CONTENTS.

EDITORIAL.

"THE JOURNAL OF THE SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION."

THE first number of the Journal of the South African Veterinary Medical Association has made its appearance. The amalgamation of the Natal, Cape Colony and Transvaal Veterinary Medical Associations, each with a small quota of members, took place in 1920, and one association was formed for the Union of South Africa. Through the united efforts of its members, this body has gained considerable importance, and it has undoubtedly contributed much to the consolidation of the veterinary profession in the Union. It has taken every opportunity to further the interest and status of the veterinarians, and it is hoped that the Bill championed by this Association, will within the next year or so become an Act of Parliament. The Association has, with a certain amount of success, interested itself in various appointments pertaining to the status of the profession. In this respect, it is bound to play a much bigger rôle, especially as soon as the profession enjoys full protection.

For several years important papers have been read at the annual conferences of the Association, and it was felt that these papers presented valuable material for a journal. At present this Journal will be published annually, but it is hoped that in time the Association will be able to issue several numbers annually. The establishment of a periodical for the veterinary profession has been urged from various sources for many years with increasing insistence. Up to the present, the results of veterinary research and progress have been incorporated in departmental reports issued by the Union Government. The long delay in the publication of important results contained in these reports was a distinct drawback, especially to those members of the profession stationed in the country districts. The present Journal will overcome some of these difficulties and give increased facilities for the publication of results of scientific work. It will serve as a medium for information of the progress of research and promote the spread of scientific knowledge as the basis for rational and successful methods of prevention and treatment.

The Journal will contain articles on the results of new work and experience in all departments of veterinary science, general views on subjects of special interest, reports of meetings of the Association, and notes and news of personal and general interest.

The veterinary profession in the Union feels that the present Journal is to a large extent the outcome of the pioneer work in veterinary science commenced by the late Dr. Hutcheon and carried on by such ardent workers as Sir Arnold Theiler, Mr. Gray, Mr. Borthwick, and others. The Association realises how much it is indebted to these gentlemen who have rendered the profession in the Union a very great service in placing it on a sound footing. The brilliant research work conducted by Sir Arnold Theiler has opened up a very wide field. Great opportunities for research in veterinary science are offered and it is hoped that the results of this work will form the basis of many important articles for the Journal of the South African Veterinary Medical Association.

GENERAL MEETING OF THE SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

HELD AT UNION BUILDINGS, PRETORIA, AND AT THE VETERINARY RESEARCH LABORATORY, ONDERSTEPOORT,

on the 18th, 19th and 20th AUGUST, 1927.

PRESENT :

Col. G. N. Williams, D.S.O. (Secretary for Agriculture).
Dr. P. J. du Toit, (President, S.A.V.M.A.)
Major A. Goodall, (Vice President).
Dr. J. Quinlan, (Act. Treasurer).
Mr. A. C. Kirkpatrick, (Secretary).

Dr. G. de Kock, Dr. H. O. Monnig, Dr. D. G. Steyn, Dr. P. R. Viljoen, Dr. H. H. Curson, Dr. E. M. Robinson, Messrs. G. H. Melck, J. L. Webb, G. C. Webster, J. Spreull, A. M. Howie, R. Paine, E. T. Clemow, J. Chalmers, W. A. Dykins, B. J. Brummer, J. Nicol, J. I. Quin, W. J. B. Green, P. J. J. Fourie, B. S. Parkin, J. H. R. Bisschop, R. B. Osrin, J. G. Williams, P. S. Snyman, J. Reid, C. V. E. Mare, G. Martinaglia, I. P. Marais, J. R. Frean, J. H. L. Lyons, W. Jones, F. A. Verney, R. S. Garraway, W. M. Power, G. May, P. L. le Roux, A. S. Canham, M. Bergh, B. van der Vijver, S. de Villiers, R. A. Alexander, G. Pfaff, P. R. B. Smith, M. W. Henning.

Dr. du Toit :

Before we commence with this meeting, I have pleasure in calling on Col. Williams, Secretary for Agriculture, Union of South Africa, to address a few words to you.

Col. Williams :

Gentlemen, I do not propose keeping you very long. You have a heavy agenda, but it gives me great pleasure to be able to address you this morning. Were it not for the fact that I see before me so many Veterinarians, I would find it difficult to believe that there were so many in South Africa. It speaks well for the progress of the country; some years ago, there were only five qualified Veterinary Surgeons in the sub-continent, but much water has run under the bridge since then. We now have a fine institute at Onderstepoort, where we are able to train our own men in this country, and this has done away with a great deal of our former difficulties.

Major Goodall is going to deal with the economic problems in the cattle industry. We have all read the report dealing with one aspect

of the dairy industry issued by the Board of Trade and Industries, which I hope the Government will be prepared to accept, and so in a few years revolutionise our dairy problem.

I see Dr. Viljoen is going to give a paper on Tuberculosis—I presume purely on the scientific aspect. This is one of the biggest problems from a state point of view. As a matter of fact, the question of the steps which it is possible for the State to take, is engaging Dr. du Toit's attention at the present moment.

I think most of the gentlemen present are officials of the Union of South Africa, but of course there are several private practitioners whom I welcome. I have to welcome Mr. Verney, the Prinicpal Veterinary Surgeon of Basutoland, as also the gentleman from Portuguese East Africa. The more representatives we get from the neighbouring States, the better.

I wish you every success in your deliberations and feel sure that conferences of this nature can do nothing but good. In addition to the scientific knowledge and exchange of professional views, the comradeship arrived at by Private Practitioners and Government Veterinary Officers meeting from all parts of the Union cannot but be productive of good.

Dr. du Toit :

I was looking through our booklet of rules last night to make sure that I should commit no error to-day in conducting the conference, and then I saw for the first time that a President is expected to deliver an address at the first meeