to make certain that the bill was ready for the ensuing session of 1928. It would seem that full confidence had been placed in the sponsor.

In 1928 Advocate van Hees' long awaited opportunity arrived, for the Minister of Public Health (Dr. D. F. Malan) succeeded in piloting the Medical, Dental and Pharmacy Bill (now Act 13/1928) through the Legislature. Nothing, however, was heard of the veterinary bill in spite of reply paid telegrams. A reason given for this omission was the limited time allotted to private members, but Mr. van Hees expressed his willingness to meet a committee of members of the profession in order to " make preliminary arrangements before next session ! !" The real reason apparently was that the bill was not ready. Dr. de Kock had in the meantime retrieved it and, remarkable to relate, although passed by the Law Adviser in 1924, it had been found necessary to make hundreds of alterations in the English version, which had been assumed to be correct !

In view of Advocate van Hees' offer, Dr. de Kock and Mr. Goodall of the Parliamentary Committee were appointed to meet him and these gentlemen later decided that the worthy advocate's kind offer should not be accepted. At the general meeting of 24/7/28 the President intimated that he intended that the Parliamentary Committee should interview the Minister of Agriculture regarding a substitute for Mr. van Hees, but it is not known whether this was carried out. Apparently it was decided, with the parliamentary elections taking place in 1929, that there was less hope than ever of the bill being introduced " the next session ! "

After the elections, however, the President interviewed the Minister of Agriculture and at the August 1929 general meeting informed the members that " he (i.e. the Minister) is more convinced than ever of the necessity of having legislation in South Africa to protect the profession." As it appeared reasonable to suppose that the length of the bill militated against its acceptance by Parliament, even were it

introduced,(36) the following motion was discussed at the meeting just referred to, namely: "That Act 21/1899 (Natal) be applied throughout the Union of South Africa and South-West Africa." It was eventually decided that the suggestion to apply the Natal Act to the Union be referred back to the Parliamentary Committee(37) with the instruction to consider the advisability of introducing it as such or with simple amendments. The Parliamentary Committee, however, had not met by 17th April 1930 when the autumn general meeting of the S.A.V.M.A. was held at Johannesburg. By this time the writer had drafted a bill extending the application of Act 21/1899 (Natal) throughout the Union and the mandated territory of South-West Africa. See Appendix ix., p. 17. This was distributed at the meeting where "it was resolved that an *ad hoc* Committee consisting of Dr. Viljoen, Dr. Curson and Dr. du Toit be appointed to arrange for the introduction into Parliament of a Veterinary Bill." A month later (23/5/30) a council meeting was held and at this Messrs. Viljoen. Kirkpatrick and Curson were appointed members of the Parliamentary Committee.

The Law Adviser having turned down the above amending bill, the new Parliamentary Committee having agreed to accept the principle that any veterinary measure should be administered **by the Government,** and the Minister of Agriculture having consented to introduce next year a bill providing for registration, the Parliamentary Committee is at present (September) engaged with the Law Adviser in drawing up a suitable measure.

Retrospection and Introspection.

In reviewing the events connected with the 28 year struggle for legal recognition, the following facts stand out clearly:—

(a) Lack of enthusiasm on the part of the profession not only in failing to insist that those elected should fulfil their duties, but also in omitting to carry out propaganda work.

(b) Lack of energy on the part of Parliamentary Committees which in many instances have never functioned. As in most things, there are notable exceptions.

(c) Absence of initiative, suggestive of timidity, on the part of senior members of the profession.

(d) Much could be said about the neglect of duty on the part of politicians,(38) but it is mainly secondary to the several shortcomings of the profession itself.

(36) It seems extraordinary, but it is nevertheless true that the Clerk of the House of Assembly has no copy of the bill.

(37) Messrs. P. J. du Toit (Chairman), Spreull, Goodall, Kirkpatrick, P. R. Viljoen and le Roux.

(38) The change in the parliamentary outlook towards the profession during the past 30 years has been striking. Whereas formerly the M.P. in his wisdom

It is here that Henley's lines remind us how we should act. Every member should make the veterinary bill a personal matter, although it will be chiefly the private practitioner who benefits.(39) No one should consent to serve on a committee unless prepared to do his duty. Everyone should interest his member of parliament, especially if a cabinet minister, in the measure. Finally there should be no thought of discouragement. We are indeed a small profession and have, it is true, no political value, but we have done much for South Africa. In fact, apart from the mining engineer, no one has done more to shape the destiny of this country than the veterinarian.

References.

In writing this paper information has been derived from many sources, the details of which have been indicated in most cases. It had been hoped that the files of the various veterinary societies would have proved sufficient, but they have been sadly neglected. The Cape papers are in the possession of J. W. Crowhurst, Esq., F.R.C.V.S., who has been exceedingly kind in furnishing details. The Transvaal files were apparently lost in 1916 when Mr. J. M. Christy,(40) Senior Veterinary Officer, Transvaal, took ill and his private belongings removed by his lawyer from his office in Erasmus Buildings, Church Square, Pretoria. Of the S.A.V.M.A. minutes it is believed that only two complete sets exist, that of the Honorary Secretary-Treasurer and that of the writer. (41)

Additional details have been obtained, through the kindness of the Acting Director of Veterinary Services (Dr. P. R. Viljoen), from the Department of Agriculture (Union Buildings) File V. 300, and the Director of Veterinary Services (Onderstepoort) File 253/7 (two sections).

The various draft bills have been collected from several sources and listed as appendices, particulars regarding which appear below.

urged the curtailment of veterinary services (See Vet. Rec. 31/12/98, p. 392) (Cape); Vet. Rec. 19/8/99, p. 105 (Natal); Rpt. of Commission of Volksraad —Resolution 551 of 29/6/96—O.F.S.) to-day his son is receiving a veterinary training locally with the aid of a state bursary.

(39) The State and various municipalities employ only qualified veterinarians, hence apart from the principle, legal protection would benefit mainly private practitioners.

(40) On the Hon. Secretary T.V.M.A. (G. W. Lee) proceeding on active service to German South-West Africa in 1914, he handed over all papers to Mr. Christy.

(41) Obviously anything of veterinary interest, e.g. minutes of meetings, should be published in a well-established journal such as the Veterinary Record,

THE FOLLOWING APPENDICES HAVE BEEN BOUND AND PLACED IN THE LIBRARY OF THE DIVISION OF VETERINARY SERVICES, P.O. ONDERSTEPOORT, THE EXPENSES BEING BORNE BY THE S A.V.M A., 31/5/1930,

Appendix I.

Cape of Good Hope Veterinary Surgeons Bill, 1907. Several of the most important clauses are published in the Vet. Rec. of 12/1/07, p. 433 (42)

Appendix II.

Transvaal Veterinary Surgeons Bill, 1904. This is published in detail in the Vet. Rec. of 12/3/04, p. 578. Minor alterations were subsequently made, but in 1908 "a small ordinance on the lines of that of" Natal was drafted, printed and distributed to members of T.V.M.A.

Appendix III.

Being Union of South Africa Veterinary Surgeons Bill 1910, which was based presumably on that of 1908 referred to under Appendix II.

Appendix IV.

Based on the Medical Dental and Pharmacy Bill (now Act 13/1928(. It was published in the Vet. Rec. of 25/5/18 and 1/6/18.

Appendix V.

This is Appendix IV revised in 1921 chiefly as a result of Sir Arnold Theiler's objections to the former. Further amendments were later made for which see

Appendix VI.

This represents the state of the Bill before being commented upon by the Faculty of Veterinary Science in May 1922. To this are attached Annexures 1 and 2 submitted by Faculty.

Appendix VII.

Being the Bill revised between May 1922 and September 1925, and therefore not incorporating the recommendations of the Law Adviser.

Appendix VIII.

This represents the final **printed** views of the profession. Not only is the Dutch version faulty, but the Law Adviser has since also markedly changed the English version. See Union Govt. Gazette 10/3/26.

(42) The Bill was sent to R.C.V.S., London, under cover of a letter dated 17/10/06 and discussed at the quarterly meeting following (4/1/07).

Appendix IX.

Amendment to Natal Act 21/1899 drawn up by Dr. H. H. Curson, April, 1930.

DISCUSSION.

On Mr. Chalmers' motion the meeting accorded a hearty vote of thanks to Dr. Curson for the trouble, work and time he was putting into the question and the photos he was collecting for the Association

SCALES OF SALARIES OF STATE VETERINARIANS (DEPARTMENT OF AGRICULTURE) FROM UNION UNTIL 1929-30.

The subjoined tabular statement gives at a glance the comparative scales of the Director of Veterinary Research (Union) and the Principal Veterinary Surgeon (Union), the Assistant Director of Veterinary Research (Union) and the Assistant Principal Veterinary Surgeon (Union), and the Veterinary Research Officers and Government Veterinary Officers. Whereas there have been Senior Veterinary Surgeons since Union, Senior Veterinary Research Officers existed only from 1918-25. This latter rank need therefore not be discussed.

Subdirectors (of the Research Division) were appointed in 1931 and at the present time (August 1930) there are two such posts drawing the scale £800-30-950(1).

As a result of amalgamation of the "Field" and Research Divisions in 1927 the positions of P.V.S. and D.V.R. no longer exist, since the D.V.R. and A.D.V.R. became the heads of the newly created Division of Veterinary Services, with the titles Director of Veterinary Services(2) and Deputy Director of Veterinary Services, respectively.

1911(a)	1912	1913-17	1918	1919-20	1921	1922	1923	1924	1925	1926	1927	1928-	1929-30	
G.V.B.(T)1200(b)(c) ...	1500(d)	D.V.R.(U)†	†	†	†	2200 (d)(f)	†	†	†	†	†	D.V.S. 1600-40,1800(f)	†	D.V.S.
P.V.S.(T)1000-50-1200(e)	P.V.S.(U) †	850-30-1000 1200(d)	†	†	950-30-1100 1200(d)	†	150-30-1300		1050-30-1200	†	†			
D.V.L.(C)700	†	A.D.V.R.(U) 700-20-800	1000-50-1200	†			150-30-1300 (f)	†	1250-30-1400 (f)	†	†	D.D.V.S. 1250-30-1400(f)	1350-30-1500(f)	D.D.V.S.
C.V.S.(C)650(e)	A.P.V.S.(U) 600-20-800	†	†	†	800-25-900	†	50-30-1000	†	800-30-950	†	†			
	S.V.S.(five) 400-750	550-20-650	†	†	650-20-750	†	50-30-800		750-25-850	†	†	†	†	S.V.O.
A.G.V.B.(T)450-30-600 ...	†	A.V.B.380-20-440 450-20-550	†	†	500-25-600 40-800	†	300-325-380-39-650		450-25-550-40-750	375-20-550 30-700	†	†	375-20-550-30-700	V.R.O.
								B.V.Sc. (S.A.)	500-25-600-40-800	†	†	†		
A.V.S.(C)350-20-450 ... D.V.O.(N)500-25-600 ... D.V.O.(T)500-10-550 ... D.V.O.(O)365	†	G.V.O.(U) 350-15-500	†	†	400-30-550 25-650	†	300-325-330-30-650		270-290-340-360-30-600	375-20-550 30-700	†	†	375-20-550-30-700	G.V.O.
								B.V.Sc. (S.A.)	450-25-550-40-750	†	†	†		

(1) The estimates provide for 4 subdirectors!!

(2) Not to be confused with the title Director of Veterinary Services, Union Defence Force (Col. J. G. Bush).

Notes:

(a) The year indicates financial year, i.e. ending 31st March.
(b) Other figures relate to scale of salary in £.
(c) G.V.B.(N) 700-25-900: G.V.B.(O) 450.
(d) Personal salary.
(e) C.V.S.(N) 600-25-800: C.V.S.(O) 600.
(f) Including teaching allowance of 200 p.a.
† As for previous year.

Abbreviations:

G.V.B. Government Veterinary Bacteriologist.
A.G.V.B. Assistant Government Veterinary Bacteriologist.
N. Natal.
T. Transvaal.
O. Orange Free State.
C. Cape Colony.
C.V.S. Chief Veterinary Surgeon.
U. Union of South Africa.
D.V.S. Director of Veterinary Services.
D.V.L. Director Veterinary Laboratory, Grahamstown.
D.V.R. Director of Veterinary Research.
A.D.V.R. Assistant Director of Veterinary Research.
G.V.O. Government Veterinary Officer.
S.V.S. Senior Veterinary Surgeon.
S.V.O. Senior Veterinary Officer.
P.V.S. Principal Veterinary Surgeon.
A.V.S. Assistant Veterinary Surgeon.
D.V.O. District Veterinary Officer.
D.D.V.S. Deputy D.V.S.

H. H. CURSON.

JL. S.AFR. VET. MED. ASSN.
1.(4) 1930.

Sterility or Reduced Fertility of Cattle in South Africa.

By Professor J. QUINLAN, F.R.C.V.S., Dr. Med. Vet. D.V.Sc.

The problem of reduced fertility in cattle in South Africa is yearly assuming more economic importance. The demands of stock-owners for information regarding breeding troubles has enormously increased since scientific investigations into this complex problem were begun in South Africa in 1925. The increase in breeding troubles is not confined to South Africa. It has been observed in the British Isles and throughout Europe during the last two decades.

Our studies in South Africa have been mostly confined to cattle, but recently infertility in sheep has not been neglected. The problem in sheep however, does not appear quite so complex as in cattle, and the investigations which have been completed indicate that successful treatment can be more easily accomplished. The etiological factors in this country appear to be mostly due to nutritional disturbances and lack of knowledge of the physiology of breeding in sheep. Infertility in horses, although it does occur, especially amongst the studs of thoroughbred breeders, appears to play a far less important rôle. On this account the general remarks made in this summary will be confined to infertility in cattle.

In a paper entitled " Researches into Sterility of Cows in South Africa " by Quinlan (1929), the subject as it appears in South Africa, was fully discussed. The present remarks are in the nature of a short summary of that paper to which a few recent observations have been added.

In order to discuss prophylaxis, it will be necessary to detail the most important causes of infertility. In this connection it has been found that the male plays a relatively unimportant rôle in the general causation. That the male occasionally is sterile or not highly fertile, is unquestionable, and it would be unwise to undervalue his importance as a causal factor.

In some males, in which infertility has been definitely diagnosed, it is possible, at a clinical examination of the genitalia, to detect some pathological lesion involving the testicles, epididymis or vesiculae seminales. In others, however, where no clinical lesion can be detected, examination of the semen reveals the presence of bacteria or morphological changes in the spermatozoa.

It appears that heredity plays a part in infertility in the male, although it is not so important as in the female. Observations made in certain pure-bred herds of cattle, however, appear to leave little

doubt that in families where the females have been " shy-breeders," some of the males may also be similarly affected.

The question of heredity playing an important part in the production of infertility in the female, is one over which prominent investigators are not quite in agreement. Marshall and Hammond (1926), Richter (1919), Wester (1921) and others, are agreed that fertility is hereditary. Others, however, are not satisfied that heredity is an etiological factor in infertility. I am satisfied from my observations in some of the pure-bred herds of both beef and milk-breeds that heredity may be a most important cause of infertility. I can trace families which have become practically exterminated as a result of failure to breed or from " shy-breeding," when other families in the same herds showed a normal increase. I consider the failure to conceive in these cases is entirely functional. It is not the result of hereditary predisposition to pathological lesions of the genitalia. From observations made in some families in the female lines, my conviction that heredity plays a most important rôle in infertility, is so strong, that for years I have advised breeders to dispose of the calves bred from these families.

In the work mentioned above, I have pointed out the artificial environment under which our milking-breeds are kept. They are fed and housed with the object of producing more and more milk. The advent of " milk-recording " has probably not been altogether a blessing inasmuch as forced milk-production is yearly producing more difficulty in breeding. [Frei und Stäheli (1926).] The demand made on the animal's system appears to be reflected on the genital tract so that the ovaries remain static for months at a time. The cyclic physiological changes are interrupted; the *corpus luteum* of lactation remains unaltered; there is no tendency for Graafian follicles to mature. Interovulation periods are prolonged if oestrus occurs at all.

Failure to conceive or cessation of the cyclic ovarian changes, appear to be nature's provision against further drain on the constitution of cows already acting as " milking-machines."

It is particularly noticeable that the native breeds of cattle are not nearly so susceptible to the etiological factors associated with infertility as the pure-bred imported cattle and their progeny.

The necessity of curtailing this summary does not allow me to go into this question fully, otherwise I would like to go into the food question in connection with infertility. It is an accepted fact by all authorities that the food supply bears an important relation to the physiological activities of the genitalia.

Underfeeding causes an upset in the normal cyclic physiological changes in the ovary. This is well marked in areas affected with

droughts in this country. Cattle in low condition, as a result of semi-starvation, do not show a normal oestrous cycle, and do not as a rule conceive should oestrus occur. Richter (1926) has drawn attention to the influence of malnutrition on fertility in Germany during the late war. Insufficiency of phosphates in the soil has been shown in South Africa to be associated with infertility, du Toit and Bisschop (1929).

Over-feeding and lack of exercise are important causes of infertility. Obesity is the natural result of such treatment, and obesity is incompatible with fertility. The condition is especially common in show cattle in South Africa. By improper feeding it may be said that the breeder produces a champion at the expense of her fertility, consequently the best females are frequently lost to the breeder.

It must be pointed out that prolonged functional infertility is frequently in association with atrophy of the uterine mucosa, so that conception if it should occur, often results in abortion during the first five to eight weeks of pregnancy. [Quinlan (1929).] It will therefore be seen that, even if the ovaries should again resume their normal physiological activity, infertility may be permanent. It is my opinion that this atrophy is the result of continued uterine and ovarian inactivity and not that of a previous endometritis.

The importance of a properly balanced ration containing a sufficiency of vitamins A, B, C and the fertility vitamin E cannot be too strongly emphasised if a satisfactory degree of fertility is to be maintained in our best herds. In South Africa our cows are not confined to sheds and yards, and as a rule get sufficient sunshine and exercise. Therefore, it is show cattle chiefly which suffer from obesity and then mostly the beef-breeds.

High milk-production is highly desirable. The necessity for showing cattle in good condition is also realised. The attainment of both objects should, however, be tempered with reason. It is the duty of veterinarians and animal husbandry officers to educate cattle-breeders to the fact that forced milk-production and obesity beyond nature's limits will produce infertility.

I would suggest that veterinarians, when investigating sterility in a herd, should go carefully into the milk-records of individual cases, and also the ration fed as well as the hygiene prevailing in the stall, before completing their advice as to the general treatment to be adopted to overcome breeding difficulties.

I have found successful treatment of breeding troubles in cattle requires a careful investigation of environment, food, and breed, as well as individual, local and general examination of animals.

Local causes of sterility are to be found in any division of the genitalia. It is not intended to discuss deformities and malformations

which are occasionally met with, causing sterility. This summary is of necessity too short, and I can only mention the general pathological conditions associated with the different compartments of the genitalia and the methods adopted to overcome them.

Contagious granular vaginitis is widespread in this country. It may assume a most acute character in heifers and young cows, and is without doubt a most fertile cause of delayed conception. It may cause trouble in a herd for months. I am quite conversant with the views held by many well known authorities in America, Germany, Switzerland, Denmark and Holland: Williams (1921), Nilsen (1926), Albrechtsen (1921), Richter (1926), Hess (1920), Zschokke (1900), Knell (1926), Martens (1926), Wester (1921) and others. Some of these authors maintain that this is a more or less innocuous disease, which has little to do with fertility except in rare cases. These views, however, do not convince me that the disease here, is not a most important factor in breeding, for I have definitely proved the reverse. As the only veterinarian in South Africa who has carefully studied the disease, I have tried many curative measures. I have used many of the special preparations imported from Europe in pessary and rod form. In addition I have used ointments and liquids as recommended by many authorities. I have, however, come to the conclusion that the most reliable and rapid method of treatment consists of attention to stall hygiene, disinfection and isolation. All breeding should be suspended during treatment for four to six weeks. Local treatment with insufflation of powders gives far more rapid results than liquids and ointments. Further, this method is simpler in application.

Inflammation of the cervix mostly exists concurrently with inflammation of the uterus, but cervicitis can and does occur independently. However, for practical purposes since treatment of the cervix is undertaken at the same time as treatment of the uterus a separate account need not be given here.

It appears that the chief local cause of reduced fertility or sterility in South Africa is *endometritis chronica catarrhalis*. Our investigations have convinced us that the origin of salpingitis and ovarian disease is for the most part secondary to disease of the uterus and the cervix. Tubercular salpingitis is naturally not included in this general statement.

In South Africa sterility of local origin has been encountered most frequently in herds in which contagious abortion is widespread. It is not contended that the organism of Bang produces the chronic endometritis associated with sterility. The delayed involution of the metritic uterus of contagious abortion keeps the portals open for secondary infection, and it is these invading organisms which keep up the inflammation after Bang's organism can no longer be found in the

uterus. The presence of bacterial flora cannot always be proved in these cases, but this does not exclude the probability of an earlier infection. It is well known that some European authorities question the existence of chronic changes in the uterus in association with ovarian cysts. It is readily admitted that these changes are not always apparent at a macroscopic examination, but histological examination has almost invariably shown uterine lesions where destruction of the cow concerned was possible.

It has also been found that delayed uterine involution, a frequent occurrence in cows, has been found associated with pathological changes in the mucosa when a histological examination has been possible. It is admitted, however, that delayed involution and uterine inactivity may result from other causes, such as weak constitution, old age, twin pregnancy, general debility, etc.

In combating local affections of the genitalia, I have attempted to steer a middle course between Hess' (1922) Ovarial Treatment, and Albrechtsen's (1921) Uterine Treatment. I have not entirely followed the individual combined treatment of Stalfors (1930). Ovarial treatment alone has not been too sucessful in my hands. I readily admit that expression of the corpus luteum, if carefully done, does not have any permanent detrimental effect on the ovarian function. In certain cases when the oestrous cycle is interrupted and the corpus luteum is retained, its expression becomes necessary for successful treatment. If the oestrous cycle is normal or not greatly disturbed, and the cases of not sufficiently old standing so that no irreparable change has taken place in the uterine mucosa, I have had highly successful results with uterine lavage alone or combined with uterine massage.

It appears that removal of the corpus luteum has a stimulating effect on the uterus in those old standing cases in which the cyclic ovarian changes have been interrupted, but equally good results are obtainable in cases of uterine catarrh not associated with this ovarian cyclic interruption without removal. It is not out of place to mention here that I have not yet experienced the haemorrhage described by others following expression of the corpus luteum although digital compresssion in the crater is carried out for about 1 minute only, in some cases not at all.

Ovarian cysts when present, are of course, always broken down by vaginal compression. It is my experience that uterine catarrh associated with ovarian cysts, is a most serious condition which, as a rule, requires prolonged treatment and is frequently incurable, especially when associated with anatomical changes in the conformation of the rump. Experienced European veterinarians appear to be more successful than I have been in the treatment of ovarian cysts, but then

the conditions are somewhat different inasmuch as their cases are treated early, while conditions here of distance and lack of veterinarians often prevent treatment being begun for weeks or months.

For uterine irrigation several dilute solutions have been used. It appears to be more a question of mechanical cleansing of the uterus rather than disinfection. Monsol 1%, normal saline, Yatren 1%, and Selectan 1% have been tried. Rivanol 1‰, and Lugol's Iodine 0.5% to 1% are now used. The solutions are frequently alternated. When the type of exudate from the uterus is somewhat purulent preference is given to Rivanol. It seems to give more rapid results than the iodine solution. After irrigation the uterus is massaged for several minutes and in the more severe cases 1 to 2 cc. of pure Lugol's Iodine are conveyed into each horn of the uterus, the object being to stimulate the mucosa. The cervix is always cleaned and swabbed with pure Lugol's Iodine. Treatment is completed by a warm saline irrigation of the vagina.

It is not intended in this summary to discuss salpingitis as a cause of sterility in detail. It is sufficient to say that it frequently appears to occur as an extension from inflammation of the uterine mucosa, especially acute endometritis. There is no question that it often disappears spontaneously. It is impossible to treat the tubes directly and we can only hope that local uterine treatment combined with non-specific protein therapy, may also have a good effect on the inflamed tube. Cases of chronic hydrosalpinx and pyosalpinx are incurable owing to the irreparable pathological changes which have taken place in the mucosa. Several photomicrographs illustrating the irreparable changes in such tubes appear in my article on sterility mentioned above.

There are certain cases of sterility in which the use of ovarian secretions either by injection or by ovarian grafting would appear to be indicated. The use of ovarian grafts and extracts has been recommended by several European veterinarians including Frei und Stäheli (1926), Stäheli (1925), Dolder (1926), Grüter (1926). Their use is still in the experimental stage and much further investigation must be done before a definite recommendation can be made. I have carried out a number of experiments, using ovarian grafts, whole ovary extract, corpus luteum extract, and Graafian follicle extract with varying results, sometimes encouraging sometimes the reverse. The most suitable cases for such treatment are aged animals showing senility and cows or heifers in which the infertility is accompanied by changes in the normal ovarian cycle. The cattle on which I tried these methods, had no previous history of uterine catarrh. They were for the most part heifers suffering from sterility because of obesity. No local uterine treatment was used in those cases.

In conclusion, I would like to express an opinion on the treatment

of contagious abortion by vaccination with live cultures. I have mentioned that contagious abortion appears to be the forerunner of infertility in many herds. I have intentionally omitted to mention the local treatment of cows which have aborted or which have retained the afterbirth, since it would be out of place in this summary. A general vaccination treatment, using live cultures, has been used in some herds in this country. I have been able to follow the subsequent records of two of those herds. From these observations I cannot but conclude that vaccination is not without danger as an etiological factor in infertility. It appears that the native breeds of cattle which are more resistant to diseases in general, are not so susceptible to abortion; that is the metritis of abortion resulting from the injections of living cultures is not very pronounced. In native cattle, therefore, vaccination may be employed with successful results and few undesirable sequelae. In the pure-bred imported cattle and their progeny, which as a result of non-acclimatization or reduced resistance due to the demands made upon them, appear to have a lower resistance to disease, vaccination appears to be a different matter. In the two herds mentioned, general vaccination was carried out, and infertility is very general, almost always as a result of chronic uterine catarrh. I feel sure that the condition is due to secondary infection invading the uterus which is in a state of delayed involution after parturition. In the pure-bred herds therefore, I would prefer to see eradication practised, rather than vaccination. It is realised that eradication is not unattended with difficulty, but I have been successful. Since it is known that calves can be raised on milk from cows suffering from contagious abortion and remain unaffected, Quinlan (1923), eradication is no longer a question of great economic loss. A clean herd can be built up or augmented by raising calves from infected cows in isolation for six months and then drafting them into the clean herd. It would, obviously, be desirable to submit the blood of these calves to an agglutination test immediately the infected milk is withdrawn and before they are drafted over as free from contagious abortion. However, there is little likelihood of calves reared in this way showing antibodies for contagious abortion in high concentration, and even if they should be present at the age of six months they rapidly disappear from the blood when the source of infection is withdrawn.

Recent literature has indicated to us another aspect of the problem of vaccination; that is the relation of Bang's bacillus to public health. The available evidence, although somewhat incomplete, indicates that there is little doubt that the *B.abortus* may be pathogenic to humans when consumed in raw milk or by infection through the skin. Makkawejsky (1929), Weidner (1926), Schlichting (1929), Blondian (1930) and others.

There appears to be good reasons for the action of the American

Veterinary Medical Association Committee on abortion in 1929, in condemning the use of vaccines containing living organisms, on account of the danger to humans. It has been definitely proven that living cultures injected subcutaneously, or given per os to cows, are capable of setting up an active infection and may eventually reach the udder.

The practice of using living cultures for vaccination must be seriously considered in herds supplying milk for human consumption. In our present state of knowledge I consider the drinking of raw milk from infected herds highly dangerous. It is a matter which should receive the careful attention of our medical and veterinary research laboratories.

It is realised that there is controversy on the pathogenicity of the different strains for humans. The evidence, however, is convincing that every strain of *B.abortus* is somewhat pathogenic to monkeys if the dosage is large enough, Silberstein (1929), Meyer and Eddie (1929). It would be unwise at the present stage to presume that the bovine strain is pathogenic only for cattle, Bastai (1929), Huddleson and Hallam (1929). In the face of these facts vaccination of the milk-breeds with virulent live cultures should not be carried out, except in cases where the percentage of infection in a herd is very high. From the point of view of public health, rather should measures of eradication of the disease be adopted. Vaccination of ranching cattle, which do not supply milk for human consumption, may still be considered provided the sequel of infertility in pure-bred cattle with a lowered resistance to *B.abortus* infection as compared with native cattle is taken into consideration. It is, however, possible that an avirulent vaccine, as described by Giltner (1929), which would overcome these difficulties, will be available in the near future. It will be necessary, however, to demonstrate that a strain of *B.abortus*, which is avirulent for bovines is also non-pathogenic for humans before it can be universally employed to protect cattle against the disease.

LITERATURE

ALBRECHTSEN, J. (1921). Die Unfruchtbarkeit des Rindes, ihre ursachen und ihre Behandelung. Berlin.

BASTAI, P. (1927). Uber die Frage der Banginfektion beim menschen *Mün. Med. Wschr. 74.*

BLONDIAN, M. (1930). L'infection de l'homme par le bacille de Bang. *Ann Med. Vet., 75, 2.*

DOLDER (1926). Heilversuche bei der Anaphrodisie des Rindes durch Infektion von Ovarialextrakten. *Diss, Zurich.*

DU TOIT, P. J., & BISSCHOP, J. H. R. (1929). The Breeding of Cattle on Phosphorus Deficient Veld. *15th Annual Report of the Director of Veterinary Services and Animal Industry (S.A.).*

FREI, W. und STAHELI, A. (1926). Uber Anaphrodisie bei Kuhe. *D.T.W. No. 43, 34.*

GILTNER, W. (1929). A virulent vaccine decreases cattle abortion. Michigan State College Agricultural Experimental Station. *The Quarterly Bulletin, Vol. XII, No. 1.*

GRUTER, F. (1926). Weitere Versuche von Geschlechtsdrüsenverpflanzungen und Anwendung andere Methoden zur Anregung der innersekretorischen Tätigkeit der Pubertätsdrüse. *D.T.W. No. 23, 34.*

HESS (1922). Die Unfruchtbarkeit des Rindes. Zürich.
HESS (1920). Die Sterilität des Rindes. Hannover.
HUDDLESON, I. F., and HALLAM, E. T. (1929). The pathogenicity of the species of the genus *Brucella* for monkeys. *Journ. Inf. Dis., Vol. 45, No. 4.*
KNELL (1926). Bericht über die dritte Jahrestagung der Fachtierärzte in München, Sept. 1925. Hannover.
MAKKAWEJSKY, W. N. (1929). Die Bang-Infektion des Menschen (Undulierendes Fieber). *D.T.W. 37, 50.*
MARSHALL, F. H. A., & HAMMOND, J. (1926). The Physiology of Animal Breeding with Special Reference to the Problem of Fertility. *Min. Agric. and Fish. (Lond.)*
MARTENS (1926). Bericht über die dritte Jahrestagung der Fachtierärzte in München, Sept. 1925. Hannover.
MEYER & EDDIE (1929). *Proc. Soc. Exp. Biol. & Med. 27, 1929.*
NILSEN (1926). Researches Concerning the Etiology and Pathogenesis of Sterility in Dairy Cows. *Annual Congress Nat. Vet. Med. Assn. of Great Britain and Ireland, Dublin.*
QUINLAN, J. (1923). Die Ubertragungsmölichkeit von Abortusbazillen auf Käiber, die mit Milch von infizierten Kühen gefüttert werden. *Arch. f. w.u.p. Tierk. Bd. 49.*
QUINLAN, J. (1929). Researches into Sterility of Cows in South Africa. *15th Annual Report of the Dir. of Vet. Services and Animal Industry (S.A.)*
RICHTER, J. (1926). Die Sterilität des Rindes. *Berlin.*
SCHLICHTING, H. (1929). Ein Kasuistischer Beitrag zur Bang-infektion beim Menschen. *B.T.W. 45, 44.*
SILBERSTEIN, W. (1929). Uber das Vorkommen menschlieker Infektionen mit dem Bazillus abortus Bang in der Provinz Brandenburg. *D. Med. Wschr. 55, Nr. 31.*
STAHELI (1925). Festschr. zum 70 Geburtst, v. Prof. Dr. Zschokke, *Zürich.*
STALFORS, H. (1930). Some New Observations and Experiments Concerning Sterility in Cattle. *The Cornell Veterinarian, Vol. 20, No. 1.*
WESTER, J. (1921). Eierstock und Ei. Befruchtung und Unfruchtbarkeit bei den Haustieren. *Berlin.*
WEIDNER, R. (1926). Zwei Fälle von Ansteckung mit Abortus Bang. *Mün. Med. Wschr. 76, 46.*
WILLIAMS (1921). Diseases of the Genital Organs of the Domestic Animals. *Ithaca.*
ZSCHOKKE (1900). Unfruchtbarkeit des Rindes. *Berlin.*

Discussion.

Dr. Quinlan replied as follows; to Mr. Neitz: He had no record of the incidence of Malta fever in South Africa, but mentioned that Dr. Steck had contracted Malta fever by drinking milk infected with Contagious abortion organisms.

To Dr. Curson (who had said that many members of the old R.A.M.C. had contracted Malta fever): Undulant fever was fairly common, but doubt existed as to whether *B. abortus* is pathogenic to humans. Mr. Carless said that he recollected a case of a woman suffering from Malta fever although no goats were within miles, and it was presumed to be due to *B. abortus.*

To Mr. Chalmers, in regard to the effect of *B. abortus* on women: The isolation of *B. abortus* from the human placenta, although not done in this country, had been effected from six women by a German worker.

The treatment of vaginitis: Dr. Quinlan had had best results with the insufflation of powder, using a basis of Boracic acid, Copper sul-

phate, Alum and Zinc sulphate. This had also proved very efficient in the hands of some Government Veterinary Officers. Olive oil and iodoform did not always give good results.

To Mr. Alexander (who stated that Dr. Quinlan had made a bold statement in regard to the danger of using a live vaccine for immunization against Contagious abortion, especially if the bacillus was dangerous to human, and thought that Dr. Quinlan had done good by drawing attention to this point, which calls for future research): Dr. Quinlan was definitely opposed to the use of live cultures since it set up the disease, and even after normal parturition the organism was retained by the cow, although *B. abortus* in milk is not definitely known to be pathogenic to man. He would oppose the use of a live vaccine in dairy herds, but not in beef herds. Dr. Quinlan had no doubts that some strains were pathogenic to man.

JL. S.AFR. VET. MED. ASSN.
1 (4) 1930.

Vermeersiekte.

By D. G. STEYN, B.Sc., Dr. Med. Vet., Veterinary Research Officer, Onderstepoort.

Vermeersiekte (vomiting disease) is a disease in stock caused by the ingestion of the so-called " vermeerbossie " (vomiting bush), which includes several species of Geigeria.

PLANTS RESPONSIBLE AND THEIR OCCURRENCE.

In the North-Western districts of the Cape Province *Geigeria passerinoides* Harv. is almost solely responsible for the disease. In Griqualand West, where the " vermeersiekte " problem has been very acute this year, another Geigeria species (*Geigeria pectidea* Harv.) has been found just recently and has proved unfortunately, to be far more toxic than the more widespread *Geigeria passerinoides.* In the Western Orange Free State (Kroonstad district), and certain parts of the South-Eastern Transvaal (Standerton district) *Geigeria aspera* Harv. has been responsible in the past for heavy losses in sheep. This species also grows luxuriantly in isolated spots in the southern portion of the Ermelo district. *Geigeria zeyheri* Harv., which is of very widespread occurrence in the Transvaal, produced the disease in sheep and goats at Onderstepoort experimentally. However, no authentic report of the species *Geigeria zeyheri* as the cause of disease has been received from the field. A feasible explanation might be that the growth of this species of Geigeria is not as luxuriant as that of the other three mentioned above.

TOXICITY OF THE VARIOUS SPECIES.

Geigeria aspera has proved to be the most toxic species, being about ten times as poisonous as *Geigeria passerinoides. Geigeria zeyheri* and *Geigeria pectidea* are about equally toxic, being about twice to three times as poisonous as *Geigeria passerinoides* These comparative figures were obtained in experiments conducted at Onderstepoort with plant material collected in the Kroonstad and Pretoria districts and Griqualand West. It must, however, be taken into consideration that the toxicity of one and the same species of plant growing in different localities may vary considerably.

Another interesting observation has been made in the course of drenching experiments conducted at intervals of fourteen days with *Geigeria zeyheri*, collected near Onderstepoort. It was found that after the heavy rains in February 1928 the toxicity of this plant disappeared until September of that year.

The Toxin(s).

The investigations into the toxic principles are being continued but from the preliminary work it would appear that the poisonous constituent(s) are most easily soluble in chloroform, and partly soluble in distilled water, ether and absolute alcohol.

Symptoms.

Sheep and goats are most susceptible to the disease. This year, however, hundreds of cattle were affected and died from the disease in Griqualand West. Even horses and donkeys were reported to have suffered.

For the sake of convenience the author has divided "vermeersiekte" into four different forms, namely: (a) the vomiting form, (b) the form in which hoven is the most outstanding symptom, (c) the stiff form, and (d) the paralytic form. The different species of animals are affected usually in different ways, but one animal may exhibit at the same time one or more of the above forms of the disease.

Sheep: These animals usually show chronic vomiting and diarrhoea, but these symptoms are frequently combined with hoven and a stiff gait, most noticeable in the hindquarters. The first noticeable symptom is pronounced salivation, which progresses until vomiting occurs. It happens quite frequently however, that sheep die suddenly after the ingestion of large quantities of *Geigeria aspera* and *Geigeria pectidea*, without showing any of the above symptoms. This also was found to be the case in drenching experiments with *Geigeria zeyheri*. When the animals vomit and purge, the loss in condition is very pronounced and ultimately they are too weak to rise or walk about. When animals are in this state it is very difficult to discriminate between actual weakness and paresis. Affected animals often will be noticed to vomit and immediately afterwards to walk off and feed again. Respiration is accelerated and may be deep or shallow. The heart beat is strong and accelerated in the beginning but as the disease progresses the pulse becomes weaker and weaker until it is imperceptible.

Goats: In goats the disease bears a marked resemblance to that in sheep, although these animals appear to be more susceptible to the paralytic form, which is frequently associated with one or more of the other forms, then mostly hoven and stiff gait. The stiff gait may be regarded, however, as a preliminary stage of the paralysis.

Cattle: These animals almost invariably exhibit the paralytic form.(1) The disease usually sets in with pronounced salivation and a slow stiff gait associated with hoven and a pronounced loss in condition. Vomiting is a symptom rarely exhibited by cattle.

Dogs and Pigs: It was impossible to kill these animals with

(1) A point in differential diagnosis is the occurrence of lamsiekte in this area.

the "vermeerbossies" as they vomited within five minutes after dosage.

It may be of importance to mention and explain here a point often raised by farmers. We advise them to move animals affected with "vermeersiekte" on to green barley, oats, etc. Many farmers maintain that these animals continue vomiting when allowed to graze on such green lands. They even hold that healthy sheep on such lands will vomit, hence their difficulty in believing that the "vermeerbossies" are the only plants which cause the true "vermeersiekte." The explanation is a simple one. Many, if not all, ruminants when fed on large amounts of green, succulent plants will have their lips stained with a greenish fluid which is frequently mixed with greenish ruminal contents. Owing to the high water-content of the green succulent plants the ruminal contents are semi-fluid and during the process of rumination it is impossible for the animal to prevent "bringing up" with the cud, a quantity of the greenish fluid present in the rumen.

This kind of "vomiting," if it may be termed such, is extremely common among sheep in the Karroo, when grazing on the luxuriant growth of green succulent grass after the first summer rains have fallen.

Cause of Death in Vermeersiekte.

In "vermeersiekte" death may be due to: (a) asphyxia caused by aspiration into the lungs of large amounts of the vomited ruminal contents, i.e. not enough to cause instantaneous choking; (c) paralysis of the centre of respiration; (d) exhaustion caused by the incessant vomiting and diarrhoea; or (e) heart failure.

The author has examined a number of sheep in agony, during the course of this disease and found that in several cases, the heart continued beating for fully a minute or two after respiration had ceased completely.

Vomiting probably is caused by the toxin acting (a) locally on the mucous membrane of the rumen, and (b) remotely, by stimulating the vomiting centre in the medulla oblongata.

Weeks and even months after the actual "vermeersiekte" has disappeared from a farm, sheep may die from chronic pneumonia, which has developed as a result of the small amounts of the vomited ruminal contents drawn into the lungs.

Post-Mortem Changes.

These depend naturally on the form or forms of the disease from which the animals had been suffering. The following lesions are found

almost invariably in all species of animals which have died from the disease: lips moist with saliva or stained with vomited greenish-coloured ruminal contents and an acute catarrhal gastro-enteritis. Furthermore, the following may be present: hyperaemia and slight oedema of the lungs, ruminal contents in the trachea and bronchi, acute or chronic broncho-pneumonia, hyperaemia of, and haemorrhages in the bronchial, mediastinal and retropharyngeal lymphatic glands, degeneration of the myocardium and liver, and oedema of the periportal lymph glands.

TREATMENT.

Farmers have administered limewater, linseed oil, paraffin, kerol and oil of turpentine extensively to affected animals without the least success. Even if it were possible to find a remedy, it would be of little value, as immediately the treated animal is released it will again ingest the " vermeerbossie." Consequently the same animal would have to be treated several times in the course of one day. Treatment would therefore be of use only if treated animals could be prevented from further feeding on the plant. Unfortunately almost all the farms in the " vermeersiekte " areas are completely overgrown with the plant, so that the only remaining alternative is to "trek"(2) with the animals. Should farmers desire to treat, the only procedure we are able to recommend at present is the use of a purgative followed by limewater and linseed oil, to alleviate the gastro-intestinal irritation. It is common knowledge that affected animals recover rapidly without any treatment when they are moved on to "vermeerbossie-free" pastures or green lands.

PROPHYLAXIS.

Many farmers maintain that *Geigeria passerinoides* is a good food for sheep provided it is eaten in moderate quantities. This contention is quite acceptable for this particular species of "vermeerbossie," but the other three species of Geigeria are too toxic to have any value as stock foods.

The sooner the farmers in the "vermeersiekte" areas realise that there is at present no hope whatsoever of ever finding a cheap, reliable and lasting remedy for " vermeersiekte," the better it will be for them and for the country. Their only salvation lies in the eradication of the plants responsible for the disease. In the case of *Geigeria passerinoides*, of which plant about eight or ten pounds are required to cause death in sheep, farmers should fence and clear at least one big camp on their farms so that the sheep could be moved on to such camps as soon as the disease makes its appearance. As soon as the symptoms have disappeared the animals can be moved back to the

(2) Trekking is a South African custom of moving stock to a different district or veld for the purpose of obtaining better pasture according to season.

"vermeersiekte" veld. In this way it should be possible to reduce or even to prevent the losses from this disease.

With regard to the other three species, *Geigeria aspera* in particular it is advisable to clear the whole farm of the plants, as they are very toxic.

Farmers as a rule are very reluctant to eradicate these plants as it seems such a hopeless task. It is, however, incredible what could be done if this problem were to be tackled energetically. One farmer near Griquatown has cleared his farm of *Geigeria passerinoides* in the course of 4 years at the small cost of £134. Personally, I have seen on different farms the effects of camping and clearing such camps. It is marvellous what two Griquas can do in a fortnight when paid per bag of the plants rooted out. Every evening the number of bags filled with the plant should be counted and the contents burnt as soon as sufficiently dry.

The great objection raised by the farmers is the expense. But if we consider that many farmers lose up to 80% of their sheep, they could rather sell 30% to 50% of the sheep and use the money to eradicate the plant. This year in a small area of Griqualand West, comprising about twenty farms, over fifteen thousand sheep were lost from "vermeersiekte" within three months. It is maintained that these farmers could have cleared their farms of the bush if they had sold one-third of the number of animals which have died from "vermeersiekte" and utilised this money in the eradication of the plant.

There is no doubt that the overstocking evil plays a very important part as a predisposing factor in causing the disease.

Such heavy losses as the farmers in Griqualand West have experienced this year, have never been known in the past. The luxuriant growth of *Geigeria passerinoides* has been caused apparently by the abnormally early rains which had fallen in July, August and September last year. These caused the "vermeerbossie" to grow, whereas the cold weather suppressed the growth of the rest of the edible vegetation. Subsequently, up to April this year very light showers fell. These caused further growth in the "vermeerbossie," but there was too little moisture to start growth in other plants. These circumstances, combined with the evils of overstocking, rendered the conditions for the occurrence of "vermeersiekte" most favourable.

In the eradication of the plants there are a few important points to be considered. The Geigeria species are essentially annual plants, but in years when late summer or early autumn rains fall the roots of many plants of this species may survive the winter, to sprout again in the next season. It is therefore essential to pull up the plants and not cut them off leaving the roots in the ground. Furthermore, after

every rain the plant has a tendency to sprout again and the same plant may therefore flower several times in one season. The seeds are enclosed in very hard containers, in such a way that they cannot drop out on their own accord when the shrubs are being trodden on or shaken by the wind. After a cluster of seventeen dried ripe seeds had been kept in water for seventy-two hours, only one of the seventeen containers had opened up, the rest still being firmly closed. During the process of drying the container which had opened closed up firmly again. It is, therefore, doubtful whether heavy rains play an important part in the dispersal of the seeds.

On the other hand, Mr. Mogg of the Division of Botany has been able to grow numerous *Geigeria passerinoides* bushes from manure collected from sheep which had been running on "vermeersiekte" veld. It therefore appears that the biggest factor in the spreading of the plant is the sheep grazing on veld where the plant grows. This is another essential reason why the whole and not only a part of a farm should be cleared of the bush.

J.L.S. AFR. VET. MED. ASSN.
1 (4) 1930.

Anatomical Studies No. 21: Thyro-Glossal Cysts.

By A. D. THOMAS, D.V.Sc., Department of Pathology.
Veterinary Research Laboratories, Onderstepoort.

During the course of post-mortem examinations held on healthy and diseased animals at this Institute, sheep particularly, the thyroid glands have frequently been noticed to contain small centres of whitish caseous matter, the nature or origin of which for a long time remained obscure. The size of these foci varies from 1 to 5 mm. Larger ones are rare, but smaller ones, although not so easily detected with the naked eye, are quite frequent as subsequent microscopic examinations have proved. See Fig. 1.

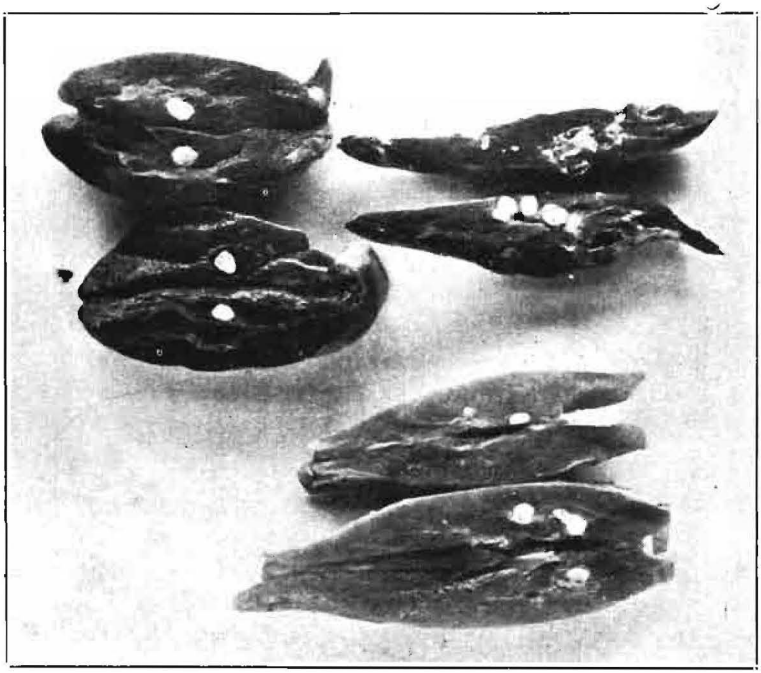


Fig. 1.—Thyroids from two sheep and one goat showing Thyro-glosal cysts.

These centres are round, oval or tubular cavities filled with a whitish grey, pasty or grumous, sometimes yellowish or greenish pus-like substance. They are generally single and unilateral, but fairly often multiple. They are nearly always situated within the glandular substance at or near the hilus and are therefore only evident after the gland has been sliced up. In no single case was there any suspicion that these lesions had provoked death, illness or any discomfort. The sheep affected varied widely in age, so that one cannot say that the condition is restricted to young animals only. The condition has also

been observed in goats fairly frequently, in a dog once, but not in other animals so far.

HISTOLOGY.

Sections prepared from such glands reveal these centres as cavities filled with a more or less amorphous or finely shredded substance, very often showing a concentric, lamellated arrangement. The general appearance closely resembles in fact the structure and contents of certain epidermoid cysts, (1) except that there are no hairs present. The contents appear to consist of macerated, keratinised, epithelial debris, so that a small zone nearest the cyst wall still shows distinct nuclei which gradually fade off towards the centre. The cyst wall itself is lined by stratified squamous epithelium, quite distinct and different from the low cuboidal epithelium of the thyroid acini. See Fig. 2. This stratified epithelium lies on a basal membrane which is separated from the thyroid tissue by a thin fibrous capsule. When more than one cyst is present they do not appear to communicate with each other, although they may lie in fairly close proximity to each

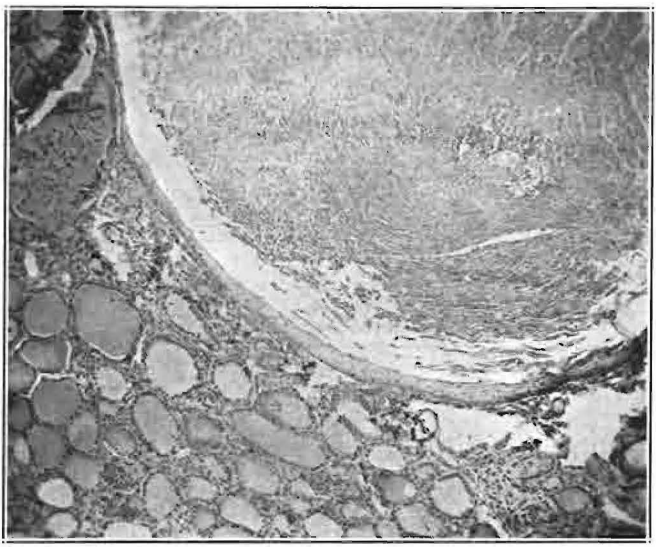


Fig. 2.—Thyroglossal cyst in thyroid of a sheep. Note contents and stratified squamous epithelium wall. Magn. 65 X.

other even to the point of simulating chains of cysts. In other cases the cysts appear partially or completely lined by ciliated columnar epithelium, the contents being usually less compact and not lamellated. These cysts are usually situated either in or near the parathyroid bodies.

An interesting instance of such cysts was seen recently within the parathyroid gland of a bitch eleven years old. It was irregular in outline, not more than 1,5 mm. in diameter and lined entirely by ciliated epithelium. See Fig. 3.

Embryology.

The structure and frequency of these "cysts" together with their apparent harmlessness have only lately pointed to their being portions or remnants of misplaced tissue and it was therefore natural to attempt to explain their origin on embryological grounds.

The thyroid gland develops in early foetal life as a downward "bud" of epithelium from the floor of the pharynx. This outgrowth sinks away to become the two-lobed thyroid on the trachea. In the earliest stage a definite stalk or strand, called the thyro-glossal duct, indicates the connection of the thyroid with the pharynx. This structure disappears entirely or partially, leaving the terminal bud which develops into the colloid secreting thyroid tissue. When disappear-

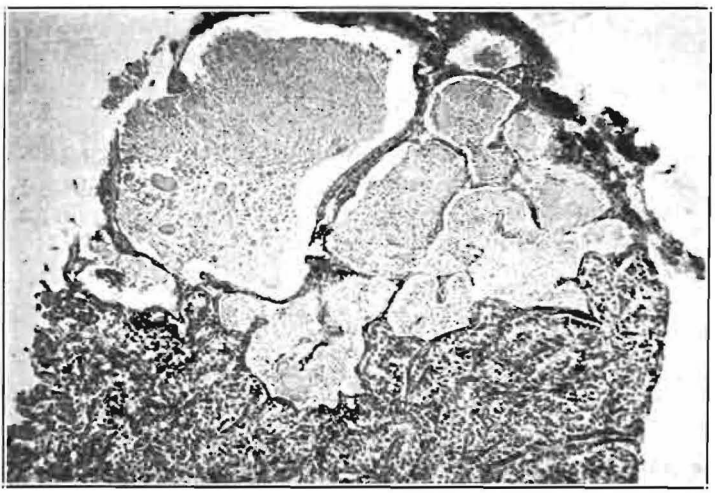


Fig. 3.—Parathyroid of bitch with cyst lined by ciliated columnar epithelium. Magn. 80 X.

ance of the duct is partial only, vestigial sections of it in the form of small islands of epithelium (pharyngeal) remain behind and become incorporated within the growing thyroid.

It is these isolated vestiges then, which presumably give rise to the cysts under consideration.

The growth of these small tubular portions of squamous epithelium is apparently very slow, being mostly a replacement of the older, dying cells. These dead cells as in squamous epithelium in general are shed off superficially, in this case towards the centre, i.e. in the lumen of the tube, and as there is no outlet they accumulate to form the pasty, macerated contents noted above. There is hardly ever any evidence of the bulging or atrophy and stretching of the surrounding glandular tissue, that one might expect to find in a rapidly developing cyst. This in itself speaks for the early incorporation in the thyroid

and very slow growth of the cyst. Considering the rather involved embryonal development of many important structures from the primitive pharynx (branchial clefts, etc.) it is not surprising that a variety of misplacements and malformations sometimes arise in this region (2). This is well exemplified by the numerous cases recorded in man, e.g. median cervical fistula, i.e. persistant thyro-glossal duct opening on to the skin of neck, accessory thyroids in various situations in the throat, and various cysts closely corresponding to those described above. The latter as ably pointed out by Wegelin (3) originate from epithelial vestiges of the thyro-glossal duct or its superior branch the lingual duct; probably also in a limited number of cases from the branchial clefts direct. They are lined either by ciliated or squamous stratified epithelium and filled with the retention products shed from it. Such cysts of the lingual duct are better known as *Ranula.*

Differential Diagnosis.

The frequency with which these cysts are met with in small ruminants, particularly sheep, is very striking when the examination of the thyroids is made a matter of routine procedure. The fact that they have not attracted more attention is probably due partly to overlooking the thyroids, or else when noted, such abnormalities are probably mistaken for:

(a) Small abscesses;
(b) necrotic centres; or
(c) parathyroid bodies.

In most cases it should not be difficult from description given above to distinguish the cysts with the naked eye.

The parathyroid when present within the thyroid have a lighter or deeper colour than the latter, but not the greyish-mat appearance of dead tissue.

The contents of a cyst can be easily enucleated leaving a more or less smooth epithelial lining membrane, whereas in an abscess or necrotic centre signs of inflamatory processes would be evident.

Summary.

(1) The fairly frequent occurrence of thyro-glossal cysts in sheep and other animals is noted.

(2) A brief account of their significance and probable origin is given and mention is made of a few conditions that they are liable to be mistaken for.

References.

(1) CURSON, H.H., and THOMAS, A. D. (1930). Anatomical Studies No. 17: Epidermoid cysts in domesticated animals. *16th Report of the Director of Veterinary Services.* In Press.
(2) BLAND SUTTON, J. (1911). Tumours Innocent and Malignant. Cassell, London.
(3) HENKE, F., and LUBARSCH, O. (1926). Handbuch der Speziellen Pathologische Anatomie und Histologie. *Band VIII Julius Springer*—Berlin.

JL. S. AFR. VET. MED. ASSN.
1 (4) 1930.

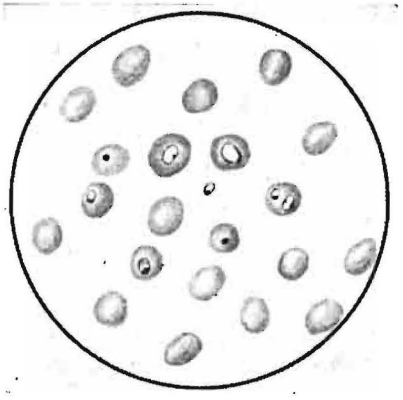
Red-Water (Babesiosis) in a Sable Antelope.

By G. MARTINAGLIA, V.S., B.V.Sc., D.V.Sc., Assistant Veterinarian to the Municipality of Johannesburg.

In the case of trypanosomiases, the inter-relationship of protozoön infection between wild and domesticated animals is well known, but of the tick-borne diseases comparatively little is known.

Several *Babesiæ* in antelopes have already been described. *B.hippotragi* was recorded by Tod and Walbach (1912) from *Hippotragus equinus*, of the Gambia. *B.stordii* was noted by Franca (1912) in *Gazella grantii* of Abyssinia, and an unnamed form by Rhodhain (1916) in *Cobus defassa* of the Belgian Congo. Clark noted a form of *B.bigemina* in white-tailed deer in Panama.

In this paper I wish to record the finding of *babesia* in the blood smears of a sable antelope (*Hippotragus nigir*) which on post-mortem showed typical liver and spleen lesions of South African bovine babesiosis.



Magn. 1200 X
Fig. 4.—Babesia of Sable antelope.

HISTORY.

The animal had been brought from the Northern Transvaal to the Johannesburg Zoo and died on July 8th, 1930, six weeks after arrival. The carcass was sent to the Abattoir destructor with the request that a post-mortem be conducted.

AUTOPSY

The condition of the animal was fair. Ecto-parasites present were a few red-legged ticks and two species of lice belonging to the genus Linognathus. The mucous membranes were pale and slightly icteric.

On opening the abdominal cavity it was found that partial decomposition had already set in, so a detailed post-mortem was not made. The main post-mortem lesions however, were the enlarged spleen and ictecic patches, which extended throughout the parenchyma of the liver. The spleen was firm and bulged on section. The lungs and the other organs appeared normal.

Smears made from the spleen and liver were stained with Giemsa. On microscopic examination babesia were noted in the red blood cells. These appeared as large, generally single, annular and vacuolated forms; two in a cell were rarely seen. Many smaller, round forms were seen, but these I took to be contracted forms so often encountered in smears taken from animals which have died of red-water. See Fig. 4.

DIAGNOSIS.

Babesiosis, due probably to reduced resistance following a change of environment and close confinement.

DISCUSSION.

Mr. Neitz: The occurrence of the Babesidae has been recorded by numerous authors. The present case in the Swart-Witpens is exceedingly interesting, inasmuch as it is the first case on record where an antelope has died from piroplasm infection. It is a pity that it was not possible to carry out transmission experiments, in order to see whether this parasite is or is not specific for the Swart-Witpens. Wenyon (1) mentions that Clark (1918) found *P.bigeminum* in a white tailed deer in the Panama region and that he could transmit the parasite both to cattle and deer by means of the tick *Margaropus australis.*

Mention may also be made in this connection of the presence of Gonderia and Theileria. In the majority of our game these small blood parasites have been found. Some authors have recorded the presence of Koch's bodies, e.g. Lichtenheld (1910) in an eland, Montgomery (1913) observed them in a bastard hartebeest, and Ross, P. H. (1911) saw them in Coke's hartebeest. It is an open question whether these antelopes act as reservoirs of the species Theileria for our domestic animals.

The genus Nuttallia has been found in various small rodents and in small carnivores such as the civet cat and the large grey mongoose. The percentage infection in zebras appears to be fairly high since I personally found not less than 30 out of 100 cases to harbour *Nuttallia equi.* By careful examination one would probably be able to find parasites belonging to the family Babesidae in most species of mammals.

Dr. Curson then exhibited under the microscope smear preparations of Dr. Martinaglia's case.

(1) (1926) WENYON, C. M. Protozoology, Vol. II, Bailliere Tindall and Cox, London.

JL. S.AFR. VET. MED. ASSN.
1 (4) 1930.

Helminthiasis of Domestic Stock in the Union of South Africa.

By P.L. Le ROUX, BSc. (Edin.), M.R.C.V.S., Veterinary Research Officer, Onderstepoort, Pretoria.

INTRODUCTION.

In this communication an attempt will be made to present in a concise and convenient form, the more essential points which may interest those who are called upon to deal with outbreaks of helminthiasis amongst domestic animals in South Africa. Details as to the identification, life histories, distribution, curative treatment, prophylaxis, etc., of each individual species to be met with in the various animals are evidently beyond the scope of this paper.

Judging from the complaints which have reached us from farmers and from what I have witnessed in the field during the last few years, it must be concluded that thousands of animals die annually as the result of worm infestation. If the actual losses could be expressed in sterling our Fathers would undoubtedly be convinced that a great deal more should be done. The worms alone have contributed much towards swelling the ranks of the poor and towards driving men off the land. Helminths have almost made the profitable running of sheep as a side line, a practical impossibility to-day.

Timely diagnosis and regular and conscientious dosing will save the State many valuable lives and keep many farmers on the land. Parasites such as *Haemonchus contortus*, *Monodontus trigonocephalus*, *M. phlebotomus*, *Gaigeria pachyscelis*, *Fasciola hepatica*, *F. gigantica* and even the dreaded *Oesophagostomum columbianum* for which curative treatments are now known, should no longer claim any victims, if only sheep owners would dose and treat their animals regularly.

IMPORTANCE OF HELMINTHIASIS.

It has already been stated that worms have this year caused heavy losses. The losses have been more severe than many of you would be prepared to accept. The annual heavy losses from actual deaths of the parasitised are merely a very small fraction of the damage suffered from loss of condition and reduced productivity. Diseased stock cannot reproduce strong healthy offspring nor can they produce the maximum amount of work, flesh, wool or eggs as the case may be. Helminths are especially injurious to the young stock, stunt their growth and undermine their fecundity. Whenever diarrhoea, lack of appetite, listlessness, unthriftiness, loss of condition and a lustreless coat begin to show, one should suspect gastro-intestinal parasitism and perform an autopsy to ascertain the cause of these manifestations.

Some helminths are small and are readily overlooked. The species of Trichostrongylus which have these last few months played such havoc in flocks of Blackhead Persians in the Eastern Province, are almost microscopic and unless specially looked for, will and have escaped the eye at apparently well conducted autopsies.

It should be remembered that worms are not as a rule out to kill their hosts, as this would mean wholesale suicide. Their attack on the host is not preceded by an ultimatum, nor with the propaganda and the beating of drums which man is so apt to resort to, in his attack on his neighbour. They suffer defeat only when the attack has been in mass formation.

THE DISTRIBUTION OF CERTAIN SPECIES.

Our knowledge of the precise or even the approximate distribution of the various worms parasitizing the livestock of this country, is unfortunately very imperfect. This information is most essential for the organisation of campaigns against them, and it is only to be expected that the life histories and bionomics of the most formidable and most widespread species, should first receive the attention of the research workers. An attempt at mapping the intensity of helminthiasis and the identification of the species present in the various parts of the country should be made at the earliest possible opportunity. The success of such a scheme should not be costly provided that farmers and veterinarians could be induced to collect material and also data as to prevalence in their areas and submit these to the Director of Veterinary Services and Animal Industry.

From the scanty information which is available it would seem that we have certain worm species more or less confined to particular areas. This locality specificity can in the case of the Heteroxenous (double host) species, be partly explained by the fact that the intermediate host concerned in the completion of the life-cycle, is more prevalent in those localities. The presence and abundance of the intermediate hosts are moreover often limited by climatic conditions such as rainfall, temperature, humidity, etc. Unhygienic animal habitations often favourise or contribute to the presence and the multiplication of intermediate hosts, e.g. cockroaches in dairies and dung-beetles in pastures are the transmitters of Gongylonema species in cattle and other animals.

In the case of the Monoxenous (single host) nematodes, it is undoubtedly not without interest to find a parasite like *Haemonchus contortus* so plentiful in the summer rainfall area, while *Ostertagia circumcincta* is confined more or less to the winter rainfall areas and the mist belts. It would therefore seem that heat and moisture alone are not absolutely essential factors determining the presence or the absence of all Trichostrongylidae. The common hookworm of sheep

(*Monodontus trigonocephalus*) seems to be mainly confined to the South-West and South-East coastal belts of the Cape and the mist belt. It is occasionally met with in other parts. The other hookworm of sheep (*Gaigeria pachyscelis*) which is responsible for serious losses, has rather a peculiar distribution in that it seems to be confined only to those more arid and flat parts of the country, where "pans" form during the rainy season. It has been recovered from animals in the North-West Cape and extends into Bechuanaland and South-West Africa. In the last mentioned country it would appear to be a most pathogenic species, and in company with *O.columbianum* causes heavy mortality.

Domestic Ruminants.

The helminthic fauna of ruminants in the South-West Cape is not unlike that of the British Isles. The absence of *Muellerius capillaris* (*Synthetocaulus rufescens*) from the lungs of sheep in South Africa should in all probability, be attributed to the absence of the snail claimed to be the intermediate host of this worm. This parasite has been observed in imported animals but has never spread to S. African bred stock.

On a recent visit to Port Elizabeth I recovered *O. venulosum* from the large intestines of Blackhead Persians on a farm adjoining the Uitenhage townlands. Here the animals were dying from the combined onslaughts of *O. venulosum*, *Trichostrongylus axei*, *T. rugatus*, *T. instabilis*, *Nematodirus spathiger* and *Moniezia expansa*. This flock was suspected to be suffering from poisoning, due to contamination of the water supply to this farm by factory effluent. Autopsies removed all doubts as to the actual cause, but not until much time had been wasted in analysing water, etc., as the owner of the flock was contemplating sueing the proprietor of the factory for damages.

In the two animals which were autopsied there were no calcareous or caseous nodules in the gut wall of either the small or large intestines. It is occasionally observed in *O. columbianum* infestation, that the number of parasites recovered seem to be out of proportion to the number of nodules present in the wall of the intestines. With reference to this presence or absence of calcareous or caseous nodules in the gut wall of *O. columbianum* infested sheep, it may be of interest to mention that several species of the genus Oesophagostomum develop within large haemorrhagic cysts in the submucosa of the caecum and colon and even small intestines, while others (e.g. *O. radiatum* and *O. dentatum*) hardly ever cause macroscopic nodules. In the case of the cattle nodular worm, the nodules are as a rule most commonly met with in the ileum and the caecum and are usually so small as to escape notice. From these findings it would seem quite in order to conclude

that *O. columbianum* as regards its intrasomatic parasitic development occupies an intermediate position to the two groups referred to above. It is to be hoped that this formidable parasite is not adapting itself to a still more prolonged development in the gut wall.

O. columbianum has a very wide distribution and its absence from the flock at Uitenhage is worthy of record. It is a common parasite of sheep on heavily stocked, permanent pastures.

CATTLE.

The parasites of cattle have received little attention in the past. It should be mentioned that *Haemonchus contortus*, *Cooperia pectinata*, *C. punctata*, *Monodontus phlebotomus*, *O. radiatum*, *Cotylophoron cotylophorum* and the liver flukes have definitely been found causing serious mortality on the Natal Coast and Zululand, where helminthiasis has undoubtedly been at times mistaken for Nagana. I experienced this at Empangeni when asked to examine an ox said to have contracted trypanosomiasis on the townlands. The autopsy and the inoculation of guinea pigs and the microscopic examination of fresh blood preparations failed to confirm the suspicion of Nagana.

Immature paramphistomes continue to claim victims in different parts of the country. Mr. Frean, M.R.C.V.S., has submitted specimens from the Clanwilliam district, South-West Cape. Mr. Paine, F.R.C.V.S., informed me that he has had cases in cattle close to Port Alfred. Additional cases have been reported from Basutoland (Verney), Queenstown (Simson), Kokstad (Henderson), Zululand and Orange Free State (le Roux) and Pretoria (Veglia), and other parts of South Africa.

As a new intermediate host of Paramphistomes and *Fasciola hepatica* I wish to record *Bulinus verreauxii* (Bourguignat) from the Field Cornetcy of Goudini, Worcester. This species has been kindly identified for me by Dr. J. Becquaert of the Harvard University Medical School.

Parasites which have recently been collected by the writer from cattle are:—

(1) *Schistosoma mattheei* from a cow on a farm close to this Institute; also collected from sheep at Humansdorp, Cape; Vryheid, Natal and Pietersburg, Transvaal.

(2) *Cooperia nicolli* from the small intestine of a calf from Ermelo.

(3) *Onchocerca sp.* from the subcutis in the region of the brisket of three heifers born and reared on a farm close to Cramond Station, Natal.

Cooperia pectinata and *C. punctata* were recently collected from the small intestines of a sheep from the Pietersburg district, Transvaal. This animal was also heavily infested with *T. instabilis*

Cooperia fieldingi described by Baylis (1929) from the intestines of cattle in Australia, is probably identical with *C. puntata*, for I have recovered from cattle in the Transvaal and Zululand, specimens with spicules varying in length between those cited for *C. puntata* and *C. fieldingi* by Ransom (1911) and Baylis (1929) respectively.

Trichostrongylus axei (*T. extenuatus*) has been collected from the abomasi of sheep and cattle and from the stomachs of horses, donkeys and mules in different parts of the country.

PIGS.

In South Africa the pig seems to be relatively free of the more pathogenic species of worms. Their apparent absence should perhaps be attributed to the want of looking for them. The only species of economical importance would seem to be *Ascaris suilla*, *Metastrongylus elongatus*, and the larval stage of *Taenia solium* of man.

The lungworm would seem to be confined to the South-West Cape while the other two are met with everywhere. It may be mentioned that new species of nodular worms have been described from pigs in the United States of America where the fight against worms would appear to be waged in real earnest.

The kidneyworm of swine has not been met with in the Union, but its presence in Portuguese East Africa should not be forgotten.

The common nodular worm of pigs is not infrequently met with in animals kept in insanitary pens or fields.

CARNIVORA.

The domestic pets and wild carnivores are potential distributors of helminths to domestic ruminants. The presence of echinococcal cysts in the internal organs of sheep, cattle, pigs and man proves this. It has recently been stated that the domestic cat is also a potential carrier, although this has not formerly been suspected. Some of the wild carnivores probably harbour the tapeworms which are responsible for the *cysticerci* not uncommonly met with in the koodoo, African buffalo, blue wildebeest, bushbuck, duiker, steenbuck, wart hog and bush pig. Fresh material from these animals should be submitted to this Institute whenever possible for attempts at infesting dogs experimentally.

Recently the writer fed *Cysticercus cellulosae* to a dog from which he recovered immature *Taenia solium* a week later. Attempts at raising the worms to the adult stage in the dog have failed on three occasions. Experiments with *Cysticercus bovis* failed likewise.

Dipylidium caninum and probably also the other species of *Dipylidium* parasitizing dogs and cats, can be transmitted to humans, chiefly children, via the dog and cat fleas and lice.

The hookworms (*Ancylostoma caninum* and *A. braziliense*) are not uncommonly met with in dogs, cats and jackals, and are usually accompanied by serious results. The larvae of these parasites are said to be responsible for some of the forms of creeping eruption met with in man in this country.

POULTRY.

The parasites of poultry have received a fair share of attention. Material has been available thanks to the many bacterial and other maladies, which yearly claim many victims and threaten our poultry industry. Legislation has recently been imposed for safeguarding this important and rapidly growing industry against the further introduction of certain virus and bacterial diseases, known not to be present in the country. That the worms got in in good time is evident from the number of species already met with.

It is perhaps of some interest to mention that the common Ascaridia of fowls in Europe has not been met with in Natal and the Transvaal. The gapeworm would seem to be confined to the Western Province. Certain tapeworms seem to be limited according to the distribution of the intermediate hosts. The life histories of a few are still to be solved. The intermediate hosts of most of the avian cestodes remain to be traced in South Africa. From the contributions by Dr. Cram of the Division of Animal Industry of the United States of America, we have some indication at any rate of the likely intermediate hosts to suspect. We are thus entitled to warn poultry keepers of the fact that earth worms, dung beetles, snails, grasshoppers or other insects, should no longer be considered necessary delicacies in the daily menu of their birds. Free range for birds should thus be advocated with due caution, since it would be a case of the early bird catching the first worms and its death.

There is no state or municipal inspection of poultry offered for human consumption, so that worm-infested gizzards are often offered for sale by the unknowing poulterer or butcher. Another parasite which is ingested by man almost daily is the common air-sac mite of poultry.

Even the domestic pigeon is subject to helminthiasis, and if it is not considered of much consequence for the table, it is certainly a severe handicap for racing birds. A Pretoria pigeon fancier approached me last year as to the reasons for his pigeons doing badly. The examination of a sick bird revealed a most heavy infestation with *Ornithostrongylus quadriradiatus*. In Natal this parasite was responsible for great losses in valuable imported brids. *Ascaridia liniata*, the common ascarid of South African fowls, was recovered from pigeons at Pietermaritzburg. Poultry keepers should therefore guard against pigeons visiting their runs.

Game Birds.

From tamed Transvaal Crowned Guinea fowls at Lehou Station, the writer collected large numbers of a species of *Gongylonema*, which on examination proved to be identical with the species from the domestic fowl in Natal and Transvaal. An examination of the worms and their comparison with the specimens of *Gongylonema* sent me by my colleague and college friend Mr. G. S. Purvis, F.R.C.V.S., from the Malay Strait Settlements, induced me to regard them as specimens of *G. crami*. I have been unable to secure a detailed description of *G. crami*, but am inclined to regard it as synonymous with *G. ingluvicola*. The species of *Tetrameres* parasitizing the domestic fowl and the tamed and wild guinea fowl is *Tetrameres americana*.

Rodents.

The intestinal helminths of the domestic rabbit have received little attention in South Africa. The only species hitherto recovered from them is *Passalurus ambiguus* which was from emaciated animals. The wild hares harbour different species of cestodes.

It may be of interest to mention that Cape ground squirrels, rats, and spring hares have been found with their livers badly infested with the eggs of a species of *Hepaticola*. Worms were not obtained and it is therefore not definite whether the species is identical with that which has been recovered from man. The species of *Oesophagostomum* recovered from these rodents are closely related to those recovered from man.

Wild Ruminants.

Although the wild ruminants have received some attention in the past, much remains to be done in establishing their importance as factors in the control of helminthiasis in sheep and cattle.

In 1926 the writer made attempts at raising larvae from the faeces of antilopes at the Pretoria Zoological Gardens. Most of the cultures never showed any larvae. A lamb born on the station was infected with larvae obtained from a Roan antilope. When this lamb was killed a month later, it was found lightly infested with *Cooperia curticei*. It harboured no other parasites. Faeces were also obtained from antilopes at the Johannesburg Municipal Zoological Gardens. From larvae hatched from the faeces of a blue wildebeest were raised a few specimens of *Haemonchus bedfordi*. A lamb infected with larvae from the giraffe did not harbour any parasites on post-mortem five weeks later. It was then decided to incubate the faeces of new arrivals at the Zoo and from the gemsbuck, larvae were obtained which proved ultimately to be specimens of *Haemonchus bedfordi, Trichostrongylus rugatus, T. instabilis, T. falculatus* and *O. columbianum*. A springbuck proved to be infected with *H. contortus* and *O. columbianum*.

Mr. Paine, F.R.C.V.S., has collected specimens of *Trichostrongylus rugatus* and *Nematodirus spathiger* from the steenbuck in the Grahamstown area this year. The former species has also been recorded from this host in the Humansdorp area. Major Keppel M.R.C.V.S. has submitted specimens of *Haemonchus contortus* from springbuck at De Aar. Dr. H. O. Monnig has described a species of *Agriostomum* from the springbuck and the writer recorded a species of this genus from the blue wildebeest in the Waterberg Area, while in Zululand I collected specimens of *H. bedfordi* from the bushbuck. This antelope also harboured three species of Trichostrongylidae.

Mr. Dickson B.V.Sc. while stationed at Nongoma collected onchocerca nodules from the subcutaneous tissues of a duiker. This and the fact that onchocerca nodules have been recovered from the three cattle already mentioned, would suggest that onchocercosis of cattle must be more prevalent in this country than abattoir records indicate. In the cases noted by me, the nodules were fairly firmly attached to the skin and caused the skin over the brisket to bulge to such an extent that they could be plainly seen from a distance.

Specimens of *O. columbianum* were submitted by Mr. N. T. van der Linde, a fourth year veterinary student, from springbuck in the Griqualand West area. He assured me that he could find no wireworms. Mr. T. Meyer collected specimens of this parasite from gemsbuck at Gobabis in South West Africa.

There is therefore ample proof that some of the antelopes harbour parasites which are known to parasitise, or can be transmitted to sheep. In spite of all this it is doubtful whether in the campaign against the gastro-intestinal parasites of domestic ruminants, one could be justified in even considering the destruction of game.

An attempt at raising the Strongylidae, infesting the various species of wild ruminants, in sheep was begun in 1926. Faeces from the different animals at the Pretoria and Johannesburg Zoological Gardens were collected from time to time, incubated, and the larvae thus obtained were fed to young lambs known to be free of helminths. The results to date are tabulated below and from them it is evident that several of the helminths known to infest domestic stock are also harboured by the wild ruminants of South Africa and other countries.

TABLE I.

Species of Wild Ruminant.	Species of Strongylidae collected from the infected lamb.
African buffalo, *Synceros caffer* Sparrm.)	*Haemonchus contortus.* *Haemonchus bedfordi.* *Cooperia punctata.* *Cooperia pectinata.*

Species of Wild Ruminant.	Species of Strongylidae collected from the infected lamb.
Roan antelope. *Egocenis equinus.*	*Haemonchus contortus.* *Cooperia curticei.*
Sable antelope. *Ozanna nigra* (Harris).	*Haemonchus contortus.* *Trichostrongylus instabilis.* *Cooperia curticei.*
Kudu. *Strepsiceros strepsiceros* Pallas.	*Haemonchus vegliai* *Ostertagia circumcincta.*
Steenbuck. *Raphiceros campestris* Thurh.	*Haemonchus contortus.* *Trichostrongylus rugatus.* *Nematodirus spathiger.* *Oesophagostomum columbianum.*
Springbuck. *Antidorcas marsupialis* Zimm.	*Haemonchus contortus.* *Trichostrongylus falculatus.* *Trichostrongylus rugatus.* *Trichostrongylus instabilis.* *Cooperia curticei.* *Oesophagostomum columbianum.*
Blue wilde-beest. *Gorgon taurinus* Burch.	*Haemonchus bedfordi.* *Trichostrongylus rugatus.*
Black wilde-beest. *Connochaetes gnu* Zimm.	*Haemonchus contortus.* *Trichostrongylus rugatus.* *Cooperia curticei.* *Oesophagostomum columbianum.*
Gemsbuck. *Oryx gazella.*	*Haemonchus contortus.* *Haemonchus bedfordi.* *Trichostrongylus instabilis.* *Trichostrongylus rugatus.* *Cooperia curticei.* *Nematodirus spathiger.* *Oesophagostomum columbianum.*
Waterbuck. *Kobus ellipsiprymnus* Olig.	*Haemonchus contortus.* *Haemonchus bedfordi.* *Trichostrongylus instabilis.* *Trichostrongylus rugatus.* *Cooperia curticei.* *Oesophagostomum columbianum.*

Species of Wild Ruminant.	Species of Strongylidae collected from the infected lamb.
Lechwe antelope.	*Haemonchus contortus.* *Trichostrongylus instabilis.* *Cooperia curticei.*
Bushbuck. *Tragelaphus sylvaticus* Sparrm.	*Haemonchus vegliai.* *Cooperia* sp. nov.
Blesbuck. *Damaliscus albifrons* Burch.	*Haemonchus contortus.* *Trichostrongylus instabilis.* *Oesophagostomum columbianum.* *Cooperia curticei.* *Impalaia* sp.
Argentine deer.	*Haemonchus contortus.* Females of *Nematodirus sp.*
Wapigi.	*Haemonchus contortus.*
Camel.	*Haemonchus contortus.* *Haemonchus longistipes.* *Trichostrongylus instabilis.*

Curative Treatment.

In this subcontinent the economical raising of sheep and poultry, two of our major industries, depends largely if not solely on the facilities for keeping the animals free from parasites of which the gastro-intestinal helminths, are indisputably the most important.

The curative treatment of livestock for the various worms will be found briefly tabulated at the end of this article (Table II). Only the drugs and chemicals which have in recent years been found effective are considered. The curative dose should be accompanied by good feeding and good nursing, in other words animals infested with worms should be protected against wind, wet, woe, and want.

Although every care has been taken in preparing these tables, it should be clearly understood that they are intended, only as a guide to the Veterinarian. Some important points regarding diagnosis, preparation and dosage are mentioned in the article, but many more are of necessity omitted, since it is assumed that the Veterinarian will exercise due care and discretion according to circumstances, e.g. poverty, idiosyncrasies, etc.

Preparation of the Patient.

Although it has been observed that the efficacy of a few anthelminthics is not influenced to any appreciable extent by a pre-

liminary starvation, there are others whose efficacy is definitely increased, when the patient has been starved for a period varying from 24 to 36 hours. A preliminary starvation would in the case of ruminants and equines seem to be absolutely imperative to reduce the contents of the alimentary tract and thus obviate undue dilution of the anthelminthic.

THE FATE OF DRUGS AS ADMINISTERED BY VARIOUS METHODS.

When treating ruminants for gastro-intestinal worms, it would seem essential that the remedy reach the abomasum without too large a proportion of it passing into the rumen or reticulum. Authorities differ in opinion as to the common route taken by the remedies administered in liquid or powder form *per os*. Some do not even seem sure as to the first destination of remedies administered per capsule or per stomach tube. Prof. Wester of the Veterinary College, Utrecht, has within the last few years contributed valuable records dealing with the physiology of the forestomachs of cattle. Amongst other things he states that sodium salts stimulate the oesophageal groove to close, resulting in the direction of the rest of the liquid into the abomasum. Other workers are by no means sure about the routes generally taken. Some have even suggested the utilisation of hard gelatine capsules for ensuring the passage of the contained drug into the abomasum and even small intestine. They have evidently never before ascertained the usual route taken by capsules.

My personal experience with the dosing of sheep by these means and as controlled by killing them at varying intervals after dosing, has led me to conclude that fluids and powders in small quantities will pass into the abomasum, provided the animals are not ruminating at the time. In the case of capsules the drug was found in the rumen in every instance and this is only to be expected for the omasum will seldom allow an object of any size to pass on. When the stomach tube was used, the liquid was recovered in the **rumen** and **reticulum.** Where sheep with food on the back of their tongues were dosed, the the Government wire worm remedy powder passed *en masse* into the reticulum and rumen. In non-starved animals, with no food in the mouth,the remedy passed into the abomasum. When an animal was killed 5 to 10 minutes after the administration of the dose, some of this was observed in the omasal groove, but most of it had reached the abomasum.

ADMINISTRATION OF REMEDIES.

Where thousands of animals are to be treated every month, the cost of the drugs prescribed and the time required for their administration are factors not to be lost sight of. The administration to sheep of anthelminthics in powdered form, appeals to the busy farmer. The dosing of small quantities of fluid per syringe into the mouth is rapid, but when the bulk is increased, this procedure is always associated

with a certain amount of risk and cases of inhalation pneumonia are not uncommon and unpleasant sequelae. Sheep and cattle kept under range condition are restless when handled and the utilisation of drugs in solution is positively dangerous. As for the giving of drugs in capsules this cannot be advised. The capsules are expensive, can only be successfully administered by the experienced and will in most cases in ruminants convey the drug to the **rumen.** Equines should be dosed per stomach tube. Dogs and cats should receive their medicine as pills, tablets or in capsules. The mouth of dogs should be tied to prevent vomiting. Pigs should be dosed per stomach tube, for even the old boot so often recommended may give rise to pneumonia. Poultry are best dosed with medicine mixed with bread crumbs and made into pills. Where liquids are prescribed they should be given by means of a syringe fitted with a few inches of rubber tubing for passing the medicine into the oesophagus. The drugs should in no cases be poured from a teaspoon into the beak as is commonly practised.

The intra-abomasal administration of drugs through the floor of the abdominal wall of sheep has been recommended by some, but is a method only to be attempted by the expert and even he will not land the dose in the abomasum every time. It is a practice which should be burried and forgotton.

Finally there is the administration of anthelminthics intravenously and per rectum. The former must be resorted to where animals are to be treated for *Schistosomiasis (vel Bilharziasis).* The rectal administration of drugs must be utilised in cases of oxyuriasis in equines, oesophagostomiasis in sheep and caecal worm infestation in poultry. The enema containing the drug should be lukewarm and no force should be applied in the operation. In the case of the smaller animals the hindquarters should be raised and the fluid allowed to flow in through a rubber tubing, of suitable bore, leading from a glass or enamel funnel. The funnel should be held at a suitable height for obtaining the required pressure for the fluid to enter. Should the animal strain during the operation too much pressure should not be applied when trying to control the escape of the liquid from the anus for the diseased gut may rupture. For the successful treatment of sheep by means of an enema it is imperative to have the animals purging or loose beforehand. This is best achieved by grazing the animals to be treated on green pastures until the desired effect is obtained.

Prophylactic Measures.

Various methods towards attaining this end have been hypothecated. It has been recommended from Russia that the faeces of sheep suffering from trichostrongylosis be collected and burned. The practicability or otherwise of this suggestion need scarcely be considered here.

Pasture rotation has been recommended from the United States of America and if thoroughly practised leaves nothing to be desired. In South Africa this can unfortunately not be carried out on every farm year after year. Droughts may force the farmer to turn his flock into the pastures set aside for his ewes in lamb, and when this necessity does not arise he may probably find the grass so long, fibrous and unpalatable, that the sheep will die of starvation shortly after being turned in. In order to keep down the grass he may graze horses in the reserved camps, but horses are unfortunately no longer available for this purpose and the next best thing to do is to graze cattle thereon. Cattle in turn are infested with most of the parasites met with in sheep, but do not harbour the sheep nodular worm.

The keeping down of the grass to the length best preferred by sheep can be achieved by burning and this should in certain cases be resorted to in spite of the fact that veld burning is generally regarded as injurious to the vegetation of the grass veld areas. The work of Mr. Staples at Cedara, Natal, has shown that burning at the right time was not in the least deleterious in that area, but if anything, improved the pasture experimented on. It is evidently not yet generally realised that what holds for one part of South Africa does not necessarily hold for others. The indiscriminate burning of grass veld year after year is a bad practice and the burning of mountain veld as practised in some parts of the Union is most unwarranted and should be prohibited as it induces soil erosion and reduces water retention. The judicious burning off of the grass in certain camps, would not only provide suitable short grazing for ewes and lambs but would free the pasture of the larvae of gastro-intestinal strongyles.

The researches of Dr. M. Henrici have shown that the ripened grass on the Transvaal High Veld contains much less nutrient material than the young stages. Ewes cannot be expected to produce the required flow of milk when grazed on old, long, fibrous vegetation, and what is more, sheep detest long pastures. Some of you will probably suggest that the animals be grazed for part of the day on green oats, green rye, green barley, etc. This may sound very wise, but can those plants be economically raised in the required amounts every year?

Gentlemen, remember that we are trying to raise sheep in areas where Nature has not provided for them for all seasons of the year. For maintaining their productivity during the lean seasons, we should feed them some of the fruits of the months of plenty. In the good old days when few crops were grown because farmers did not know that they could be, sheep were moved (trekking) during the lean and cold months to the warm low bush veld. This practice has aided in the spread of various diseases, e.g. Scab and helminthiasis. It was fur-

thermore often associated with heavy losses resulting from poisonous plants and subjection of the animals to diseases against which they were not immune. The advent of fencing has so limited the grazing along trek roads to-day, that the practice has ceased to be a practicable solution of the winter feeding problem.

Permanent Pastures.

Farmers in certain parts have laid down permanent pastures to grasses such as cocksfoot, species of fescues, kikuyu and others, and claim that they can now run hundreds of sheep where formerly scores could not live. They have created artificial conditions and are stocking heavily. When worm infested animals get on to these pastures trouble will begin both for the owner and for the veterinarian. Irrigated permanent pastures are most dangerous and as aptly put by Dr. Maurice Hall, "Permanent pastures perpetuate parasites." The most important factor to be considered in the fight against the trichostrongylidae is the avoidance of repeated reinfection and concentrated infestation of pastures with the eggs and larvae of these worms.

Dr. Maurice Hall, who has been engaged in the fight against helminths for years, has recently reported on the position in Central America. He admits that his visit to those parts had been an eye-opener. He had always regarded the Tropics as characterised by the presence of heat and moisture and therefore presenting conditions ideal for the propagation of parasites. Instead of finding thousands of worms as he thought he would, he failed to collect. *H. contortus* or other trichostrongyles from the cattle examined at various abattoirs on the Pacific Coast. This absence of helminths he probably quite correctly attributes to . . . "the abundant range and consequent avoidance of overstocking . . ." The fact that he found the closely confined animals such as pigs, horses, poultry and even man heavily infested, proves that continued contact with the same unhygienic habitat, is the most important factor contributing to helminthic incidence in a population.

Finally, the Bare Lots Method as outlined by Dalrymple from America should be recommended. The underlying principle here is to keep the lambs off worm infested pastures. They should therefore be kept in pens where they are fed from raised racks and are watered from raised troughs while their mothers are out grazing. This method should be given a trial in small flocks, or where the breeding of stud sheep is practised.

Preventive Licks.

The idea of giving licks for the prevention of helminthiasis is as old as the hills. Various licks have been recommended and manufacturing firms have taken full advantage of this, for flooding the

market with expensive, patented licks for which they claim all bar the revival of the dead.

Hutcheon (1905) gives as an effective lick:—

> Powdered common salt, 6 parts; powdered slaked lime, 1 part; flowers of sulphur, 1 part.

Dixon (1912) recommends the following two licks:—

i. Powdered sulphate of iron, 1 part; flowers of sulphur, 1 part; powdered slaked lime, 1 part; common salt, 5 parts.

ii. Cooper's dip, 1 part; powdered bluestone, 1 part; flowers of sulphur, 3 parts; slaked lime, 3 parts; common salt, 5 parts.

The Division of Veterinary Services and Animal Industry now recommends that a hundred sheep should receive every week a lick composed as follows:—

> Coarse tobacco, 10½ lbs.; bonemeal, 24 lbs.; salt, 10½ lbs. To this lick may be added ½ lb. sulphur for the prevention of geilsiekte and 3½ ounces of iron sulphate when the sheep are in poor condition.

The animals should preferably have free access to this lick morning and evening, even if it should entail their kraaling overnight, not necessarily in the same enclosure all the year round. Animals may be induced to partake of the lick by moistening it with molasses. Difficulty will always be experienced in regulating the intake of every individual, but this should not deter the owner from giving a lick. The complete prevention of helminthiasis by giving licks has not been an absolute success, but data to hand would seem to indicate that losses from worms are much reduced where licks have been regularly supplied and animals regularly dosed for wireworms every three weeks throughout the year.

The inclusion of calcium, in a readily assimilable form, in licks for heavily parasitized animals would seem desirable. Apart from larvicidal properties the licks should aim at supplementing the minerals extracted from the tissues of the host, or rendered inert, by the parasites. Furthermore the minerals in which our pastures are deficient should also be added, so that the animals' natural powers of resistance be generally increased.

THE VETERINARIAN.

In the Report of the Committee on Parasitic Diseases at the Thirteenth Annual Meeting of the United States Live Stock Sanitary Association it is stated that the treatment of parasitic diseases should be regarded as the field of the veterinarian, rather than that of the stockman. This we must endorse, for only the veterinarian is qualified to make a diagnosis and prescribe the most efficacious treatment.

The veterinarian is there to advise the farmer. Advice should only be offered after the farm has been visited and after the veterinarian has satisfied himself as to the cause of the trouble. Farmers cannot be satisfactorily advised on the treatment of their stock by an expert living hundreds of miles away and unacquainted with local conditions. In our advice to farmers on various subjects we often lose sight of the fact that our country is a large one and that the same malady may be influenced by different factors in the different parts.

The fight against worms should in future be waged with greater vigour than has been the case in the past. I am convinced that the Veterinary profession can live up to the claims made by Dr. Cooper Curtice of *O. columbianum* fame. In an address to the students of the New York State Veterinary College at Cornell University he concluded with the statements:—"Veterinarians are of the salt of the earth. They see their duty and do it."

DISCUSSION.

Mr. le Roux replied as follows to Mr. Carless: There was no data definitely proving the efficacy of tobacco licks against Oesophagostomes.

To Mr. Chalmers: It was essential in the treatment of worm diseases that the animal be removed from the source of infection, and although this was difficult, it was necessary. He mentioned an experiment in which a flock of sheep infected with Trychostrongyles was divided into two lots, the one group which received nicotine and copper sulphate every week for one month, improved, whereas the other group which received carbon tetrachloride every week for a month, became worse. Mr. le Roux thought that the administration of the Wireworm Remedy without previous starvation was of absolutely no use. With this Mr. Carless agreed.

ADDENDUM.

Since going to press the writer has had the opportunity of examining merino sheep near Bot River, Cape Province. In addition to the more common parasites, he reports finding *Chabertia ovina*. In fairly large numbers in the middle third of the colon. Together with *Ostertagia circumcincta* they were undoubtedly the cause of the loss of condition of the sheep. *Chabertia* are somewhat longer than *Oesophagostomum* and of a pinkish grey colour. Unlike the latter they are definitely active blood suckers and are usually firmly attached to the mucosa, on which they produce pin point haemorrhages. Little is known as regards treatment of this worm, but it is quite possible that carbon tetrachloride may prove to be of some value in this respect.

TABLE II.

EQUINES.

Parasites	Habitat.	Drug or mixture used (in order of preference)	Preparation of the animal.	Dose.	Remarks as to further treatment, etc.
Parascaris equorum (Ascaris megalocephala).	Small intestines	(i) Carbon bisulphide (in capsules)	Starve for 18 hours	One dose of 15-20 cc. or 3 doses of 6 cc. at one hourly intervals	No purge to follow
		(ii) Carbon tetrachloride (in capsules)	do.	One dose of 15-35 cc.	do.
Strongylus species *Trichonema* species *(Cylicostomes.)* *Gyalocephalus* sp. *Triodontophorus* sp. *Poteriostomum* sp. *Oxyurus equi*	Large intestines	(i) Oil of Chenopodium (in capsules)	Starve for 24-36 hrs.	One dose of 10-15 cc.	Followed by 1 litre of Raw linseed oil
		(ii) Carbon tetrachloride (in capsules)	do.	One dose of 15-35 cc.	No purge required
		(iii) Oil of Turpentine (in capsules)	do.	One dose of 50 cc.	Followed immediately by 1 litre of Raw linseed oil

BOVINES.

Ascaris vitulorum	Small intestine	Oil of Turpentine	Starve the calves overnight, dose first thing in the morning and allow milk two hours later	One dose of 10-15 cc. mixed with 50 cc. Raw Linseed oil on two consecutive mornings	Give a third dose a week later
Wireworm *Haemonchus contortus*	Abomasum	(i) Carbon tetrachloride with 4 times its vol. of Raw Linseed Oil (not in caps. or per stomach tube)	No starvation, but feed bone meal for a few days previously	One dose of 10-15 cc. followed immediately by Magnesium sulphate (4 ozs.)	Repeat the dose if necessary every three weeks on badly infested farms
		(ii) Sodium arsenite, 1 prt.; Copper sulphate, 4 prts. †(Dissolve 62.5 gm. in one litre of acidulated rain or soft water)	Fast calves overnight but adult stock for 18-24 hours	One dose of 10 cc. for every 100 lbs. live weight. Maximum dose not to exceed 50 cc.	Feed 6 hours later and allow water 24 hours after dosing

†Commonly known as Government Wire Worm Remedy.

BOVINES (continued).

Parasites	Habitat.	Drug or mixture used (in order of preference	Preparation of the animal.	Dose.	Remarks as to further treatment, etc.
Hookworm of Cattle *Monodontus phlebotomus*	Duodenum	Carbon tetrachloride (as above)	No starvation, but feed bone meal for some days	One dose of 10-15 cc. mixed with an oil, followed immediately by Magnesium sulphate	Repeat the dosing every month during the period that infection may be picked up
Tapeworms *Moniezia alba,* *M. expansa,* *Helicotrema giardi.*	Small intestine	(i) Oil of turpentine (as for ascaris) (ii) Copper sulphate, 1 oz.; 40 per cent. nicotine dip, 1 oz.; rain or soft water, 3 pints.	Starve the calves overnight, dose next morning and allow milk two hours later do.	As for Ascaris infection One dose of 60-90 cc.	Repeat the treatment a week later if no worms are passed do.
Liver Flukes *Fasciola hepatica,* *F. gigantica*	Bileducts	Carbon tetrachloride (as above)	No starvation, but feed bone meal for a few days	One dose of 5-10 cc. followed immediately by Magnesium sulphate	Repeat three weeks later. Dose once every 2-3 months
Immature conical flukes Immature paramphistomes *Cotylophoron cotylophorum.*	Rumen, reticulum, omasum, abomasum and intestines	Carbon tetrachloride (as for wireworm)	As for wireworms	As for wireworms	Repeat the treatment every three weeks and feed bone meal during period that infection may take place
Mature paramphistomes or amphistomes *Paramphistomum cervi.* *Cotylophoron cotylophorum.*	Rumen	Drug as for liver flukes except that they are given in capsules or per stomach tube.	As for liver flukes	As for wireworms	Repeat the dose after three weeks

SHEEP.

Wireworms *Haemonchus contortus,* *H. bedfordi.*	Abomasum	(i) Sodium arsenite, 1 part; Copper sulphate, 4 parts. (In finely powdered form on the back of the tongue or in solution into the mouth (ii) Carbon tetrachloride mixed with 3 times its volume of Raw linseed oil or liquid paraffin	Starve for 20-24 hrs. Lambs only starved overnight No starvation, feed bone meal	0.18 gm. for 2-4 mos. 0.25 gm. for 4-6 mos. 0.375 gm. for 6-10 months 0.5 gm. for 1 year 0.625 gm. over 1 year 4-6 cc.	Allow food only after 6 hours. Allow water only after 24 hours. Repeat the dosing every three weeks Repeat every three weeks on badly infested farms, or on farms infested with Hookworms
Hookworms *Monodontus trigonocephalus,* *Gaigeria pachyscelis,* *Agriostomum* sp.	Middle portion First portion Last portion of small intestines	Carbon tetrachloride (as recommended for wireworms)	No starvation	Dose as for *Haemonchus.*	Repeat every three weeks on badly infested farms
Liver Flukes *Fasciola hepatica,* *F. gigantica.*	Bileducts	Carbon tetrachloride	No starvation	1 cc. in 3 cc. Raw linseed oil or liquid paraffin	Repeat three weeks later and then as required. In stud animals Mag. Sulphate should also be given
Immature conical flukes *Paramphistomum cervi,* *Cotylophoron cotylophorum.*	Rumen, reticulum, omasum, abomasum and intestines	Carbon tetrachloride mixed with three times its volume of oil	No starvation necessary	5 to 10 cc. in 10 to 15 cc. Raw linseed oil or liquid paraffin	Repeat a week later if the diarrhoea does not stop. Remove the animals from the snail infested pastures and feed bone meal, etc.
Mature conical flukes *P. cervi,* *C. cotylophorum.*	Rumen	Carbon tetracloride per stomach tube	No starvation necessary	5 to 10 cc. in 10 to 15 cc. Raw linseed oil or liquid paraffin	Repeat the treatment every few months, depending on the prevalence of infested molluscs.

Parasites	Habitat.	Drug or mixture used (in order of preference)	Preparation of the animal.	Dose.	Remarks as to further treatment, etc.
The smaller Trichostrongyldae (1) Brown stomachworm *Ostertagia circumcinta.* (2) *Ostertagia ostertagi* (3) *Ostertagia trifurcata* (4) *Trichostrongylus axei* (5) *Trichostrongylus instabilis* (6) *Trichostrongylus rugatus* (7) *Trichostrongylus falculatus* (8) *Cooperia punctata* (9) *Cooperia pectinata* (10) *Cooperia curticei* (11) *Nematodirus spathiger*	Abomasum ,, ,, ,, Duodenum ,, ,, ,, ,, ,, ,, ,,	Copper sulphate, 1 oz.; 40 per cent. nicotine sulphate, 1 oz.; rain or soft water, 3 pints	Animals in poor condition starved overnight and dosed next morning. Administer the dose orally by means of a syringe. Animals in not too low condition to be starved for about 18 to 24 hours	Dose the animals with the Copper sulphate and nicotine dip solution as recommended for tapeworms in lambs (see below)	This mixture is being tested but the results are not too promising. Repeat the dose every fortnight or three weeks. Allow food four hours later and water 24 hours after dosing
Nodular worms *Oesophagostomum columbianum,* *O. venulosum.*	Caecum Colon	Sod. arsenite, 1 part; Cop. sulph., 4 parts. Liquid Government wireworm remedy. See under Haemonchus in Bovines	When animals are not purging they should be turned on to green pastures. This will soften the faeces to some extent	Give 10-15 cc. of the liquid wireworm remedy in 2-4 pints of lukewarm rain or soft water per rectum	Repeat a week later on those animals which do not respond to treatment. Do not give the enema to animals which have just been dosed with wireworm remedy
Lungworm *Dictyocaulus filaria*	Bronchi	None satisfactory	—	—	Animals to be kept off moist pastures, well fed and given usual licks

Intestinal tapeworms *Moniezia expansa, M. trigonophora, Helicotrema, giardi.* *Avitellina centripunctata*	Small intestines	(i) Government wireworm remedy as recommended for wireworms (ii) The mixture recommended for the smaller Trichostrongylidae	Starve the lambs overnight, dose next morning and allow milk 3-4 hours later do.	(i) Dose as for wireworms (ii) 1-3 months 15 cc. 3-6 months 22 cc. 6-9 months 30 cc. 9 mos. and over 45 cc.	Repeat a week later and then every three weeks until the lambs are about a year old. The first dose does not always remove all the worms
Schistosomes (Bilharzia) *Schistosoma mattheei*	Mesenteric and Portal veins	Tartar emetic 6% aq. solution (sterilised)	None	Intrajugular injection 1st dose 2 cc. 2nd dose 4 cc. 3rd to 10th, 6 cc. Inject on alternate days	Keep animals away from infested pools, etc. Destroy snails

PIGS.

Ascaris suilla (A. lumbricoides).	Small intestine and occasionally the bileducts	Oil of chenopodium 1 part and castor oil 16 parts	Fast for 24-36 hours	65-70 cc. per 100 lbs. body weight	Repeat in a month if necessary. Attend to sanitation
Stomach worms *Arduenna strongylina, Physocephalus sexulatus*	Stomach	do.	do.	do.	do.
Nodular worm *Oesophagostomum dentatum*	Caecum and colon	No satisfactory treatment known	—	—	Attend to sanitation, dry pens and good food
Lungworm *Metastrongylus elongatus*	Bronchi	do.	—	—	do.

DOGS.

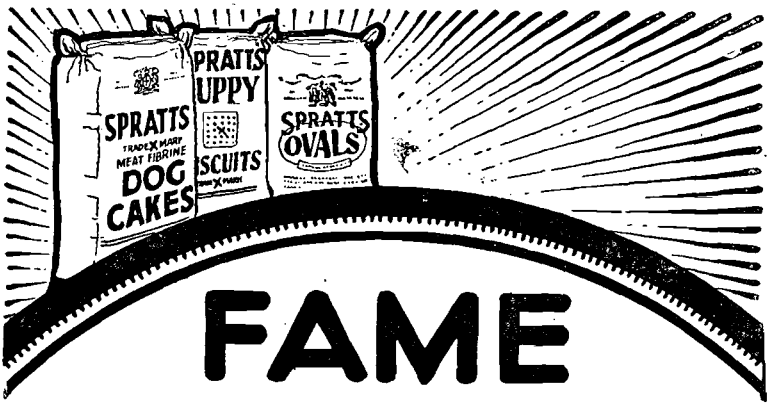
Parasites	Habitat.	Drug or mixture used (in order of preference)	Preparation of the animal.	Dose.	Remarks as to further treatment, etc.
Large round worms *Toxocara canis* and *Toxascaris leonina*	Small intestine	(i) Oil of chenopodium with or followed by castor oil	Starve for about 15-18 hours	1 cc. in a capsule, preceded or followed by 30 cc. of castor oil for a dog weighing 22 lbs.	This drug is contraindicated in cases of gastro-intestinal disturbances as it is an irritant
		(ii) Carbon tetrachloride	do.	3 cc. in a strong capsule followed by a purge a few hours later	
		(iii) Santonin and calomel are preferred when a gastro-intestinal irritant is contraindicated	Starve overnight	½-1 gr. daily, with an equal amount of calomel, for 5-6 days	
Hookworms *Ancylostoma caninum* *A. braziliense.*	Small intestine	Carbon tetrachloride	In the case of animals poor in condition put them on a milk diet for some days and then starve and treat	As for ascaris above	—
Tapeworms *Taenia hydatigena* *T. serrata* *T. multiceps.* *Echinococcus granulosus* *Dipylidium caninum* *D. sexcoronatum.*	Small intestine	Arecoline hydrobromide per os.	Starve for 15-18 hrs.	Small dogs ⅛ grain Average size ¼ grain Large size ½ grain	The dog should not be allowed food, etc., infested with the larval stages of these worms. Must be kept free of fleas and lice

CAT.

Large round worms *Toxocara mystax* and *Toxascaris leonina*	Small intestine	(i) Carbon tetrachloride	Starve for 15-18 hrs.	0.3 cc. per Kg. body weight	—
		(ii) Oil of chenopodium followed by castor oil (15-60 cc.)	do.	0.05 cc. per Kg. body weight	—
Hookworms *Ancylostoma caninum* *A. braziliense*	Small intestine	Carbon tetrachloride	do.	As for ascaris	—
Stomach worm *Ollulanus tricuspis.*	Stomach	Carbon tetrachloride and Oil of Chenopodium should be tried	do.	As above	—
Tapeworms *Taenia taeniaeformis* *Dipylidium caninum* *D Sex coronatum* *Echinococcus granulosus*	Small intestine	Arecoline hydrobromide per os	do.	1/16th-⅛ grain	As for dogs

FOWL.

Large round worm *Ascaridia lineata*	Small intestine	(i) Turpentine, 1 part, and castor oil, 4 parts	Fast the birds for 18-24 hours	10 cc.	Repeat the treatment a week later. Attend to the hygiene and disposal of droppings
		(ii) Oil of chenopodium 1 part, and castor oil 10 parts		2-3 cc.	
		(iii) Tetrachlorethylene		1 cc.	
Caecal worm. *Heterakis gallinae*	Caeca	(i) Oil of chenopodium 1 part, and cotton-seed oil or raw linseed oil 50 parts	Fast the birds for 18-24 hours	5-10 cc. through cloaca by means of a syringe fitted with suitable rubber tubing	As for ascarids
		(ii) 2 per cent. tobacco dust by weight in the mash	None	Feed daily for a month	Repeat when necessary
Tapeworms *Raillietina cesticillus*	Small intestine middle portion	Kamala	Fast the birds for 18-24 hours	For fowls ½-1 gm. For turkeys 2 gm.	Repeat in a week. Attend to the hygiene and disposal of the droppings. Keep down insects, snails and earthworms in the runs
R. tetragona	last half				
Davainea proglottina	first half				
Amoebotaenia sphenoides	first half				
Johnstonia echinobothrida	last half				
Choanotaenia infundibulum	first half				
Hymenolepis inermis	first half				



FAME

Merely to think of a dog is to think of Spratts'! Why? Because through 70 years of manufacture Spratts' have set a standard that many have tried to equal, but none have attained. For doggy health and happiness Spratts' Foods are justly famous—they are your best pal's best pals!

SPRATTS MEAT-FIBRINE DOG FOODS

Look for the name Spratt's on every bag of dog food you buy and see that each biscuit bears the trademark **X**.

Resident Representatives:
A. D. S. Millar, P.O. Box 4529, Johannesburg, and P. N. Ryan, P.O. Box 249, Capetown.

JL. S.AFR. VET. MED. ASSN.
I (4) 1930.

The Value of the Midbrain in the Diagnosis of Rabies in Rabbits.

By A. D. THOMAS, D.V.Sc., and CECIL JACKSON, B.Sc., B.V.Sc.,

Research Officers, Onderstepoort.

The attention which of recent years has been paid to the growing menace constituted by the spread of rabies among small wild carnivores, e.g. the yellow mongoose (*Cinictus penicillata*) and the genet cat (*Genetta felina*) has thrown a considerable amount of diagnostic work upon the staff of this Institute. Both histological examination of the brain from suspected cases and also the biological test (i.e. inoculation of rabbits) are carried out, owing to the current opinion in regard to the inconstancy of Negri bodies in positive cases of rabies and also because the material sent in is often unsuitably chosen or preserved.

It has hitherto been an accepted fact that the hippocampus is the seat of predilection of Negri bodies and this organ has, therefore, been almost exclusively employed for diagnostic purposes. Further, it has been widely recognised that the demonstration of Negri bodies in clinically positive cases in rabbits is by no means always possible (Kraus). It is certain that in a fairly large proportion of cases one fails entirely to find Negri bodies in the hippocampus, but this of course does not exclude the possibility of their being present in other parts. Neither does this view, in our opinion, take sufficient cognizance of inaccuracy dependent on variation in staining technique. Overstained sections are, in our experience, a source of error which deserves great emphasis. We have made a practice of restaining all material in which the absence of visible Negri bodies was considered due to this factor, with the result that on re-examination the diagnosis has frequently been reversed.

As a result of these difficulties we have attempted, by sectioning various portions of the nervous system, to determine whether Negri bodies cannot be demonstrated more constantly in parts other than the hippocampus.

Among the various parts of the brain and ganglia so examined, we have found only one of outstanding interest. This is the *nucleus oculomotorius* the midbrain. This nucleus is situated in the central grey matter of the brain stem, extending from the level of the anterior *corpora quadrigemina* to that of the posterior *corpora quadrigemina* ventral to the *iter* and close to the *formatio reticularis* and the mesial plane.

In the large motor nerve cells of this nucleus we have been able

to see Negri bodies in almost every instance in which they were present in the hippocampus, and also in a considerable number of cases in which they could not be found in the latter. They are usually present in greatest numbers at the level of the posterior colliculi, from which region, therefore, material for sections is most suitably selected.

In the midbrain, it may be noted, we often find Negri bodies in other situations, such as the *nucleus ruber* and the *substantia nigra*, but these are of quite subsidiary importance as compared with the *nucleus oculomotorius*. In the cerebellum the presence of Negri bodies is so inconstant that we have discontinued the cutting of sections from this organ.

The following table, giving the relative frequency of Negri bodies in the midbrain and hippocampus in a series of cases examined over a period of approximately five months, will show to what extent are justified the claims we make for the improvement of diagnosis. Cases in which suitable midbrain material was not available have been left out.

It must be understood that our data and the remarks based on them apply only to rabies in rabbits, and to the disease as encountered in South Africa. It is, of course, a possibility—albeit an unlikely one—that in this country we are dealing with a different strain of the virus, an opinion which, although supported by the distribution of the disease in nature, is, as pointed out by du Toit, contradicted by all other criteria.

RELATIVE FREQUENCY OF NEGRI BODIES IN CASES EXAMINED BETWEEN 3/4/30 AND 6/9/30.

Path. No.	Rabbit No.	Midbrain.	Hippocampus.	Pathological Diagnosis.	Clinical Diagnosis.
10170	140	**	—	P	P
10175	139	*	*	P	P
10199	144	—	—	N	D
10200	123	—	—	N	D
10218	130	—	—	N	D
10219	138	—	—	N	P
10226	133	—	—	N	D
10240	97	—	—	N	D
10241	100	—	—	N	D
10260	154	***	—	P	P
10264	153	**	—	P	P
10318	119	—	—	N	N
10320	162	***	*	P	P
10321	160	***	***	P	P
10328	164	***	***	P	P
10354	169	—	—	N	D
10359	166	—	—	N	D
10371	168	***	***	P	P
10372	170	****	**	P	P

10373	171	**	**	P	P
10374	136	—	—	N	D
10375	145	—	—	N	D
10392	156	*	—	P	P
10413	179	****	**	P	P
10414	178	****	**	P	P
10426	143	—	—	N	D
10427	180	***	**	P	P
10428	101	—	—	N	D
10443	187	**	*	P	P
10465	189	**	**	P	P
10467	201	**	**	P	P
10473	202	***	***	P	P
10474	191	***	***	P	P
10475	198	—	—	N	D
10476	137	—	—	N	D
10489	197	**	**	P	P
10490	102	—	—	N	D
10507	199	*	—	P	P
10509	141	—	—	N	D
10511	204	**	***	P	P
10512	207	****	***	P	P
10513	208	***	**	P	P
10521	203	**	**	P	P
10543	205	***	***	P	P
10548	200	—	—	N	D
10549	226	****	***	P	P
10561	220	*	—	P	P
10562	211	—	—	N	D
10563	229	**	**	P	P
10564	230	***	***	P	P
10565	225	***	***	P	P
10591	231	***	***	P	P
10592	232	****	***	P	P
10614	218	*	—	P	P
10615	227	—	**	P	P
10616	228	****	***	P	P
10617	237	**	**	P	P
10618	238	*	—	P	P
10652	239	***	***	P	P
10653	240	**	**	P	P
10654	246	*	—	P	P
10678	252	****	****	P	P
10679	245	**	—	P	P
10692	258	**	—	P	P
10693	250	****	**	P	P
10694	251	***	*	P	P
10695	259	****	****	P	P
10696	260	***	***	P	P
10747	268	—	—	N	N
10751	278	***	**	P	P

* Negri bodies rare.
** Negri bodies fairly frequent.
*** Negri bodies frequent.
**** Negri bodies very frequent.

P=Positive.
N=Negative.
D=Doubtful.

Total number of cases examined	70	
Clinically positive (x)	49	
Histologically positive	48	(98%)
Negri bodies more frequent in the midbrain than in the hippocampus	25	(51%)
Negri bodies more frequent in the hippocampus than in the midbrain	1	(2%)
Negri bodies absent from the hippocampus but present in the midbrain	11	(22%)
Negri bodies absent from the midbrain but present in the hippocampus	1	(2%)

From the above analysis of cases, we feel justified in claiming for the employment of midbrain sections:

(1) a large decrease in the percentage of inaccurate diagnosis (i.e. those cases in which the histological and the biological diagnosis are at variance);

(2) that the hippocampal sections can actually be dispensed with; and

(3) that much time and trouble in searching are saved, inasmuch as the Negri bodies in the midbrain are very often more frequent and often also larger than in the hippocampus.

TECHNIQUE.

For the purpose of this work we relied entirely on paraffin embedded sections. The brain is removed with as little laceration as possible and, after portions of the cerebrum and medulla have been taken for biological inoculations, dropped into a 10% solution of ordinary commercial formalin. When the material has become sufficiently hard to be handled, a slice about 2 to 3 mm. thick is cut transversely from the brain stem, so as to include the posterior colliculi (see fig. 5). Making the more posterior cut first, and thus removing the cerebellum, facilitates cutting vertically to the long axis of the brain stem. (The hippocampus was in all cases included for comparison).

The material is embedded in paraffin wax in the ordinary way, and sections cut to a thickness of about 5 μ. We find a distinct advantage in having several sections (4 to 6) from the same block on one glass slide. The chances that at least one of these will be stained to the correct shade are thereby increased. The great importance of the staining factor (see below) fully justifies the slight extra labour involved. Furthermore, the cutting of several sections at slightly different levels enables one to be certain that in one at least the "centre" of the oculomotor nucleus (i.e. that portion in which the cells are most numerous) will have been transected.

x The clinical diagnosis is based upon incubation period and course of disease as well as upon symptoms. Where animal dies within a period after inoculation inconsistent with rabies it is recorded as "doubtful."

For staining, a slight modification of Mann's method is followed throughout. Briefly, this consists in

(a) immersing the de-paraffinated and washed sections overnight at room temperature in the following freshly mixed solution:
35 cc. of a 1% aqueous solution of Methyl Blue*,
45 cc. of a 1% aqueous solution of Eosin.
100 cc. distilled water,
followed by
(b) washing in distilled water;
(c) absolute alcohol—½ min.;
(d) alkalinized alcohol (5 drops 1% KOH to 30 cc. alcohol)± 15 seconds;
(e) absolute alcohol;
(f) distilled water (until sections turn pale blue)± 5 seconds;
(g) absolute alcohol;
(h) xylol, mounting in Canada balsam.

The differentiation is a delicate operation and on it rests to a large extent the success of the staining. The correct procedure can be learnt only by experience.. The suitable preparation has typically a clear bluish-pink colour. In such a section the erythrocytes are of a bright reddish colour, the ganglion cells have deep bluish purple nuclei and fairly deep mauve-grey cytoplasm, while the rest of the cellular elements are pale blue. Success in demonstrating Negri bodies depends of course on the staining of the cytoplasm of the ganglion cells: this should have undergone just that degree of differentiation sufficient to allow the inclusion body to become visible through its substance without losing any intensity of colour.

With preparations such as these, the search for Negri bodies is greatly curtailed. The oculomotor nucleus is easily found and its whole extent can be covered rapidly owing to its restricted size. All that is necessary is to focus the small group of ganglion cells lying immediately below and on either side of the aqueduct (especially those in the neighbourhood of the small blood vessels which will be seen transected in this region), when, in the great majority of positive cases, Negri bodies will be found immediately. In cases in which the Negri bodies are rare and difficult to find, it may be advantageous to follow the motor cells ventralwards along the course of the fibres of origin of the third cranial nerve, or even to look in other parts, such as the *substantia nigra*.

Examination of the midbrain by the impression method has also been found satisfactory and will probably prove advantageous as a routine procedure where the material can be obtained in the fresh state.

Do the above peculiarities in the distribution of Negri bodies

* Not to be confused with Methylene Blue. Grübler's stains are used for preference.

apply only to the disease as encountered in South Africa? If the answer to this should prove to be in the affirmative, it would contribute valuable evidence that we are, after all, dealing with a different strain of the virus. If not, then we may expect that the method advocated above will facilitate the diagnosis of rabies in other parts of the world.

It is hoped to extend the scope of this work to include animals other than rabbits, especially the small veld carnivores with which we are concerned in this country.

We are greatly indebted to Mr. W. O. Neitz, B.V.Sc., of this Institute, for placing at our disposal much of his time and data regarding biological tests.

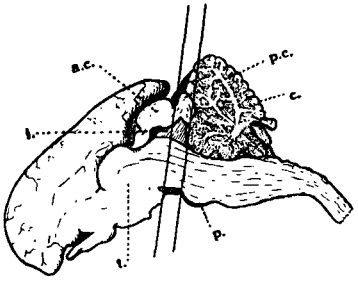


Fig. 5.—Brain of Rabbit. Mediam longitudinal section to show between the two parallel lines the portion of midbrain containing the oculomotor nucleus. a.c. anterior corp. quadr. p.c. posterior corp. quadr., i. iter, t., thalamus, p. pons, c. cerebellum. Natural size.

SUMMARY AND CONCLUSIONS.

(1) Attention is called to the constancy with which Negri bodies may be demonstrated in the oculomotor nucleus of rabbits affected with rabies.

(2) By the examination of midbrain sections at the level of the posterior *corpora quadrigemina* the proportion of incorrect diagnoses may be materially decreased.

(3) The midbrain in rabbits must be regarded as the seat of predilection of Negri bodies, so that hippocampal sections can be dispensed with in routine diagnosis.

(4) On account of the frequency and often the large size of Negri bodies in the midbrain and the ease with which the oculomotor nucleus is examined, the labour and time formerly spent in routine diagnosis are greatly reduced.

Since this article went to press, the following further improvements in technique have to be noted.

The best level at which to cut the midbrain section appears to be at the anterior extremity of the posterior *corpora quadrigemina*. At this point the *nucleus ruber* lies in the most dorsal part of the *formatio reticularis*, immediately below and against the *nucleus oculomotorius*.

A method for taking midbrain impressions which saves time in examination is as follows: The slice of midbrain having been cut out as shown in fig. 5, a small circular disc below the iter is punched out by means of a canula or cork borer having a diameter of about $\frac{1}{4}$ inch, and the impression taken from this. The field for examination is thus greatly reduced.

REFERENCES.

DU TOIT, P. J. (1929). Rabies in South Africa, *Proc. Pan-African Agric. & Vet. Conf.*, August, 1929.

KRAUS, R., GERLACH, F., & SCHWEINBURG, F. (1926). Lyssa bei Mensch und Tier. Urban & Schwarzenberg, Berlin.

JL S.AFR. VET. MED. ASSN.
1 (4) 1930.

Black Lung in Ruminants.

By R. A. ALEXANDER, B.Sc. (Agric.), B.V.Sc., Onderstepoort.

Any student of veterinary medicine in South Africa cannot be other than impressed by the lengthy list of apparently baffling and mysterious diseases, chiefly existing only in the minds of farmers and cattle breeders. As an instance one may mention the numerous possible conditions which are immediately brought to mind, when a cattleman ventures a diagnosis of Gallsickness in the case of a beast that has previously been reported by the herd boy to be "sick." When, however, the animal dies suddenly and an incomplete post-mortem examination reveals those pathological conditions on which a diagnosis of Black Lung is warranted, the farmer invariably fears that a disease, which has baffled veterinarians for all time, has made its unwelcome appearance in his herd of cattle or flock of sheep, and anticipates heavy mortality with no hope of applying any effective prophylactic measures.

Just as Gallsickness is the name given to a number of conditions which invariably show the same obvious anatomical abnormality on opening the abdominal cavity of the cadaver, namely an enlarged and distended gall bladder, no matter what the aetiological factor may be, so Black Lung is the name given to several diseases characterised by a sudden onset, rapid death and on post-mortem examination, a state of venous stasis or hyperaemia of the lungs easily recognised by their dark purple discoloration.

The use of the name appears to be confined to the Transkeian Territories, the Border, and the Eastern Districts of the Cape Province, where it is believed that Black Lung is a specific disease, more prevalent along the coastal belt, and generally credited with being the chief cause of mortality in cattle and sheep.

It is difficult to explain how this idea of the disease as a specific entity, has gained so firm a hold on the minds of a large and exceedingly progressive section of the farming community. References have been made to the disease in contributions to early numbers of the Agricultural Journal of the Cape of Good Hope, so that in all probability the term came into general use in the early days of the agricultural development of the Cape and has been handed down from father to son. It is noteworthy, however, that the Xosas recognise a distinct disease "Imipunga" meaning "a lung" to which Curson refers in his article on "Some little known South African poisonous plants and their effects on Stock" (1928). Possibly this name was

applied by the natives to those diseases where deviations from normal appearance of the lungs was a constant feature, and was freely translated, or differentiated from Contagious Bovine Pleuropneumonia, by the early settlers as Black Lung.

As a general rule those farmers who are credited with an intimate knowledge of the disease gained by experience are somewhat vague as to the clinical symptoms in affected animals and are usually unable to give a clear description of the morbid anatomy. Veterinarians have been singularly unfortunate in not being presented with opportunities of investigating typical cases when armed with the knowledge of South African diseases made available by intensive research in recent years. Briefly, it is believed that two forms exist:

(a) **Peracute form.** Invariably the animal is not noticed to have been ill and is either found dead in a secluded spot, or alternately suddenly goes down and after a period of agony lasting for only a few hours dies. Post-mortem examination then shows nothing but a dark, purple discoloration of the lungs.

(b) **The acute or subacute form.** Affected animals are noticed off colour, not feeding and separated from the remainder of the herd or flock. Symptoms of fever may or may not be present. There is grinding of the teeth, anxious expression of the eyes, and very often profuse salivation. Respirations are usually increased in frequency. In some cases animals go down, are semi-paralysed, more particularly in the hindquarters and unable to rise. Alternately there may be continuous more or less rapid staggering progression in circles, or there may be wild and dangerous excitability. Post-mortem examination reveals in such cases, in addition to the discoloration of the lungs, a variable hydropericardium and hydrothorax, haemorrhagic gastro-entiritis and in some cases a variable tumor splenis.

So indefinite and incomplete a description and history, coupled with a great diversity of opinion as to the existence of any pathognomonic, clinical symptoms or post-mortem findings, would at first sight seem to favour the opinion of the existence of some unknown infectious disease. However, an examination of the few cases presented and investigated from an epizootological aspect, has thrown a great deal of light on the problem.

(a) Without any doubt several severe outbreaks of Black Lung in cattle and sheep have been controlled effectively and rapidly by the use of efficient Anthrax vaccine.

(b) Regular conscientious dipping of all farm animals over a period of years has made the breeding of both large and small stock a profitable undertaking on farms which had received a notorious reputation of being badly infected with Black Lung.

(c) The practice of feeding bone meal in adequate amounts to cattle, and of providing salt, bone meal and tobacco for sheep has considerably reduced mortality throughout the area in question.

(d) The necessity of adopting sound methods of general animal management and the judicious camping of farms, in an endeavour to facilitate rotation of grazing in the eternal fight against internal parasites, has contributed also to the progressively lower death rate.

Examination of reputed cases of Black Lung have produced conflicting results. In a few cases microscopic examination has definitely shown the cause of death to be Anthrax. In the large majority of cases, however, a definite diagnosis from examination of blood smears has not been possible. Occasionally a definite diagnosis of Heartwater or Lamsiekte could be made from a fairly lucid clinical history, and a careful post-mortem examination, due attention being paid to the presence or absence of ticks, the existence of osteophagia amongst the stock and the discovery of putrid carcass material.

Consideration of these points, in spite of the absence of any definite experimental proof which it would obviously be practically impossible to obtain, leads one to venture the opinion that Black Lung is not a specific disease, infectious or otherwise, but is the local name applied to the peracute or acute forms of the following maladies:

1. Anthrax.
2. Heartwater.
3. Lamsiekte.

The peracute form of Redwater in cattle caused by the well known extremely virulent coastal strains of *Piroplasma bigeminum* may be an additional aetiological factor.

Finally, the undoubted prevalence of poisonous plants e.g. *Akocanthera venenata* gives strength to the assumption that numerous cases of vegetable poisoning pass unrecognised and in ignorance or for want of a better term are dubbed Black Lung.

CONCLUSION.

Black Lung is the local name applied in the Eastern Cape Province and the Transkei to peracute or acute cases of Anthrax, Heartwater, Lamsiekte, vegetable poisoning possibly of unknown aetiology, and in some cases Redwater.

JL.S.AFR. VET. MED. ASSN.
1 (4) 1930.

Studies in Native Animal Husbandry (*).

I. Notes on the Wankonde.

By H. H. CURSON, A. D. THOMAS and W. O. NEITZ,
Veterinary Research Laboratories, Onderstepoort.

INTRODUCTION.

With the rapid opening up of Africa, it is obvious that the primitive methods associated with native animal husbandry are being speedily replaced by European methods. The object of this series of studies is to place on record information bearing on any aspect of live-stock farming which will be of interest to veterinarians, especially those whose duties bring them into contact with natives as yet uninfluenced by civilisation. It is, however, extraordinary to what extent use is being made to-day of European goods, utensils, etc.

It should be a function of the State to preserve such tribal material and to instruct civil servants, especially magistrates, police officials, doctors and veterinarians regarding native customs; but this study will probably be taken up seriously only when it is too late!

The various types of indigenous cattle in South Africa have received no attention in the past, in fact the time has gone when detailed investigations can be undertaken. Had improvement by selection been adopted in the early days of the various Colonial Departments of Agriculture, the advantages would by now have been evident and the farming community would be benefitting, but what is there to show? Nothing! All credit is therefore due to the Director of Native Agriculture (R. W. Thornton), who although only appointed in 1929 has already made a beginning in the selection and breeding of Zulu cattle.

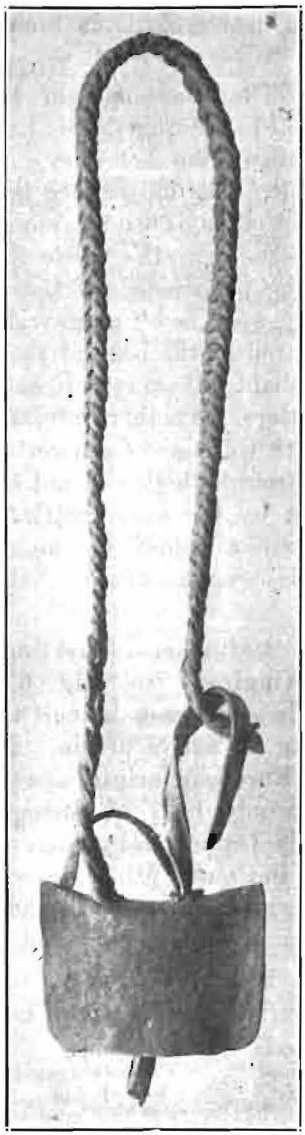


Fig. 6. Wankonde Cattle Bell.

* See File 258/254, Vet.-Res. Laboratories, Onderstepoort.

In India, the Sahiwal or Montgomery type of Zebu has, in 25 years at the Ferozepore farm, been improved by selection to such an extent that " to-day the average yearly milk-yield of that herd approximates to 9,000 lbs. or more per cow." (1st Quarterly Bull. Imp. Bur. Animal Genetics, p. 5, 1929).

It is hoped that not only veterinarians, both of the Union and neighbouring territories, but also others interested in native stock farming will contribute to this series of studies; for as indicated above, our object is to prevent that neglect which has characterised research into native cattle in South Africa.

Notes on the Wankonde.

The Wankonde or Wanyatyusa, a tribe inhabiting the country immediately north of Lake Nyasa, west of the Livingstone Range (Tanganyika Territory), is one of the most skilled in cattle management. The local breed is of Zebu strain and more care is taken of the stock than is usual among native tribes. Owing to the high rainfall in the area, the cattle are housed, a portion of the family dwelling being partitioned off for that purpose. One of us (H. H. C.) has not only seen bedding provided, but also the manure taken out and deposited at the base of the banana trees which flourish in that country. Probably these practices have been adopted from the early German settlers. Another interesting custom is the administration of saline earth (obtained from certain salt " vleis " or marshes) which is placed in troughs hollowed out of logs, mixed with water ready for consumption by the eager cattle. Some owners will travel long distances to obtain a supply of the saline earth, thus indicating an intelligence and care surpassing that of many European farmers.

Cattle Bells.

A further interesting custom is the wearing of cattle bells or " Kingire " (see Fig. 6, which is reduced to approximately 1/3rd). It is sometimes difficult to determine whether cattle bells are of European or native origin. In South Africa it seems clear that they are of European origin and were later adopted by the natives who now use only bells of European pattern. The Wankonde, however, use bells fashioned by their own blacksmiths, who obtain iron from ore by the most primitive methods. The bell is worn in bush country chiefly to attract the attention of the herd-boy, but even in open country it will be found worn usually by a favourite cow.

Below is given a list of the more common Nkonde words which may be of use to veterinarians(1):

Abscess	ilipu	Back	injuma
Animal	ikinyamana	Bark to (verb)	kema
Arm	ikiboko, ulukongi	Bite to (verb)	luma
Arm, left	ikimama	Bell	kingiri, ilibangala
Arm, right	ikilasilo	Bleat to (verb)	meta

(1) Taken mainly from C. Schumann's "Grundriss Einer Grammatik Der Kondesprache." 1899. Reichsdruckerei, Berlin.

Blister	ilitulundu
Blood	ililopa
Body	umbili
Boil	indundu
Bone	ikifupa
Bovine	inombe
Brain	ubongo
Bug	ingunguni
Bull	ingambaku
Butter	uluketa
Calf	ingwata
Calve to (verb)	beka
Cackle to (verb)	ana
Carcase	umfimba
Cat	nyalu
Cattle path	iligulumbilo
Chest	ikipambaga
Chin	ikile-fu
Cock	ingongobe
Claw	ikyuga
Comb of cock	uluhuhu
Cow	ingolombe
Cow (sterile)	indata
Cough	ulukosomolo
Cough to (verb)	kosomola
Cream	uluketa
Diaphragm	amanona
Disease (contagious)	imbungu
Disease of cattle as result of in-breeding	ikitasya
Doctor	unganga
Dog	imbwa
Duck	ilibata
Dung (cow)	indope
Ear	imbulukutu
East Coast Fever	matussi (amatuse)
Egg	ilifumbi
Entrails	ubula
Epistaxis	ilinoge
Eyes	amaso
Face	amaso
Fat	amafuta
Feather	ilijoja
Feed to (verb)	swela
Fever	akakinya
Flea	imbani
Fly	imbwele
Fly to (verb)	pululuka
Food	imfindu umpipi
Footprint	umpuso
Fowl	inguku
Fowl basket	ikipagasa
Fowl crop	unsokelo
Fowl faeces	amasusu
Fowl nest	ikitele
Furuncle	ilylulu
Gall	inyongo
Gaskin	ilikeno
Goat	umbene
Goat he-	,, imbonge
Goat she-	,, imbeki
Goose	ilisekwa
Grass (young)	indeka
Grass, broad	ulusanu
Grass, long	ulusundje
Grass fire	ulupya
Grass Jungle	ikikome
Grass veld, after being burnt	ikisugujila
Hair	ulusyoja
Hand	ikiboko
Heal	bumbulusya, gangula
Hear to (verb)	pilika
Heart	indumbula
Healthy	gona
Heifer	indama
Heifer, small	akalama
Hen (young)	indemba
Hen (old)	ingolokoko
Hoof	ikyuga
Horn	ulupembe
Hunger	indjola
Hunger to (verb)	fwa indjala
Kaffircorn, red	imbila
Kaffircorn, white	ilipemba
Kid to (verb)	beka
Kidney	ulufigo
Knee	ilifundo
Lamb to (verb)	beka
Leg, lower part, in stock	ikibondo
Lip	undomo
Liver	ikinie
Louse	ingolo
Low to (verb)	brina
Lung	amabagaja
Maize	ifilombe
Meat	inyama
Medicine	unkota
Medicine, fluid	imbosya
Medicine, powder	imbondanya
Milk	ulukama
Milk calabash	ulukekwa
Milk colostral	ulumyoso
Milk curd	ulusuje
Milk, freshly curdled	umwalo
Milk, the first	ikisenya, ikitwa
Millet	ilisese
Monkey-nut	ilisyabala
Mosquito	imbwele
Navel	ilitumbu
Neck	amakosi
Nose	imbulo
Owner of a cow	umwene nombe
Ox	ingambuka
Pain on navel	ulundu
Paralysed	lemala
Pasturage	ulukubo
Patella	ingata
Period of disease	ulubine
Perspiration	amafuku
Perspire, to (verb)	tunganyila

Pig	ingulube
Pigeon	ingunda
Place where cattle stand in stable	ulwama
Poor	ganda
Post for fastening cattle	ikikingi
Pupilla	imboni
Pus	amafila
Pus in the eye	amatiti
Rib	ulubafu
Riem	ulukoba
Root	unsi
Saliva	amata
Salt (fine)	undasi
Salt (common)	imyunya
Salt (Glauber's)	ikilambo
Salve	inyemba
Scar	ilikoko
Sheep	inosi
Sheep (small)	akanosi
Sheep (ewe)	inosi imbeki
Sheep (ram)	inosi imbongo
Shoulder	ikibeja
Sick	bina
Sinew	ulukole; ikisipa
Skin	ingubo
Skin (disease in cattle)	saria
Skin (dry)	umpapa
Skin (fresh)	ikikanda
Skin (flesh side)	ubunyama
Skin (hair side)	ubusyoja
Skull	ulupaja
Slaughter to (verb)	bola
Sneeze	tyemula
Spleen	ilibengwe
Stable	ikibaga; ilihebe
Stable to (verb)	fufya
Stomach	ulwanda
String made of sinew	ikisipa
Swallow to (verb)	mila
Swelling of ear glands	amatuse
Switch of cow tail	isandja
Tail	ubuswigala
Tail (goat)	umpepe
Tail (sheep)	umpepe
Tail (long)	unkwimbili
Teat	inyato
Tears	ilisosi
Thirst	ikyumilwa
Thirst to (verb)	umilwa
Throat	ummilo; ingolomelo
Tibia	ulusogolo
Tick	inqulupi
Tooth	ilino
Tongue	ululimi
Tsetse fly	ilisasi
Udder	ulusese
Upper-jaw of cow	ikikeno
Vein	ulukole
Wart	ulusundo
Water	amesi
Whey	amasulu
Wing	ilipiko
Witchcraft	ubulosi
Wound	ilipu
Wrist	ikiputo

Anatomical Studies, No. 22: An Anomaly in the Pectoral Region of a Horse.

By A. R. THIEL, Faculty of Veterinary Science, T.U.C., Pretoria.

While dissecting at the end of March 1930, the pectoral region of an aged brown horse (gelding) 18228, obtained from the South African Police, Ermelo, on 29/9/26, the anomaly referred to above was encountered.

Externally, owing to the good condition of the animal, nothing unusual was seen, except that the right anterior superficial pectoral

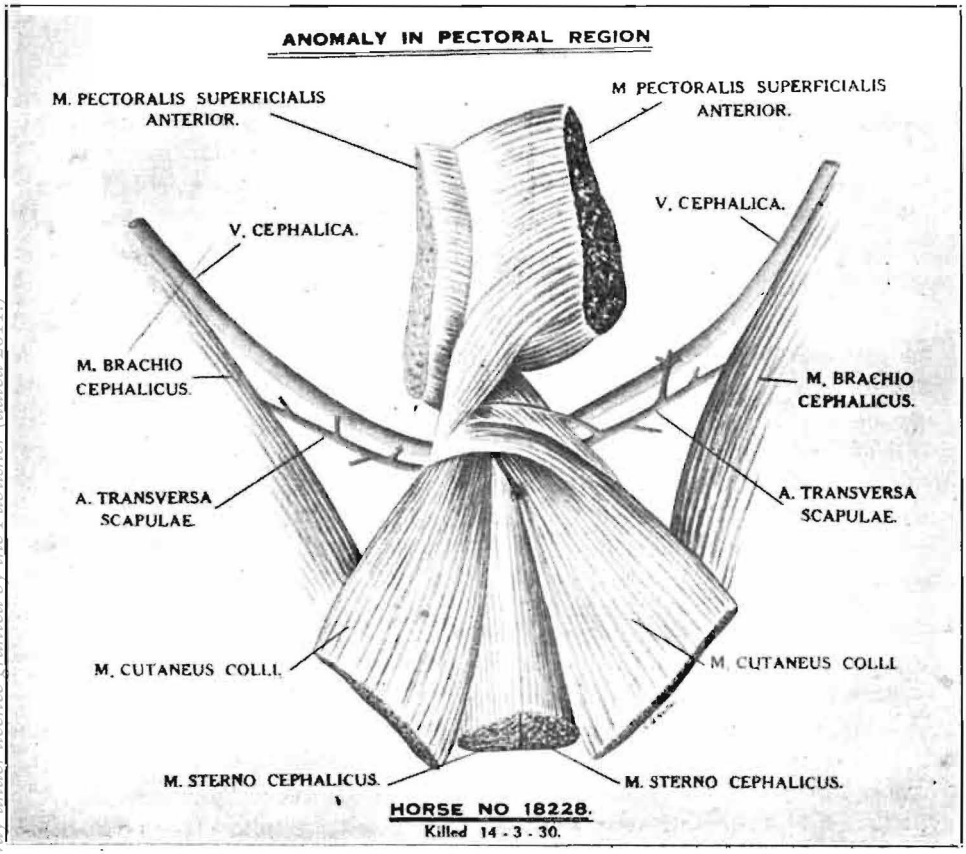


Fig. 7

muscle appeared better developed than the corresponding muscle of the opposite side.

On removal of the skin, however, the following abnormalities (see Fig. 7) were observed:—

(a) Not only was the right anterior superficial pectoral muscle better developed, as indicated above, but a strong bundle of muscular fibres, taking origin from the cutaneous muscle (*M. cutaneous colli*) of the opposite side became incorporated in its substance.

(b) The *M. cutaneus colli*) of the right side, broader than that of the left, also received a strong band of muscular fibres from the left cutaneous muscle, the origin in both cases being identical.

Anomalies of the cervical muscles are, of course, well known and are associated with irregularities of the myotomes during morphogenesis.

REFERENCE.

CLAPHAM, W. S.B. (1929). An unusual feature of the musculature of the shoulder in a donkey. *Vet. Rec. IX. p. 60* (*26/1/29*).

The International Microbiological Congress.

The first International Microbiological Congress was held in Paris from 20th to 25th July, 1930. Being the first of its kind to be held, the congress was naturally somewhat experimental in its scope, but proved to be a great success. The delegates and members present totalled close on five hundred and the lecture halls at the Pasteur Institute were taxed to the limit of their capacity.

The congress office at the Pasteur Institute was open on the afternoon of the 20th July for members to register and receive their papers, but the actual work of the congress did not commence until the morning of the 21st. The opening meeting was held in the large lecture hall of the Pasteur Institute. Professor Jules Bordet was elected president of the congress and it is only just to mention that his tact and diplomacy, associated with his charming personality, contributed very greatly towards the success of the meeting.

Dr. Roux, Director of the Pasteur Institute, was unable to be present owing to illness. Associated with Professor Bordet on the dais were a number of famous microbiologists of whom one may mention Calmette and Martin, Pfeiffer, Neisser, Madsen (Denmark), Sanarelli and Sir Almroth Wright. The opening addresses were naturally all of a general nature, mainly expressions of international good feeling. Wright caused much amusement by quoting an anecdote about nightingales, a story with a moral much to the point in modern science. In brief it was as follows: A man had a nightingale which sang beautifully, but it died and wishing to replace it, he went to a dealer. The dealer, however, had no nightingales but only eggs. He could not guarantee that any egg would hatch or if it did that it would produce a singer. The man, therefore, departed sadly. The moral of this story is of course obvious.

After the opening meeting an adjournment was made to visit the tomb of Pasteur, a most impressive sight. During the remainder of the week, special general meetings were held in the mornings, attended by all members, and sectional meetings for different subjects were held in the afternoons and before the general meetings in the mornings. From the veterinary point of view there was much of interest in the congress though naturally much time was devoted to subjects of chiefly medical interest such as diphtheria, scarlet fever and variolas.

The afternoon of the 22nd July was devoted to the subject of the relationship of the causal organisms of Malta Fever and Bovine Contagious Abortion. Professor Vallée of Alfort presided. It cannot be said that the discussion produced any new ideas, but it certainly aired the views of workers of all nations on this thorny subject, and one was left with the impression that, with our present methods of research, it will be difficult to reach any finality.

On Thursday morning the 24th, Prof. Calmette gave an address occupying an hour, on the B.C.G. vaccine. The address was well received but no discussion was allowed after it. Later in the day at a sectional meeting some discussion took place, and it was fairly obvious that opinions were not entirely unanimous in favour of the value of the vaccine. Watson of Canada mentioned his unsatisfactory experience with it, but one of the most convincing bits of evidence as to its possible danger was given by Petroff, an American worker. He stated that he had been able to cultivate virulent and partially virulent strains of tubercle bacilli from cultures of B.C.G. strains sent to him from Paris. His practical demonstration of his cultures was certainly very convincing. Calmette's experience with the inoculation of 200,000 children would certainly seem to show that the vaccine is harmless. The Lübeck catastrophe is now explained as an accidental contamination with a virulent strain of the tubercle bacillus. The onlooker is, however, left with the impression that such gross carelessness is almost incredible.

Excellent demonstrations were given by Wright and his co-workers on serological technique and by Nuttall and his colleagues on protozoology. The latter included a demonstration of the life history of *Tryp. grayi* of the crocodile with the cycle in the tsetse. This parasite caused much confusion in evaluating the part played by tsetse flies as intermediate hosts of trypanosomes. Very fine demonstrations were given by Professor Langeron on fungi and diseases caused by them, and an excellent address on immunity in worm infections was given by Professor Fülleborn of Hamburg. In association with this address, a series of films illustrating the life histories of *bilharziella, fasciola hepatica, ascaris suis* and *bothriocephalus* were shown. These films

were unusually good and serve to show what the possibilities of the cinema film are from the educational point of view.

A subject which was discussed at considerable length was that of yellow fever. Dr. Sawyer from New York and Dr. Hindle from London were the chief speakers. The idea of the spirochaetal origin of the disease has now definitely been dropped and the virus has reverted to the former classification as an ultra-visible, filterable virus. The results from the use of vaccines were very promising. It may be of interest to mention that Dr. Max Theiler's method of transmitting the disease to white mice by intradural inoculation may greatly facilitate future research.

The subject of tissue culture received a good deal of attention, and Dr. Carrel of the Rockefeller Institute, New York, was present and demonstrated.

The congress closed on Friday, 26th July, but a visit was paid on Saturday to the serum institute at Garche.

Amongst the members of the congress were a large number of veterinarians many of them well known to South African research workers. One has only to mention Leclainche and Vallée, Donatien, Velu and Lestoquard (France), Miessner (Germany), Oluf Bang (Copenhagen), and Watson (Canada). Sir Arnold Theiler, Dr. P. J. du Toit and the writer were present as members, there being no official representative of South Africa. It is possible that, as a result of the congress, branches will be formed in all countries and South Africa will have its own local branch.

Looking at the meeting in retrospect one has the feeling that it was a great privilege to have attended it. Seeing and meeting so many famous men was in itself an inspiration. As with all congresses, the chief value is not so much the subject matter under discussion as the association of so many people with common interests, and it is in the private discussions between meetings and after, that the real value of such congresses makes itself evident.

E. M. R.

The International Veterinary Congress.

The Eleventh International Veterinary Congress was held in London from 4th to 9th August, 1930. The meetings took place in the Central Hall, Westminster, a very suitable place for the purpose, with its large central hall and its several smaller ones for sectional meetings. It was sixteen years since the previous congress had been held and this had been broken up owing to the outbreak of the Great War. On that account it was decided to hold the present congress in London again. It is a sign of the times and that international feeling has greatly

improved, that it has been possible to hold several international conferences recently. There is no doubt that these conferences have done much to remove distrust and to improve international relationships generally.

The congress was opened on Monday morning, the 4th of August, and as an act of courtesy to Great Britain, and in view of his great services to veterinary science, Sir John MacFadyean was elected president for the meeting of 1930. Lord Harewood addressed the congress as representative of the King, and mentioned the bad state into which the London Veterinary College had been allowed to fall. The writer paid a personal visit to the College and was very much depressed by it. It seems, however, impossible to get the money for rebuilding unless the state is prepared to shoulder the bulk of the expense, and even then the desirability of rebuilding on the present site is questionable. Lord Harewood's address was followed by those of the president and delegates. It is here that one may be permitted to express the opinion that a mistake was made in not getting one delegate of international repute such as Professor Hutyra for instance, to reply on behalf of the delegates. As it was, nearly two hours were spent in needless repetition of similar sentiments.

The proceedings were so arranged that the general meetings were held in the mornings and the special sectional meetings in the afternoons. Owing to the great variety of subjects treated, these sectional meetings were necessary and even then many members found it difficult to attend all the addresses they would have wished to.

Of the subjects dealt with in the general meetings the most important were Foot and Mouth Disease, vaccination against Tuberculosis, and the control of Bovine Contagious Abortion.

On the first subject the leading authorities such as Vallée of France and Waldmann of Germany gave their views. The importance of the plurality of the virus was emphasized but nothing new was brought up. Lignières of the Argentine, after giving his views, stated that he had a method of inoculation which he had not yet described but which he wished a committee of the congress to investigate. The congress decided that this could not be entertained unless the method was described in detail and supported by experimental evidence sufficient to warrant the congress making any move in that direction.

A very long, and at times rather acrimonious debate was produced by the subject of vaccination against Tuberculosis by the B.C.G. (Calmette-Guerin) method. The debate had to be extended to the next day to give all the speakers a chance to air their views. Guerin described the method and gave experimental details. Ascoli spoke in support of the value of the vaccine. The chief opposition came from the Canadian delegate Watson, who stated that he had found the ino-

culation to be potentially dangerous. He stated that he had found virulent tubercle bacilli in the local abscesses formed by the vaccination and that virulent tubercle bacilli had been found in the milk of cows which had been vaccinated as calves. The evidence of Petroff given to the Microbiological Congress in Paris, that one might find virulent tubercle bacilli amongst the attenuated ones in B.C.G. vaccine supports Watson's contentions. The debate centred round the questions as to (1) whether the vaccine was or was not harmless, (2) whether it produced immunity, and (3) whether it was a suitable method to apply in veterinary practice.

As regards the first point the evidence of Calmette in the cases of 200,000 children would seem to show that it is usually harmless and in veterinary experience most investigators have not had bad results. One must, however, take note of Watson's experience and regard it as quite possible to produce the disease by vaccination.

On the second point the evidence as to the length of time immunity lasts is uncertain, and it would seem that it may be necessary to inoculate several times at intervals of a few months.

On the last point opinions differed, but the American and Canadian veterinarians were strongly opposed to the general introduction of the vaccine, holding that their experience with the accredited herd system warrants its continuation. In many European countries where the incidence of tuberculosis in dairy herds is anything from 25 to 40% there is a feeling that B.C.G. inoculation might be used as the position is somewhat hopeless, and that it would be useless to attempt the eradication by testing, as a depletion of the herds by 30%, unless results could be guaranteed, would be an impossible undertaking. From the South African point of view, with the comparatively low incidence of bovine tuberculosis, there is no doubt that something on the lines of the accredited herd system should be adopted. The use of a living vaccine such as B.C.G. amounts to a confession of failure to combat the disease by other means and by some would be regarded as a retrograde step.

The discussion on the control of Bovine Contagious Abortion did not bring forth much new, but an interesting account of an outbreak of contagious abortion in pigs in Denmark was given by Thomsen of Copenhagen. A resolution was passed to the effect that the eradication of the disease by methods based on serological tests of herds, should be attempted in all countries.

In the sectional meetings there were very many interesting discussions, and one may mention in particular those on Rinderpest, Theileriases, control of Trypanosomiases and Distemper inoculation. Poultry diseases came in for a great deal of discussion, occupying two sectional meetings. It is of interest to note that some of the German

investigators consider that Fowl Typhoid and White Diarrhoea of chickens are identical, the evidence being based mainly on the similarity of the causal organisms. With regard to Fowl Pox, Doyle claimed good results for vaccination against the disease by means of pigeon pox virus, though the immunity conferred was of short duration.

The paper by Dr. P. J. du Toit on Theileriases was well received and a good discussion on the subject took place. At one sectional meeting deficiency diseases were discussed, the subject of Rickets occupying most of the time. It was evident from the discussion that not much work is being done on these diseases and that the work done in South Africa compares more than favourably with that done elsewhere.

In reviewing the subject matter under discussion at the congress one was struck by a few weaknesses in the arrangements. No adequate time was allowed or arranged for a discussion on the filterable viruses in general. Apart from a discussion on vaccination against Blackquarter in calves, no time at all was devoted to diseases caused by anaerobic bacteria. It is obvious that for the next congress, which is to meet in the United States in 1934, the arrangements will have to be commenced at least two years beforehand, and the committee will have to go very thoroughly into the question of subject matter for discussion, and the best reporters will have to be asked to open the debates on the various subjects. At the recent congress many papers were never received in time for printing, and half of them were only distributed at the congress itself.

Much of the success of the congress was due to the secretary, Dr. de Blieck, and to Professor Buxton, the local secretary. One could not help being struck by the facility with which many of the European delegates were able to address the congress in two or three languages, Dr. de Blieck for instance, though his native language is Dutch, addressed members in English, French and German with the utmost ease. Much of the time of the congress was wasted on translations of speeches into the other official languages and one was struck by the need for some kind of international language, failing which children should at least be taught to understand French, German and English. Receptions were held for delegates and members at the Mayfair Hotel, Piccadilly, at the Natural History Museum, South Kensington, and by the Lord Mayor of London in the Guild Hall. The latter reception was most impressive and will long be remembered by those present. A congress dinner was held in the Connaught Rooms in the Kingsway and was a great success.

In all, 62 countries were represented at the congress and many eminent veterinarians from different countries were present. To men-

tion only a few, there were present from Germany, von Ostertag, Zwick, Miessner, Waldmann; from France, Leclainche, Vallée, Lestoquard and Velu; from Denmark, O. Bang and Thomsen; from Norway, Holth; from Holland, de Blieck; from the United States, Mohler and Eickhorn; and from England, all the prominent men. Many members from the British dependencies were there, such as Walker from Kenya, Kennedy and Bennett from the Sudan, Mettam from Uganda and numerous others. Seddon from Australia was present. South Africa was represented by Dr. P. J. du Toit as official delegate and Mr. J. Spreull represented the South African Veterinary Medical Association. Mr. Howie and the writer were present as ordinary members.

Looking back at the congress, one cannot but feel that such meetings do a great deal of good. To meet men with world-wide reputations and to discuss problems with them is indeed a privilege. It will interest the members of the South African Veterinary Medical Association to know that Sir Arnold Theiler was present and took part in many discussions and presided at some sectional meetings. His general health has improved and he hopes to commence work on some research problems again very soon and will probably visit South Africa again in the course of the next two years.

The next International Congress will take place in the United States in 1934, probably at Boston. In view of the expense of travelling to the United States, it is likely that some kind of grant will have to be obtained in that country to assist some members, apart from official delegates, to attend. Unless this is done it is difficult to see how many people apart from American members will be able to attend. E. M. R.

Impressions in Europe and America while on Study Leave 1929-1930.

By Dr. GILLES DE KOCK, Onderstepoort.

October, November, and December 1929 were spent with Professor Ludwig Aschoff at the Pathological Institute of the Freiburg University, Breisgau, Germany. Professor Aschoff is regarded as one of the most eminent Pathologists of Germany, especially in respect of Pathological Anatomy and experimental Pathology. Unfortunately shortage of funds in Germany is hampering and curtailing the magnificent research work that has been emanating from the Freiburg Institute.

His interests in Pathology are varied but a great deal of intensive research work has been, and is being, conducted into the reticulo-endothelial system (with which his name is so closely associated), the structure and function of the spleen, lymphoid tissue, and organs of

internal secretion. These morphological and experimental studies are amplified very profitably by pathological physiological observations, especially in respect of the question of cholesterin and other lipoids, and the pigments of the body. Various Onderstepoort problems were discussed with him from time to time and research work was commenced to attempt to explain the true nature and function of the haemo-lymph glands especially in ruminants. It was thought that in this way we may be able to understand the origin and purpose of those haemo-lymphoid-like nodules described by me in cases of splenectomised ruminants.

Aschoff was satisfied that the proliferations in the alveoli of lungs of sheep affected with Jaagsiekte, could be interpreted as a type of papilliform cyst-adenoma, directly derived either from the bronchiolar or alveolar epithelium. In Leipzig I had the opportunity of studying many section of verminous pneumonia, and I was satisfied that the epithelial proliferations in that disease were entirely of a different nature. Jaagsiekte in sheep presents extremely interesting features for the study of neoplasms, especially in respect of the causation and the susceptibility of the sheep. At the Rockefeller Institute for Medical Research in New York I had an opportunity of studying the incidence of spontaneous lung tumours in mice. It was found that these neoplasms in mice, structurally closely resembled the papilliform

Sir Arnold and Lady Theiler.

cyst-adenomata of Jaagsiekte. These tumours occur only in certain strains of mice, and it was found that the incidence of these tumours could be greatly increased by the inclusion of certain substances in

their diets (e.g. coal tar oil). Experiments are still proceeding to ascertain whether the coal tar oil influences the susceptibility of mice to these neoplasms, or whether it is a direct irritant. These comparative studies are of great importance and may throw light on the etiology of these tumours in sheep and in mice.

Jaagsiekte in sheep furthermore, presents material which would be of great help in elucidating the true nature of the alveolar lining. Many authorities are inclined to believe that there is no true epithelial lining in the alveolus of the adult lung. By intravital and supravital staining of the lungs of early cases of Jaagsiekte, it may thus be possible to show that some of the cyst-adenomata in the lung, at any rate, are derived from a tissue which could only be interpreted as epithelial in nature.

During the winter recess I was afforded an opportunity of visiting Sir Arnold and Lady Theiler in Florence, Italy. Both were looking remarkably well, and Sir Arnold has lost nothing of his tremendous interest and enthusiasm for veterinary problems in South Africa. The discussions with him were most stimulating and helpful, and his profound knowledge of various aspects of research pertaining to animal diseases amazed me. He is making such a thorough study of the pathology of aphosphorosis in bovines that the work is bound to become a classic. Sir Arnold and Lady Theiler have not lost the art of entertaining, and the few days spent with them were not only of great educational value, but most enjoyable.

January and February 1930 were spent in the Pathological Institute of the Veterinary Faculty in Leipzig. The Director, Professor Nieberle, is mainly interested in the pathogenesis of tuberculosis in domestic animals, and is inclined to follow the teaching of Heubschmann. He has published several interesting articles about the **three** forms of tuberculosis in Bovines:—

(a) Primary complex;
(b) Generalised tuberculosis in calves;
(c) Chronic lung tuberculosis.

One feels that this question should be closely followed, especially at our large abattoirs in South Africa, in order to confirm this work of Nieberle.

Leucosis of the lymphatic aleucaemic type in fowls, formed the bulk of the post-mortems at that Institute. In this respect it is interesting to note that no cases of neurolymphomatosis (fowl paralysis) have come to their notice and this would indicate that there is after all no association between these two diseases.

March, April, May and June 1930 were spent in the Department of Experimental Surgery (Director Dr. Carrel) of the Rockefeller

Institute for Medical Research, New York. The main object of the visit was to become fully acquainted with the technique of tissue culture which had been in progress in that department since 1911. During the past years the method of tissue culture has been progressively adapted to the requirements of physiological research. Carrel has mainly been responsible for the elaborate techniques dealing with the cultivation of cells of a given type in media of constant composition and under such conditions that the rate of growth can even be measured.

The more important steps have been the isolation of pure strains of fibroblasts, epithelial cells and monocytes; the discovery of embryonic tissue juices for promoting unlimited proliferation of certain cells. Attempts have been made to reduce complex phenomena to simpler phases, and bring to light some of the underlying principles. These studies have led to the discovery of some previously unknown properties of the tumours and cells of the body. The pure cultures of fibroblasts which have been grown in vitro for nearly eighteen years, grow as a dense tissue which doubles its volume in about 48 hours. Since we are now able to cultivate pure strains of tissue cells indefinitely, we know that the cells under the conditions of the experiment remain typical and retain their morphological characteristics throughout the entire period of cultivation. Incidentally it may be mentioned that the Rockefeller Technique for tissue culture has been introduced by me at Onderstepoort, and cultures of macrophages and fibroblasts have been prepared.

Tissue culture lends itself admirably to the study of malignant cells. It is certain that tumours practically always occur at the site of chronic irritation, sarcoma during youth, and carcinoma during old age. These observations indicate that two factors are necessary for the production of cancer, viz. local irritation together with certain conditions of the tissues and humours, which have become irritated. We have to discover by what process a group of cells acquires the power to proliferate indefinitely amongst the dormant tissues of the adult animal. Much of the progress made recently in the knowledge of malignant cells, has been brought about by this new method of research.

The specific elements of tumours can be studied while living in an independent state outside the organisms, e.g. their rate of growth, the manner in which they modify the medium, their secretions, their food requirements, etc. Malignancy may coexist with a healthy state of the cells. Malignant cells are almost as law-abiding as normal tissue elements, but it was found that they differ from normal cells chiefly in their food requirements. They do not possess an inherent growth energy greater than the normal, but merely a greater aptitude to feed on the substances of the body.

Recently, tissue cultures have been made use of extensively in the study of the influence of living tissues on viruses. Vaccinia virus is capable of multiplying in cultures of susceptible tissues. The reproduction in vitro of the active virus of Rous Sarcoma depends on the presence of fresh tissues in the culture and upon the quantity, the activity, and the nature of the cells contained in the medium. Characteristic vaccinial and herpetic intracellular changes regularly occur in infected rabbit corneas cultivated in vitro.

One subject of very great importance in the laboratory of Dr. Carrel was the cinematographic records of cell locomotion and the movements of protoplasmic inclusions, etc. By this process cells of the blood presented very specific movements, e.g. the monocytes or macrophages revealed extremely delicate but extensive membranes, the polymorphs progressed by means of pseudopodia, whereas lymphocytes showed sharp, jerky movements across the field.

In the same department of the Rockefeller Institute an extensive study is made to ascertain the influence of various diets on the incidence of infection, neoplasms and neurosis. For this purpose about 12,000 mice are utilised and it is an education in itself to see how these animals are fed, handled and housed. The recording of various data is done on suitable cards capable of being punched and classified rapidly by an electrically driven machine.

I was also given an opportunity to study the leucocytes in a large number of mice of different strains, different ages, on different diets, both culturally, supravitally and in fixed preparations, and a report of the findings will appear in the Journal of Experimental Medicine.

The activities of other departments were also closely followed, e.g. the effect of cataphoresis on viruses. Under ordinary conditions of hydrogen ion concentration the virus of poliomyelitis migrates in an electrical field to the anode. It follows therefore that this virus bears an electro-negative charge. By means of cataphoresis the virus can therefore be recovered from a non-infective mixture of virus and specific immune serum. This type of investigation should open up a very wide field of investigation at Onderstepoort especially with regard to many of our virus diseases.

The Department of Animal Pathology at Princeton, directed by Dr. Theobald Smith from its beginning to the present time, was visited, and great interest was shown by Dr. Theobald Smith and other colleagues in the lecture on splenectomy given by me. In addition to the provision for the various branches of bacteriology and parasitology, divisions of physiology, biochemistry, and genetics, have been established at Princeton, and the activities of these Departments are correlated with those of the Rockefeller Institute in New York.

Besides the Rockefeller Institute, other laboratories in New York, Philadelphia, and Baltimore were visited. At the Royal College of Surgeons, Columbia University, New York, a long discussion took place with Pappenheimer and Richter, who are inclined to believe that they have transmitted *neurolymphomatosis gallinarum* in spite of the fact that a small percentage of their controls contracted the disease.

Richter who had interested himself in *Leucaemia of mice* was of opinion that he had transmitted that disease to mice by blood inoculation, but the evidence of Furth, working under Opie at the Phipps Institute, Philadelphia, seems to be more convincing. Furth was able to propagate the disease by intravenous injection of blood in strains of mice believed to be free from leucaemia. Furth also studied the leucaemia of fowls and he was able to transmit cases of myeloid leucaemia and anaemia (erythro-leucosis of Ellermann). Ellerman's claim that the same transmissible agent may cause myeloid as well as lymphoid leucaemia is not well supported by him. This fact is of great importance to our investigations in South Africa where the lymphoid type is the dominant form of leucaemia. So far only one authentic case of anaemia (or erythro-leucosis) has been observed at Onderstepoort.

The tissue culture methods of Professor Warren Lewis, Department of Embryology, John Hopkins University, Baltimore, were observed in that institute and the multiplication of macrophages from the " buffy coat " of a child's blood was demonstrated.

I was also afforded an opportunity to study the functions of the U.S. Bureau of Animal Industry at Washington. The Bureau of Animal Industry is part of the U.S.A. Department of Agriculture. It is charged with the building up and protecting of the livestock industry in the United States and includes the eradication of animal diseases. Coupled with these activities are extensive experimentation on farms, research work in Laboratories of Agricultural Colleges and Universities, and the application of control measures in the field. A further measure is the inspection of imported animals and the supervision of those exported. Experiments in breeding are conducted, and inspection is maintained at all large slaughtering establishments, etc.

The following are the different Divisions of the Bureau:—

1. Animal Husbandry Division. Its work consists chiefly of research in Animal husbandry, which includes breeding, feeding and management of domestic farm animals and poultry, and a study of their products.

2. Biochemic Division conducts research work concerning various diseases and upon the wholesomeness and nutritive value of meat.

3. At the Experiment Station located at Bethesda, Maryland,

studies are mainly made concerning the cause, character, and dissemination of Contagious Abortion in cattle, and Tuberculosis in all classes of domestic animals, also with particular reference to prevention, control, and eradication.

4. The Field Inspection Division administers the regulations of the Department governing the interstate movements of domestic animals, and the importation of livestock, hides, skins, etc.

5. Division of Hog Cholera control.

6. Meat Inspection Division applies the Federal Laws governing Meat inspection. A comprehensive and effective system has been established.

7. Pathological Division conducts Laboratory investigations and studies of Animal diseases, such as Contagious Abortion, Anthrax, Dourine, Rabies, Glanders, Tuberculosis, Swamp fever and also poultry diseases. Work is also done relative to forage poisoning and stock poisoning plants.

8. The Tick Eradication Division has for its object the work of eradicating the cattle or Texas-fever tick (*Margaropus annulatus*) from the Southern States.

9. The Tuberculosis Eradication Division was organised in the Bureau in May 1917. Its object is to obtain freedom from Tuberculosis in the livestock herds of the country.

10. The Division of Virus-Serum control is charged with the supervision of the preparation of Veterinary biologics at commercial laboratories operating under United States Veterinary licences.

11. The Zoological Division is responsible for the identification and classification of parasites of livestock and of man. Investigations are conducted relative to parasitic diseases and information furnished in regard to diagnosis, treatment and prevention.

The following interesting observations came to my notice during my visits to the Bureau in Washington and to the New York State Veterinary College at Ithaca.

(a) Oesophagostomiasis according to Dr. Maurice Hall is fairly frequent in the South, yet he has never seen a case of intussusception (Reksiekte).

(b) In connection with the B.C.G. Vaccine experiments conducted at Bethesda (Dr. Cotton) it would appear that their results so far are not too promising, whereas in the West good results have been obtained.

(c) Very satisfactory results have been obtained at Bethesda with a specially selected attenuated Contagious Abortion strain when com-

pared with non-inoculated controls. Amongst the latter were a much greater percentage of abortions. The success of this vaccine depends mainly on the selection of a satisfactory strain. Recently there have been many authentic cases of a type of undulant fever in man caused by the *Bacillus abortus* of Bang and many cases of a more active nature were contracted from bovines immunised with a porcine strain, contained in vaccines from a manufacturing house in the States. Again the great importance of the proper departmental control of all vaccines in the Union of South Africa becomes apparent.

(d) Cross-immunity tests were conducted in guinea-pigs at Bethesda with Vesicular Stomatitis virus of horses. The lesions obtained on the soles of the hind feet of guinea-pigs were very characteristic. These cross-immunity tests according to Dr. Cotton seem to indicate that there are at least two strains of this virus.

(e) Interesting observations have been made in respect of Anaplasmosis of Bovines in certain Southern states, believed to have been dipped free of the usual transmitting tick. Spontaneous cases of Anaplasmosis, without the presence of Redwater, have been observed in these areas. A tick survey was made of the areas affected, and in no two centres were the same species of tick identified, with the exception of Dermacentor, which was seen in two areas. At present it is not known how these cases are transmitted. In some of the blood smears from such cases of anaplasmosis, peculiar "inclusion bodies" were seen in the monocytes, besides the presence of typical marginal points (Anaplasma). These "inclusions" were not of the nature of the products of an erythrophagocytosis. The question of transmission in these spontaneous cases of Anaplasmosis is being studied by Maurice Hall and co-workers and will be of great interest to South Africa when elucidated.

(f) Ictero-hemoglobinuria in sheep has been studied by P. Olafson at the Cornell Veterinary College, and it would appear that this disease is identical with Enzootic Icterus of sheep in South Africa. He says that the symptoms and lesions in the outbreaks referred to by me are so similar that he has omitted them, except for the brief references given in his paper, e.g. sudden onset of the disease, short duration of the illness, animal very depressed, the mucous membranes and skin become yellow, the urine becomes red, showing "skeletons" or "shadows" of red cells, 2-3 microns in diameter, very numerous. The lesions were very marked and uniform, e.g. icterus, enlargement of the spleen, greenish yellow or ochre colour, friable consistance, appearance resembling that of liver. The characteristic and specific pigment cells, in the liver and other organs, described by me were also identified. The kidneys were very enlarged, black, and globular, and haemoglobinuria was present in many cases. He failed to transmit the disease, and in the outbreak reported by him as well as

those reported elsewhere, it appears that many of the animals that sicken, are sheep that have been subjected to a sudden change of environment.

This point was particularly stressed in my paper on Enzootic icterus.

NOTES AND NEWS.

Personal news and short notes on subjects of topical interest to the profession in general and South Africa specially, should be sent to the Editor for insertion in these columns.

Municipal.

In these days of propaganda it is refreshing to see that at least one member of the Association is "doing his bit" in this direction. Mr. R. Alexander, at a meeting of the Benoni Rotary Club at the end of September, stressed the need for veterinary inspection of dairy herds; as a result, it is understood, that the Benoni Town Council is considering the appointment of a Municipal Veterinarian.

* * * * *

Friends of Dr. G. Martinaglia, formerly Research Officer at the Veterinary Research Laboratories, Pretoria, will be pleased to learn that last May he secured the appointment of Assistant Veterinarian to the City Council of Johannesburg. His new Chief, Col. Irvine-Smith, is well known for his reforms in Municipal veterinary work, especially from the public health aspect.

Dr. Martinaglia, who was born in May 1888 at Roodepoort, is a graduate of the Universities of Toronto B.V.Sc. (1919), Cornell M.Sc. (1920) and South Africa B.V.Sc. (1924). Since he joined the Union Government service on 29/8/22, the outlook in South Africa regarding diseases of bacteriological origin has changed considerably. He showed outstanding capabilities as a bacteriologist and contributed valuable work on various subjects, e.g.: calf paratyphoid and bovine tuberculosis in kudus and other animals. His outstanding work, however, is in connection with organisms of the Salmonella group for which he obtained the degree of D.V.Sc. (Toronto), last year. In fact, as a result of his and Mr. Mitchell's researches into typhoid and white diarrhoea of fowls, the Union Government has recently been enabled to pass legislation against the introduction of sufferers of these diseases. His future career will be watched with interest by all his colleagues.

* * * * *

The lively action of the Department of Veterinary Services and Animal Industry, in taking the necessary steps to prohibit the recon-

signment of slaughter stock from one quarantine abattoir to another, not under the direct supervision of a qualified veterinarian, is indeed to be commended and will receive the wholehearted support of all veterinarians. Warranted actions such as this will direct the attention of Municipalities, to the urgent need for the adequate inspection by those competent to carry out the work, of animal products to be used for human consumption.

Departmental.

Dr. J. I. Quin has just returned to Onderstepoort after spending eight months study leave in Europe. During this time a considerable number of the Veterinary Schools and Physiological Institutes in Great Britain and on the Continent were visited. He is enthusiastic over the hospitality shown him and the facilities granted for visiting places of scientific interest.

* * * * *

Mr. J. G. Bekker, formerly Officer in Charge of the Experimental Station at Vryburg, has been sent oversea by the Union Government to obtain an insight into problems connected with Wool Research under Prof. Barker of Leeds University and Dr. Crew of Edinburgh. He has been accompanied by Mr. S. Rossouw, who will study the chemical aspect of the problem. On his return Mr. Bekker will take charge of the new Research Section for Wool to be established at Onderstepoort.

* * * * *

Mr. J. H. R. Bisschop, at present Officer in Charge of Armoedsvlakte, has but recently returned from a 12 months visit to Europe. He spent a considerable portion of the time motoring through Holland, Germany, France and Switzerland, where he had every opportunity to study cattle breeding problems as they occur on the Continent. He was able to pay a visit to Sir Arnold and Lady Theiler and subsequently toured England prior to purchasing pedigree Hereford heifers for the Union Government.

* * * * *

The services of Dr. H. H. Curson, who at the beginning of the year was invited by the Portuguese Government to be Director of the Veterinary Research Laboratory at Lourenco Marques, have been requested by the Imperial Government for work in N'gamiland with Dr. Hale Carpenter in connection with trypanosomiasis. It is expected he will leave for the Bechuanaland Protectorate on 1st November. During his absence Dr. Quinlan will deputise as Hon. Secretary-Treasurer.

Defence.

It is of interest to note that cadet members of the S.A.V.M.A. continue to show creditable interest in the profession from a military

aspect, and that an increasing amount of attention is being paid to this important branch of the veterinary profession at Onderstepoort.

No. 1 Veterinary Hospital S.A.V.C. of the A.C.F. was established in 1927, but not until 1930 did the unit obtain some insight into the organisation of a veterinary hospital under field conditions when they attended the A.C.F. Continuous-Training Camp at Ladysmith under the command of Capt. J. H. R. Bisschop. To facilitate training, the 1st Mobile Veterinary Section S.A.V.C., which has its headquarters in Pietermaritzburg, under the command of Lieut. R. Clark, was attached to the unit. During the 10 days under canvas 221 cases were treated varying from simple conditions such as slight rope galls and saddle sores to fistulous withers and horsesickness. The value of these camps, which it is hoped will be attended by the unit wherever held, is immediately apparent. Not only is an opportunity afforded of becoming familiar with the methods of treatment and maintenance of a large number of remounts in hard working condition, but cadet members are enabled to obtain some proficiency in horsemanship, a very necessary qualification for any veterinarian employed in the field or in general practice. It is to be hoped that cadet members will continue to support this military organisation since the instruction given in shoeing, saddlery, grooming, feeding, etc., by the instructors, is a valuable adjunct to training and education of students of veterinary medicine.

General.

DAVID THOMAS MITCHELL, born near Londonderry in County Tyrone on 16/6/85, had a brilliant scholastic career and distinguished himself at the Royal Veterinary College, Dublin, where he graduated in 1908. He shortly afterwards received an appointment with the Transvaal Government and took up his duties as District Veterinary Surgeon as from 27/1/09. A few days after Union, on 4th June 1910 to be precise, he was transferred to the Research Department with the designation Assistant Government Veterinary Bacteriologist. In February 1910 he was gazetted as lieutenant in the Transvaal Veterinary Corps (Reserve).

With Mr. Shilston's departure for India early in 1914, Mitchell took charge of Allerton Laboratory, Maritzburg (as from 1/3/14), where he remained until the end of June 1918. After this he returned to headquarters at Onderstepoort and during the Director's (of Veterinary Research) absence in England in 1919, he deputised with great success. On 1/4/19 he was appointed Assistant Director of Veterinary Research.

On Sir Arnold Theiler's re-appointment as Director in 1920, Mitchell was transferred to Armoedsvlakte Laboratory, Vryburg, where he remained until early in 1922, when he proceeded oversea on study

leave for a year. On his return he was again placed in charge of Allerton Laboratory, where he carried out much valuable research work into the diseases of poultry.

Apart from his administrative ability and scientific work, Mitchell will always command respect for the work he did on behalf of the T.V.M.A. and later the S.A.V.M.A. On Mr. Kehoe's departure for Ireland in October 1918, he became Honorary Secretary of the former Association and through his energy and enthusiasm brought into existence the S.A.V.M.A.

His colleagues not only in South Africa but elsewhere regret that he found it necessary to take up an appointment last year in Burma, where he is Director of Veterinary Services, but they feel that in his new sphere he will get unrestricted scope for the outstanding administrative and research capabilities for which he is known. In him South Africa has lost a splendid worker.

* * * * *

Mr. G. Pfaff sailed from Durban on September 6th to take up an appointment with the Burmese Government. He will be stationed at Insein, ten miles from Rangoon, and working under Mr. D. T. Mitchell, formerly Sub-Director of Veterinary Services, will be engaged on field research work. In addition Mr. Pfaff will be associated in all probability with the Veterinary School to be established in Burma. It will be agreed generally that the Union's loss is Burma's gain since Pfaff during his connection with the Department showed ability well above the average. After qualifying in July 1923 and graduating at Edinburgh at the same time, he joined the service and was engaged in East Coast fever eradication work in Natal chiefly in the Estcourt District. In 1927 the Scab Check Inspection Staff was established, the activities of which he controlled in various parts of the Union until 1929 when he was transferred to Onderstepoort as a Research Officer and appointed to the Faculty of Veterinary Science as lecturer in Surgery.

* * * * *

It is gratifying to learn that veterinarians in South Africa are alive to the possibilities of private practice in the larger centres. Mr. J. Reid has purchased Mr. C. H. Wadlow's practice in Port Elizabeth and he carries with him our good wishes and the promise of every support in his new undertaking. Incidentally we regret that Mr. C. H. Wadlow has found it expedient to abandon practice in this country and to return to England.

* * * * *

We were pleased to hear this month from our old stalwart, Mr. H. M. Webb, who is now stationed at Kazungula (Bechuanaland Protectorate.) He reports that glossina is spreading in Ngamiland and much is expected of Dr. Hale Carpenter's visit in connection with

methods of control. He has had many encounters with lions and sends a snap of the last one he killed. This could unfortunately not be included in this issue.

* * * * *

The S.A.V.M.A. has presented bound copies of veterinary bills passed since 1902 to the Library of Veterinary Research Laboratories, Onderstepoort, and also the available minutes of T.V.M.A.

* * * * *

Veterinarians in Northern Rhodesia are to be heartily congratulated on the passage of Ordinance No. 14 of 1930 as published in the Supplement to the Northern Rhodesia Government Gazette of 11th April, which makes provision for the registration of Veterinary Surgeons desiring to practise in the Territory. It is indeed noteworthy that so young a colony as Northern Rhodesia has realized so quickly the necessity for making provision for the registration of veterinarians and moreover, has a legislative body which appreciates that necessity. This is in striking contrast to the position in the Union where many repeated attempts to introduce a similar measure, have been unsuccessful, as indicated in Dr. Curson's article in this Journal, in spite of the fact that a comprehensive veterinary organisation and a huge research institution are in existence already.

* * * * *

We gather from the Farmer's Weekly, July 30th, 1930, that a consignment of unfrozen meat treated by the Pitchford process was sold on the Smithfield Market in May last by the exporters Messrs. Pitchford Patent Process Ltd. This trial consignment was fairly representative, being made up of ten prime oxen, eight medium oxen, two cows, ten merino hamels, five Persian hamels, ten baconers and three porkers. It will be noticed that this is the type of stock which can be obtained in this country in large amounts. Over five weeks elapsed between the time of slaughter and marketing and it would appear that, although the conditions on board ship were not ideal, and that unfavourable weather conditions prevailed in England, the meat, when sold, compared favourably with the chilled product from the Argentine. The significance and importance of such a process to the South African Meat Industry need not be emphasised. The ranching community as well as the veterinary profession will look forward with great interest to future developments.

Conferences.

Veterinary representation on public health bodies, e.g. Public Health Council, and at conferences where public health is discussed, is a matter which apparently has not received the attention of the Director of Veterinary Services. As examples we may mention that had it not been for action taken by the S.A.V.M.A., the Director of

Veterinary Services would not have received an invitation to be present at the Public Health Officials' Conference at East London in September, nor at the Municipal Association Conference at Standerton in October. Surely a most important matter when the Dean of the Faculty of Veterinary Science (who is Director of Veterinary Services) is seeking to widen the sphere of activities for veterinary graduates!

* * * * *

The S.A.V.M.A. is to be congratulated on the election of its previous President Dr. P. J. du Toit to the chair of the Agricultural Section of the British Association for the Advancement of Science. This is the first occasion on which the honour has been conferred on a South African, in fact the first time a member outside the British Isles has been elected chairman. Our hearty congratulations are extended to Dr. du Toit. Incidentally the Director of Veterinary Services and Animal Industry, since his departure for Europe in May, has represented the Union or one of its institutions at at least half a dozen conferences. It is hoped that a brief résumé of the impressions gained during his travels will appear in the next edition of the Journal.

* * * * *

We are greatly indebted to Dr. E. M. Robinson for two chatty articles which appear in this issue, one on the International Microbiological Congress held in Paris in July and one on the International Veterinary Congress held in London in August. The thoughtfulness and prompt action of Dr. Robinson in forwarding these articles in time for publication are much appreciated.

* * * * *

Mr. Spreull, Senior Veterinary Officer, Capetown, who proceeded to England on six months leave in May, attended the International Veterinary Congress in London as the representative of the S.A.V.M.A. His report on the proceedings is being anticipated with great interest, but of necessity cannot be completed in time for inclusion in this issue of the Journal.

ABSTRACTS AND REFERENCES.

A short note on the spirochaetal wound infection of pigs.

W. O. Neitz and A. S. Canham.

16th Report of Dir. Vet. Services & Animal Ind. August, 1930. p. 96—80.

Spirochaetal wound infection in pigs occurs fairly frequently all over South Africa and although not directly fatal, causes considerable economic loss by detracting from the health of the animals and the value of the carcasses. It is characterised by chronic abscesses or open wounds on the skin, with thick, tough, granulomatous bed and foul smelling discharge. The parts affected are usually those liable

to injury, e.g. ears, scrotum, limbs, etc. The spirochaetes can usually be demonstrated microscopically in preparations from the lesions. The authors claim successful treatment in a few cases by local applications of arsenical preparations, such as Atoxyl, Cooper's Double Dipping Powder, etc.

The immunization of horses against horsesickness by the use of formalized virus. P. J. du Toit and R. A. Alexander. *Ibid* p. 85-106.

The authors describe step by step the various experiments which were conducted in an attempt to produce a vaccine against horsesickness by the inactivation of the virus with formalin. They came to the conclusion that inactivated virus as contained in the blood of a reacting animal, possesses no demonstrable antigenic properties but that formalized spleen virus, under certain conditions, produces a solid immunity after subcutaneous injection. Nothing definite is known of the manner in which this immunity is produced, but certain conclusions are drawn which may be enumerated as follows:—

1. No solid immunity is produced by a single injection of completely inactivated virus.
2. Varying concentrations of formalin produce varying degrees of inactivation.
3. The minimum safe concentration of formalin is 1 part of formaldehyde to 1,000 parts of a 20% emulsion of pulped spleen tissue. This may be injected into susceptible horses without danger and produces some immunity, insufficient, however, to protect against fully virulent virus.
4. The maximum concentration of formalin, to produce a vaccine which has antigenic properties sufficient to produce a solid immunity again O virus, is 1 part of formaldehyde to 6,000 parts of spleen tissue.
5. The virus contained in the blood of an animal reacting to the injection of formalized virus is fully virulent and apparently does not differ from O virus.
6. By injecting spleen tissue, inactivated by decreasing concentrations of formalin commencing at 1 part of formaldehyde to 1,000 parts of emulsion and progressing to 1 part of formaldehyde to 6,000 parts of emulsion at intervals of 14 days, horses have been successfully immunized. The concentrations of formalin to produce the most economic vaccine have still to be ascertained.
7. Formalized spleen virus appears to produce an immunity which tends to decrease with time and in all probability the final stage will have to be the injection of fully virulent virus.

The article is only in the nature of a preliminary report on work

which has given very satisfactory results and which is being continued.
Author's summary.

A Note on the preservation of engorged female ticks. H. O. Mönnig. *Ibid*, p 199-200.

The author gives the composition of a preservative fluid mixture with which he has been successful in preserving male and engorged female ticks with unaltered colours. The fluid consists of 4% formaldehyde (10% commercial formalin) to which sufficient chloroform is added to produce a saturated solution. Any undissolved chloroform is removed by decanting and the live ticks are placed in the fluid in suitable stoppered tubes.

On two new helminths from the abomasum of the bushbuck in Zululand, Natal. P. L. le Roux. *Ibid*, p. 233-242.

Of the two new helminths described, one belongs to the genus *Ostertagia* and the second, although closely resembling *H. contortus* is allocated to a new genus. The names proposed for these parasites are *O. harrissi* and *Ashworthius pattoni* respectively.

A Contribution to the study of immunity in bovine trypanosomiasis. B. S. Parkin and H. E. Hornby. *Ibid*, p. 11-20.

Some examples are given to illustrate the production of premunition (a resistant state associated with the survival of the trypanosome) by means of chemotherapy. The authors regard premunition as established in a bovine, when the detection of the parasite is possible in animals whose red cell count is normal, whereas the subject still in the chronic stages of the disease always gives a red cell count below half normal. It is also demonstrated that a bovine which is premunised against one strain of *Tryp. congolense* is not necessarily premunised against a different strain and that bovines premunised against a particular strain give a strongly positive adhesion reaction with the same, but not with different strains.

Mineral metabolism and blood analysis. A. I. Malan. *Ibid*, p. 307-312.

Work is being done at Onderstepoort to study the effect of variations in the diet of Sodium, Potassium, Magnesium, Chlorine and Iodine on the content of these inorganic elements in the blood. The present article deals almost exclusively with the phosphorus content of the blood of animals as affected by changes in the phosphorus content of the diet. Blood calcium in relation to blood analysis is also mentioned.

The results have been obtained from a large scale breeding experiment, which began with 200 head of cattle as the basis herd 3 years before, in 1925. This herd consisted of 4 breeds of cattle and each divided into bone meal fed animals and control animals, respectively,

the bone meal fed animals receiving a supplement of 3 oz. bone meal per head per day. No characteristic differences were observed for the phosphorous content of the blood of animals belonging to different breeds.

The average figure for the blood phosphorus of lactating cows on the bone meal supplement was 3.1 mgm per 100 cc. whole blood and for the control cows 1.5 mgm. For dry cows the corresponding averages were 3.7 and 1.6 mgm. In case of heifers the difference was almost as striking, the corresponding figures being 5.2 and 2.5 mgm. Clinical symptoms of aphosphorosis were noticeable in case of the control lactating cows, but the control heifers would certainly not have been called phosphorus deficient by one unacquainted with their history. Nevertheless, incipient Styfsiekte or aphosphorosis could already be diagnosed from blood analysis.

Even the 6 months old heifer calves of the two lots of cows showed slight differences in the inorganic phosphorus-content of their blood. Those of the bone meal lot averaged 4.6 mgm. phosphorus per 100 cc. blood, while the calves of the control showed 3.4 mgm. The conclusion is reached that aphosphorosis even in the very early stages, is definitely reflected in the blood of cattle and a phosphorus survey of the Union of South Africa, based upon these findings, has been begun. Low inorganic phosphorus in the blood of sheep has been noticed in areas where cattle suffer from phosphorus deficiency and hence blood analysis has great value in studying the problem of aphosphorosis in sheep and may be in other classes of stock.

From the limited number of calcium determinations in the blood of sheep it appears that the calcium is low in areas where the vegetation is deficient in calcium.

Author's summary.

Pisgoed or Pigras. D. G. Steyn. *Ibid*, p. 417-420.

It was at one time believed that farmers used the above terms in reference to *Euphorbia genistoides* or to conditions in animals produced by ingestion of the plant. It seems however, that there is no justification for this belief and that the term " Pisgoed " is used indiscriminately to denote diseases of inflammatory nature, or due to calculi, affecting the urogenital tract in male ruminants. This condition is seen most commonly during the wet and warm months of the year. The symptoms consist in reddening and swelling of the prepuce and matting of the surrounding wool with decomposing urine and exudate. Unless relieved, the progressive purulent inflammation which is accompanied by much swelling and irritation, very often leads to retention of urine and fatal ending. The author succeeded in transmitting the disease by rubbing pus from affected sheep onto the prepuce of healthy animals. The aetiological factor has not yet been definitely established but belongs probably to the coccus group of bacteria. Treatment

consists in clipping the wool round the prepuce and applying suitable disinfectant ointments, e.g. lard or vaseline 9 parts, carbolic acid or Little's dip 1 part.

A note on some conditions in sheep in the Strandveld of the Bredasdorp District. J. G. Bekker and S. W. Rossouw. *Ibid* p. 293-300.

These workers record the occurrence of osteophagia, allotriophagia and lamsiekte (parabotulism) in sheep in this part of the Cape. Analysis of blood from sheep in this area showed the inorganic phosphorus content to be less than half the figure on phosphorus sufficient pastures. As a further result of this aphosphorosis, these sheep show: (a) undeveloped bodies, (b) reduced fertility of ewes, (c) light, soft and easily fractured bones.

THE ASSOCIATION.

South African Veterinary Medical Association.

A great improvement has been effected by the redrafting of the Constitution of the Association. Not only is it hoped thereby, to ensure greater efficiency and economy in the running of the Association's affairs, but Council members are placed in a position, enabling them to show more active interest in professional matters, than has hitherto been the case. The separate offices of Secretary and Treasurer have now been fused, the powers and duties of the various standing committees have been more clearly defined, steps which should undoubtedly make for better coordination of work generally.

The Constitution as amended has already been circulated among members but for the sake of easy reference, it is also inserted in the present issue of the Journal.

The annual subscription remains as before, One Guinea (£1.1.0.) and is payable to the Hon. Secretary Treasurer in advance, on the first of June.

Membership is open to all Veterinarians in South Africa and abroad subject to election according to the rules of the Association.

OFFICE BEARERS FOR CURRENT YEAR, EASTER, 1930-1931.

President: F. J. Carless, M.R.C.V.S.
Vice-President: Dr. P. R. Viljoen.
Hon. Secretary Treasurer*: Dr. H. H. Curson.

* Owing to the sudden and premature death of Major Goodall who had been elected Sec. Treasurer at Easter, 1930, Mr. Coles, the second nominee for this office, took over the duties. Owing to ill-health, however, Mr. Coles had to relinquish this office in June, when the Council appointed Mr. Pfaff to fill the vacancy. This again was not for long as Mr. Pfaff, on his departure for Burmah, resigned at the end of August. Fortunately for the Association, the Council was then able to obtain the services of Dr. Curson for this exacting and thankless task.

MEMBERS OF COUNCIL.

Drs. P. J. du Toit, P. R. Viljoen, E. M. Robinson, J. B. Quinlan, Col. Bush, Messrs. Chalmers, W. H. Chase, A. C. Kirkpatrick, R. A. Alexander, J. L. Dickson.

Mr. J. D. Borthwick, Col. J. Irvine-Smith and Sir Arnold Theiler, being honorary life vice-presidents are also life members of the Council.

Owing to the abolition of the Treasurership as a separate office, Dr. Quinlan was requested by Council to retain his seat on that body for a year, during this transition period. This explains the apparent anomaly of having one more member of Council than provided for in the Constitution.

STANDING COMMITTEES.

The Council at a meeting held 23/5/30 constituted the following Standing Committees in accordance with the new Rules:—

FINANCE.

Col. Bush, Dr. Quinlan and Dr. Curson (convenor).

STATUS OF PROFESSION.

Messrs. Chalmers, Fourie and Alexander (convenor).

PARLIAMENTARY.

Dr. Curson, Mr. Kirkpatrick, and Dr. Viljoen (convenor).

EDITORIAL.

Messrs. Chalmers, Alexander and Thomas (Editor).

BANKERS.

Standard Bank of South Africa, Church Square, Pretoria.

THE JOURNAL.

The Journal of the S.A.V.M.A. is owned by the South African Medical Association which body is entirely responsible for the control.

An Editorial Committee appointed by the Council of the Association and approved of at a General Meeting is responsible for publication.

At present are published mainly addresses delivered at the Spring General Meeting which usually takes the form of a Scientific gathering; also such other articles and notes of topical interest to the profession, as the Editorial Committee may decide. The present issue completes the first volume, which thus comprises the four numbers that have appeared to date. An author's and title index will be found at the end of this Number.

RETROSPECTION:

It may well be asked now, whether the Journal as it has appeared during the last four years, has justified its existence and warrants continuation,

Although as a scientific publication it is open to criticism, the efforts on the part of the various Editorial Committees, in the face of serious difficulties, must be regarded as very creditable indeed. Its value can probably not be gauged yet, but the Association undoubtedly took a step in the right direction when it embarked on the publication of its first Journal. The numerous letters of congratulation and appreciation, and also the growing list of oversea subscribers testify to the success of the undertaking. It is confidently felt that the Journal having thus survived its trial stage, has now become a permanent and useful feature of the Association's activities.

The Veterinary profession as a whole in South Africa is but a small body and gets but little sympathy from the public or from the Government. What is more the community being so widely scattered over a large country, it is difficult to maintain that *esprit de corps* so essential to any profession. Opportunities for personal contact, social and scientific intercourse and exchange of views between members, are few and far between and when meetings are convened, only comparatively few find it possible to attend.

It is obvious enough therefore, that if the Association is to be something more than a name, its members must be kept interested in veterinary matters here and abroad; they must be continually reminded of what the Association stands for and how it is striving to further the common interest of the profession; they must be afforded a medium for airing their views; and finally they must receive a regular and readable source of information on the latest scientific progress affecting their everyday work.

All these needs can be fulfilled by the Journal provided it appears regularly and at reasonably frequent intervals.

The financial resources of the Association have been severely taxed by the Journal in the past, but the advantages to be derived from more frequent publication are so real, that it was decided at the last General Meeting that the Journal appear twice yearly instead of annually as at present. It is hoped by practising strict economy and with better support from subscribers and advertisers, that the undertaking will be successful.

The Journal in this form should be more attractive to advertisers on account of greater circulation and to readers because of a greater variety of reading matter. It is intended to enlarge the section for abstracts considerably, so as to review not only the Reports of the Director of Veterinary Services, and other S.A. matter, but also to present concise resumés of work and opinions appearing in current oversea literature.

The Journal should also appeal more to contributors since they will have less fear of losing priority by publication at long intervals.

In this connection an appeal is made to members for contributions. The Journal should reflect the activities of the whole Veterinary profession and not merely those of a few research workers. After all field or any other work is just as important as those who perform it wish to make it.

It is not necessary that communications in all cases should be lengthy and highly technical. Various experiences, observations and even views, provided they are of interest and based on facts, are just as desirable. Valuable information could thus be gathered from all quarters and placed on record. The Editor would be only too pleased to answer any queries from, or assist likely contributors. Finally suggestions and helpful criticism will be much appreciated at all times.

COMMUNICATIONS.

Communications should be complete and concisely written, preferably typewritten, and full details supplied as to photographs, figures and references. Contributors of scientific articles receive free of charge 25 reprints, but an additional number can be supplied at cost price provided application is made on submitting the communication.

SUBSCRIPTION.

Every member, Hon. Associate, and Hon. Life Vice-President of the Association receives a free copy of each issue.

Subscription is open to non-members, other bodies or institutions at the following rates:—

7/6 per annum post free.

5/- per single copy including back Nos. post free.

Future issues will appear twice a year after the annual General Meetings of the Association, held in April and August respectively.

SPECIAL GENERAL MEETING.

This was held in Polley's Hotel, Pretoria, on 16/11/29 at 2.30 p.m. The Vice-President, Mr. Chalmers, took the chair and 22 members were present. The following matters were dealt with:—

(a) The **minutes** of the Spring General Meeting held at the Union Buildings, Pretoria, on 5/8/29 were confirmed.

(b) **Professional allowance** for the Permanent Force Veterinary Officer. Dr. Curson, after explaining the situation, suggested a deputation should interview the Minister of Defence in this connection, as medical officers and officers in the S.A.V.C. Active Citizen Force were already drawing such an allowance. Mr. Henning proposed and it was accepted that the Minister of Justice should also be pressed to grant a similar allowance to the Veterinary Officer, South African Police.

(c) **Scale of salaries** offered to Veterinarians by Union Government. Mr. Alexander pointed out that in 1920 the S.A.V.M.A. resolved that a commencing salary of less than £500 per annum was insufficient. The scale now offered was £375-25-550-30-700. He proposed that the Minister of Agriculture be interviewed to have the original scales (£450-750 and £500-800) restored. If matters were not righted an attempt should be made to find positions for the graduates outside the service and the Council should assist the students to repay their loans and bursaries. It was decided that a deputation be appointed to interview the Minister of Agriculture in this connection.

(d) Mr. Alexander proposed and it was accepted that "the S.A.V.M.A. approach the South African Medical Association *re* the **appointment of laymen** to posts at present under the jurisdiction of the medical profession which should be held by veterinarians."

(e) The prevention of the use of **Laidlaw and Dunkin's Distemper vaccine** for dogs by others than members of the profession. It was explained that, as things now stand in South Africa, the vaccine could be obtained and used by unqualified practitioners. Accordingly the recommendation of Council was accepted that the Hon. Secretary should furnish Messrs. Burroughs, Wellcome & Co., England, with a complete list of qualified veterinarians in the Union.

(f) The meeting decided that **personal notes** on members holding public appointments should ordinarily be limited to not more than **one half page** of the Journal.

(g) Major Gavin was elected to the status of Profession Committee *vice* Major S. I. Johnson, deceased, and Mr. Alexander was elected to fill Dr. Quin's place on the latter's departure for Europe.

AUTUMN GENERAL MEETING.

This was held in the Veterinary Office, Show Grounds of the Witwatersrand Agricultural Society on 17/4/30 at 2.30 p.m. The President took the chair and 19 members were present. The following matters were dealt with:—

(a) The **minutes** of the Special General Meeting held in Pretoria on 16/11/29. were passed after minor additions, the principal being that the S.A.V.M.A. should approach officially the Medical Association of South Africa, with regard to the appointing of Veterinarians to positions at present given wrongly to laymen in abattoirs, etc.

(b) It was decided that the "Veterinary Record" be furnished with an **abstract of the minutes** of each meeting.

(c) The following new members were elected: Messrs. O. Henning, C. Jackson, B. Horwitz, J. Zwarenstein, W. O. Neitz, D. J. Pullinger, F. B. Wright.

(d) The Office-Bearers for the year 1930-31 were duly elected.

(e) **Report of Council.** Two meetings were held, one in February and one in March. The first was called principally to deal with the question of salaries of Government Veterinary Officers. It was resolved that a deputation wait on the Minister on his return from Cape Town. At the March meeting the new constitution was considered, as was also veterinary representation on the Public Health Council. It was agreed that the deputation should mention this latter point together with the Veterinary Bill when interviewing the Minister.

(f) The Council recommended that a suitable presentation be made to Mr. Kirkpatrick who was relinquishing the office of Honorary Secretary of the Association.

(g) Provision was made in the new rules for a more profitable investment of the Association's funds. It was agreed that Mr. Spreull should represent the Association at the International Veterinary Congress in London.

(h) The Report of the Status Committee was read by Mr. Fourie. It was emphasised that representation on the Public Health Council was most necessary.

i) **Veterinary Bill.** The Chairman said there was no chance of having it introduced during the present session of Parliament. He referred to the draft bill drawn up by Dr. Curson which embodied all the clauses of the Natal Act 21/1899, amended so as to conform with present day requirements. An **ad hoc** committee, consisting of Drs. Viljoen, Curson and du Toit was appointed to look after the interests of this bill.

(j) The Financial Statement was read by the Secretary and adopted.

(k) **Advertising in the Press.** Mr. Chalmers read a letter from

Miss Morice re an article by "Shortlegs" in the "Sunday Times." He had seen the editor and arranged that such articles should be written only by veterinarians.

(l) **Cadet Members** of S.A.V.M.A. Dr. Curson proposed, and it was agreed to, that students of the local faculty of Veterinary Science should be admitted as Cadet members of the Association, the subscription to be 5/- per annum.

(m) **Designation of Government Veterinary Officers.** The Chairman pointed out that the term "veterinarian" had been agreed upon by the Association. Dr. Curson explained that the term "Government Veterinary Officer" had been coined to evade certain legal difficulties arising from the use of the term "veterinary surgeon" in Natal, which province was the only one possessing any legislation with regard to registration of veterinarians.

(n) This meeting also confirmed the new constitution as redrafted by the Rules Committee appointed on 28.3.29.

SPRING GENERAL MEETING.

This was held at Onderstepoort on Wednesday, 30/7/30, at 10 a.m. The President took the chair and 25 members were present. The following matters were dealt with:

(a) The President, Mr. Carless, addressed the meeting and briefly recapitulated recent events affecting the Association and the Veterinary Profession in relation to the Government. Amongst other things he mentioned the extraordinary anomaly of having no veterinary representation on the Public Health Council, but otherwise expressed satisfaction and optimism at the steady, although slow, progress of veterinary affairs in this country.

(b) The **minutes** of the Autumn General Meeting were confirmed.

(c) **Reports of Committees:**

i. FINANCE. The audited official statement dealing with the period 1/7/27 to 30/6/30 was read and adopted. It will be found elsewhere in this issue.

ii. PARLIAMENTARY. Dr. Viljoen gave a resumé of the work done. After several interviews with the Government Law

Advisers it was found necessary to recast completely the altered Natal Act. The proposed new Act would be administered by the Minister of Agriculture and any income derived therefrom paid into revenue. The Minister of Agriculture had so far committed himself to an undertaking that, if a simple measure were brought to him, he would himself introduce it, and it could then go through as a Government measure.

iii. EDITORIAL. It was suggested that this Committee should hold office for three years to ensure continuity of action, that the Journal should appear twice a year, and that the Committee should, within limits, be empowered to transact its own business.

iv. STATUS OF PROFESSION. The Minister of Agriculture had been written to, to express the Association's gratification at his action in connection with quarantine cattle from outside the Union, which could not now be slaughtered except under veterinary supervision.

(d) The **Registration of the Association** under the Companies Act was agreed upon unanimously.

(e) **Formation of Natal Branch** of S.A.V.M.A. A letter from Mr. Amos (Secretary of the Natal Veterinary Board) requesting authority for the formation of such a branch was referred back to Council.

(f) **Alteration of Rule 9(g)** of the Constitution. It was resolved that this be amended to read, "The Chairman-Convenor is to be elected by each committee and the President and Secretary-Treasurer are ex officio members of all committees."

(g) On representations made by Col. Bush a Committee consisting of Col. Bush, Mr. Melck, and Dr. Quinlan was appointed, to investigate the question of **horse-breeding** in this country and report to Council. It was pointed out that the light horse breeding industry was in a desperate plight and that it was becoming more and more difficult to obtain suitable remounts for the normal peace requirements of the Defence and Police Forces. Incidentally, there was a ready market in India for any surplus horses of the right type, so that no immediate overproduction need be feared.

FINANCIAL STATEMENT

Period 1st July, 1927—30th June, 1930.

To Balance as per Pass Book 1926-27 a/c	£139	2	7
,, Subscriptions	499	12	6
,, Sale of Journals	1	10	0
,, Adverts. in Journals	14	10	0
,, Interest on Fixed Deposit	131	6	11
	£786	2	0

By Stationery	£21	1	5
,, Secretary's clerical expenses	54	11	9
,, Secretary's disbursements	16	3	0
,, Treasurer's clerical expenses	31	10	0
,, Treasurer's disbursements	3	0	9
,, Conference and Special Meeting expenses	20	13	11
,, H. H. Curson, disbursements	1	11	9
,, Refund to B. S. Parkin, re sub.	3	3	0
,, Contributions to Royal Veterinary College	50	7	6
,, Subscriptions to National Veterinary Medical Association	4	5	4
,, Honorarium J. G. Bush	5	5	0
,, Wreaths	6	6	0
,, Photo frames, etc.	2	9	6
,, Union Loan Certificates	149	12	0
,, Printing of address, Messrs. Goodall & Chalmers	8	5	0
,, Printing of Constitution	6	0	0
,, Printing of Journals	253	19	6
,, Government Gazettes		5	10
,, Stamps	13	2	8
,, Increase of fixed deposit	28	11	4
,, Bank Charges	6	6	1
,, Balance	99	10	8
	£786	2	0

To Balance	£99	10	8
Fixed Deposit	£1000	0	0
U.L.C. No. 26858, 27525, 27520 at issue	£149	12	0

Audited and found correct:

(Signed) C. O. WADNER.

7/7/30.

CORRESPONDENCE.

The Need for a State Veterinarians Association.

P.O. Onderstepoort, 12.9.30.

The Editor, Journal S.A.V.M.A.

Dear Sir,—It is interesting to note that at the last annual general meeting of the Public Servants' Association (Pretoria 26-28/5/30), Dr. E. P. Phillips moved "That the Protechnical Section of the Pretoria District be a section of the P.S.A."

I have always felt that it is not only desirable that there should be a section for professional and technical officers, but that the officers of the various groups of the section should themselves be organised, e.g. veterinarians, botanists, entomologists, etc. The veterinary group could be the "State Veterinarians Association," who would deal through the P.S.A. with the Advisory Council.

It is true that at present there exists the S.A.V.M.A. for protecting professional interests, but whenever a state matter is introduced for discussion, attempts are made to rule it out of order "because it is a departmental affair!"

At present approximately 50 of the 100 state veterinarians are members of the P.S.A. and apart from the fact that Drs. Curson and Mönnig and Mr. T. Meyer represent the Division of Veterinary Services on the Protechnical Committee, Pretoria, there is little or no cohesion or co-operation among Government veterinarians.

It is obvious that several matters which are now ignored would receive attention, e.g.: definition of Government Veterinary Officer, veterinary representation on the Public Health Council, professional allowance U.D.F., etc. Through being scattered over the Union our mutual interests are suffering.

The S.A.V.M.A. would exist side by side with the S.V.A. and subscriptions could be paid as now to the local treasurer. As a result there would be more enthusiasm, the S.A.V.M.A. could concentrate on more pressing problems such as legislation, and a larger P.S.A. membership through the S.V.A. would follow.

Reverting to the introductury paragraph it was agreed "That the matter be referred to the Executive Committee for consideration and report to the next Conference."

In the meantime state veterinarians who wish to bring forward any matters are advised to communicate with either Dr. Mönnig or Dr. Curson (both of P.O. Onderstepoort), who will endeavour to do what is best under the circumstances. Technical officials are advised to communicate with Mr. T. Meyer, also of P.O. Onderstepoort.

H. H. CURSON.

OBITUARY.

Lieut.-Colonel Alexander Goodall (1879-1930).

Alexander Goodall, born on 2/9/79, was educated at Charterhouse School, where he was a keen member of the Cadet Corps (1893-95). Later, he served as a private (1897-99) in the Volunteer Medical Staff Corps in London. After graduating at the Royal Veterinary College at Camden Town in July 1902, he joined the Cape Civil Veterinary Division, his service dating from 4/10/02. He became F.R.C.V.S. in 1921.

Until shortly after the outbreak of the Great War in 1914, when he joined the Active Citizen Force as a Temporary Captain S.A.V.C. (14/10/14), he served as a Government Veterinary Surgeon in various

parts of the Cape Colony. Owing to his energy and sympathetic dealing with the farmers he showed that it was not necessary to be South African born in order to gain their esteem.

Shortly after receiving his captaincy, he was appointed O.C. No. 5 Veterinary Section, which was located first at Parow and then at Maitland, where a Veterinary Hospital was established in order to deal with the thousands of equines which were collected and malleined after their return from the South-West Africa Campaign. Here the writer, who was G.V.S. Capetown, was closely associated with Capt. Goodall (1), and was able to appreciate the ability and good qualities generally of his senior. For his services in 1914-15 he was mentioned in despatches.

After the termination of major operations in South-West Africa, Goodall was transferred to Maritzburg, where a Veterinary Hospital had been established in connection with the purchase and dispatch of remounts for the German East Africa Campaign. Here, as from 1/1/16, he was promoted major. A few months later he proceeded to the Base Veterinary Hospital at Durban and from 1/9/17 was appointed A.D.V.S. He was attached to the Defence Staff and with the A.D.M.S. and N.T.O. constituted a Board to examine all ships conveying animals for the East African Expeditionary Force which was under Imperial Administration. Goodall was released from military service on 15/4/18 and on 19/12/18 he was mentioned in a press communique for valuable services rendered within the Union of South Africa in connection with the Campaigns in German South West Africa and German East Africa. On 2/3/27 he transferred to the Reserve of Officers, Veterinary Branch (Section I), with rank of Lieut.-Colonel.

After resuming his civil duties he acted as Senior Veterinary Officer, Orange Free State, but in 1920 proceeded to Windhoek as Officer in Charge of Agriculture and Veterinary Services, thus succeeding Col. Lee, who had been the first civil director after annexation of the territory. In 1924 he was transferred to the Eastern Cape Province as S.V.O. with headquarters at Queenstown, but this was only for a few months, as in the same year he became Assistant P.V.O. (Union) with headquarters at Pretoria.

In 1927, when the Field and Research Divisions were amalgamated as the Division of Veterinary Services, Goodall was appointed a sub-Director and at the same time received the lectureship of Municipal Veterinary Hygiene in the Faculty of Veterinary Science, Onderstepoort.

Having recently returned from Sir John McFadyean's Laboratory, the writer prepared **concentrated** mallein for military purposes. Ophthalmic and intrapalpebral tests were then carried out, the first undertaken in this country. Thanks are due to Col. Bush, Director of Veterinary Services U.D.F., for many of the details of this note.

His death occurred at Wolmaransstad on 6/4/30, while en route by car to Hermanus with his wife for a holiday, and his funeral took place at Pretoria the following day. To his widow we offer our sympathy in her sad trial.

Lt.-Col. A. Goodall (1879—1930).

Alexander Goodall will be greatly missed by the members of his profession. Ever since he joined the Cape of Good Hope V.M.A. in 1906 he had taken an active part in fostering the interests of his calling. By his contributions to literature, his zeal for his work and, above all, by the qualities which stamp an English gentleman, his memory will be revered for many years.—H.H.C.

Capt. George Raphael McCall (1885-1930)

Was born 1/1/85 at Blairtammock, Lanarkshire, being the 7th son of the late Principal James McCall of Glasgow Veterinary College, and educated at Glasgow, where he had a brilliant career at the High School, Veterinary College and later University. He obtained his M.R.C.V.S. in December 1905 and was next appointed Professor of Materia Medica and Hygiene at the Glasgow Vterinary College. Later he served in the Egyptian civil service for 2½ years and then came to South Africa, joining the Union Department of Agriculture in October 1910.

On the outbreak of the Great War he joined the S.A.V.C. and took part in the Rebellion and the South-West and East African campaigns, for which he received three medals. In 1920 he resigned

from the Union civil service and proceeded to Kenya, where he became interested in farming. Since that date he had identified himself with Kenya interests and had established a sound reputation both from the professional and business aspects. Socially he was exceedingly popular and his untimely death, while on a holiday visit to his brother Major D. McCall of Durban, will be a severe loss not only to the profession, but to his many friends in South and East Africa.

The late Capt. McCall was a successful owner of race horses and was considered to be one of the best judges of blood horses in the country. As far back as his Egyptian days he was an owner and incidentally one year won the Khedive Cup with Ayr, which he rode.

Our sympathy goes out to the members of his family, especially to his brother David, who is in private practice in the Garden Colony.

AUTHOR'S INDEX. VOL. I.

TITLE INDEX.

The Constitution of the South African Veterinary Medical Association. (*)

(Drafted and issued 1/2/30 by Rules Committee appointed 28/3/29.)
(Considered by Council 29/3/30. Approved at General Meeting 17/4/30.)

1. The Association shall be called : South African Veterinary Medical Association.
2. **The objects** of the Association shall be :—
   (a) to supervise and protect all the interests of the veterinary profession;
   (b) to introduce and discuss matters relating to the profession;
   (c) to establish, promote and maintain, a good and friendly understanding among members;
   (d) to discuss subjects relating to the theory and practice of the art and science of veterinary surgery and medicine;
   (e) to do all things to advance veterinary science and to elevate the status of the profession.
3. **Membership :** The Association shall consist of Members, Life Members, Honorary Associates, Honorary Life Vice-Presidents and Cadet Members.
   (a) Membership is open to all veterinarians.
   (b) Any member may at any time become a life member by one payment of 15 guineas in lieu of future annual subscriptions.
   (c) Honorary associateship shall be open to all non-veterinarians who occupy a distinguished position, either as administrators, teachers, writers, scientific workers, discoverers or benefactors to veterinary science.

(*) Redrafted by Rules Committee 25/4/30, issued 15/5/30 and to become operative from 1/6/30.

(d) Honorary life vice-presidentship shall be an award to veterinarians as recognition of signal services rendered to the veterinary profession.

(e) Cadet membership shall be open to students of the local Faculty of Veterinary Science.

4. **Election :**

(a) Members :

(i) Every candidate for membership shall be proposed and seconded in writing by two members of the Association. The Secretary-Treasurer is to be notified at least one month prior to a General Meeting.

(ii) This proposal shall contain the name, address and veterinary qualification of the candidate.

(iii) The Council shall scrutinize every such nomination for membership before the next General Meeting, when it will recommend the candidate for ballot or otherwise.

(iv) A candidate recommended for election shall be declared elected if $\frac{4}{5}$ of those members balloting vote in his favour.

(v) No ballot will be taken on any candidate not recommended for election by the Council.

(iv) The Secretary-Treasurer shall notify the candidate of the result of the ballot in writing and, if elected, furnish him with a copy of the Constitution of the S.A.V.M.A.

(b) Honorary associates shall be elected by ballot of members as in (a) above.

(c) Honorary life vice-presidents shall be elected by ballot of members as in (a) above.

5. **Resignation :**

Any member wishing to withdraw from the Association shall give written notice to the Secretary-Treasurer before the first day of June. Such resignation shall be read and considered at the next General Meeting.

6. **Expulsion :**

(a) The Association shall upon the recommendation of the Council call upon any member to resign by a majority of not less than $\frac{3}{5}$ of the votes of those present at a lawfully convened meeting, and any member so called upon to resign and failing to do so within three months, shall forthwith cease to be a member.

(b) Questions for the consideration of Council with reference to (a) shall be made in writing and forwarded to the Secretary-Treasurer.

(c) The Council shall be empowered to call for such evidence in support of (b) as it may deem fit and proper.

7. **Subscriptions :**

(a) Each member shall pay on election the sum of one guinea, which shall be the first annual subscription. After the first year or portion thereof an annual subscription of one guinea shall fall due on the first day of June in each year. No member shall be entitled to the privileges of the Association until all fees have been paid.

(b) **Arrears.**—Any member three years in arrears with his annual subscription shall receive from the Secretary-Treasurer a letter sent by registered post requesting payment before the next General Meeting, and if such member does not pay before such Meeting, or give a reasonable excuse to the satisfaction of the Council, his name shall be removed from the membership list. No member so removed from the list shall be re-instated until his arrears have been paid.

(c) Each cadet member shall pay an annual subscription of 5/-.

8. **Privileges :**

(a) **Members, life members** and **honorary life vice-presidents** shall be eligible for all offices of the Association and shall receive all publications issued by the Association.

(b) Associated members shall be entitled to the privileges, rights and powers possessed by members of the Association, except in elections and such matters as pertain to the administration and internal economy of the Association.

(c) A cadet member shall be entitled to attend scientific meetings and to receive a copy of the journal of the Association.

9. **Council :**

(a) The management of the affairs of the Association shall be entrusted to a Council.

(b) The Council shall consist of :—

A President, Vice-President, Secretary-Treasurer and 8 Members or Life Members, duly elected.
Honorary Life Vice-Presidents shall also serve on the Council.

(c) The election of Council :

(i) The Secretary shall forward nomination forms to all members during the first week of January in each year on the following lines :

Election of Office-Bearers.

Nomination Form.

I, ...

hereby nominate .....

for the office of .....

Signature .....

Date .....

I agree to the above nomination, and will accept the office should I be elected.

Signature .....

Address .....

Date .....

(ii) On the nomination form the office for which any member or life member is proposed must be clearly stated.

(iii) Existing office-bearers shall be eligible for re-nomination at the termination of their period of office.

(iv) Nomination forms must be signed by the person nominated, signifying his acceptance of office if elected.

(v) The nomination form must be returned duly completed to reach the Secretary-Treasurer on or before the 31st day of January.

(vi) After the date fixed for the receipt of nominations, the Secretary-Treasurer shall prepare and forward to every member a voting paper setting forth the names of the nominees.

(vii) The voting papers, duly completed, shall be returned to the Secretary-Treasurer on or before the date stated thereon.

(viii) The counting of the ballot papers shall take place the day prior to the meeting by the Secretary-Treasurer and any one member of Council, and they shall submit a signed statement of the result of the ballot at the meeting.

(d) At meetings of Council five members shall form a quorum.

(e) Meetings of Council shall be held at the discretion of the President or on the request of three members of Council or ten members, and at such time and place as they may determine, notice to be given 10 clear days before meeting.

(f) In the event of a vacancy arising amongst office-bearers the Council is empowered to fill such vacancy from those entitled to the privilege.

(g) The following shall be Standing Committees (**) of Council:

(i) Editorial;

(ii) Finance;

(iii) Parliamentary;

(iv) Status.

Each Committee is to be elected by Council and is to consist of three members, two being represented on the Council. The Chairman-Convenor is to be elected by each Committee and the President is ex-officio a member of all Committees.

(h) Each Standing Committee shall submit a report in writing to be circulated to members at least 14 days before each general meeting.

(i) The Council shall have the power to appoint Sub-Committees for any such purpose and with such powers as the Council may determine, and Sub-Committees shall report to Council.

10. **General Meetings:**

(a) Meetings of the Association shall take place at least twice a year (Autumn and Spring), at centres and on dates to be decided upon by the Council.

(b) Members shall be notified in writing by the Secretary-Treasurer. This circular shall indicate the time and place of the meeting and such agenda as may be put forward for consideration, and shall be posted at least 14 clear days prior to the Meeting.

(c) Any member unable to attend a General Meeting may express his views to the Secretary-Treasurer in writing on any question on the Agenda, and these views will be read out and considered at the meeing.

(d) Ten members shall form a quorum for General or other Meetings. Members assembled shall wait half an hour prior to dispersing when there is no quorum.

(e) The President shall instruct the Secretary-Treasurer to convene a special meeting of the Association whenever he may deem it necessary, and at all times on the requisition of ten members.

(**) Each Committee, in order to avoid confusion, shall make written arrangements as to its responsibilities.

(f) The President shall occupy the chair at all meetings. In his absence the Vice-President or in his absence any member may be elected to the chair, and he shall be vested with all power of the President during such occupancy.

(g) The President, in addition, shall deliver an address to the members at the first meeting following his election.

(h) The Chairman shall declare the meeting open, preside thereat; regulate all the proceedings, state and put questions, maintain order, see to the execution of the Agenda and close the meeting on the conclusion of the proceedings.

(i) When a vote is taken the Chairman shall have a casting vote in addition to his ordinary vote as a member.

11. **Order of business :**

Order of business at General Meetings shall be :

(a) Reading of minutes of preceding General Meeting by the Secretary-Treasurer.

(b) Signing of minutes by the Chairman if approved by those present.

(c) Matters arising out of the minutes.

(d) Election of new members.

(e) Notification of election of Council (at Autumn Meeting).

(f) Consideration of the Agenda.

(g) Consideration of matters arising out of reports of Standing Committees.

(h) Introduction and consideration of any other matters not provided for in the foregoing rules of procedure at the discretion of the Chairman with the general approval of the meeting.

(i) Reading of papers and discussion thereon.

(j) Exhibition of specimens with discussion thereon.

12. **Conduct of Debate :**

(a) The ruling of the President on all subjects under discussion shall be final, but he may, should he consider it fit, take into consideration the opinion of the meeting on any point, should such a course be proposed and seconded by any members present.

(b) All addresses shall be made to the Chairman, who shall obtain and maintain for the speaker an orderly and impartial hearing.

(c) In the event of two or more members rising at the same time, the Chairman shall indicate who has the floor.

(d) The Chairman may at any time call upon a member to conclude his remarks, should he in the Chairman's opinion be trespassing on the time of the meeting.

(e) No member shall be entitled to speak more than ten consecutive minutes on the subject under discussion except with the permission of the President.

(f) After all who wish have spoken, the mover of a resolution is entitled to reply.

(g) No motion shall be discussed until duly seconded.

13. **Finance :**

(a) The financial year shall be 1st June—31st May. Finance shall be entrusted to the care of the Secretary-Treasurer, whose duty it will be :—

(i) to receive subscription of members, issue receipts for same and keep account thereof in a book provided by the Association;

(ii) to give notice to the Council of defaulters in payment of subscription;

(iii) to furnish for the Spring Meeting an audited statement of accounts;

(iv) to pay the Association's accounts when directed by the Financial Committee;

(v) to meet emergency expenditure which has been duly sanctioned and approved by the Finance Committee;

(vi) to deposit the funds of the Association in a Bank or other Institution approved by the Council.

(b) After receiving approval from Council, the Finance Committee shall invest available funds.

(c) **Auditing.**—The accounts of the Association shall be audited annually by two auditors appointed by the Autumn General Meeting, and the balance sheet shall be submitted to the Annual Spring Meeting.

14. **Secretariat :**

This will be in the hands of the Secretary-Treasurer whose duty shall be :—

(a) to keep a book, provided by the Association, in which shall be entered the rules, a complete list of members, life members, associates, honorary life vice-presidents and cadet members, and minutes of every meeting;

(b) to send out notices convening all meetings, such notices to include the Agenda;

(c) carry on all correspondence of the Association, retaining copies for reference;

(d) to submit a report at the Autumn Meeting of the Association. Suitable remuneration for assistance to the Secretary-Treasurer shall be decided upon and sanctioned by the Council on the recommendation of the Finance Committee.

15. **Alteration of Rules :**

(a) The alteration or rescinding of any rule or the promulgation of a new rule shall take place only at General Meetings.

(b) The rescinding or alteration of any resolution passed at a General Meeting will not be permitted until six months have elapsed. Further such rescission to be carried by a ⅔ majority.

(c) Notice of motion for any such alteration shall be given to the Secretary-Treasurer in writing, at least 21 days before the date of General Meeting, and shall appear on the Agenda.

(d) All such alterations shall be duly recorded by the Secretary-Treasurer.

16. **Copy of Paper :**

To facilitate a full and accurate report, members who read a paper before the Association shall furnish the Secretary-Treasurer with a copy of the paper on the day of the meeting.

17. **Visitors :**

Visitors to meetings may be introduced by members with permission of the President.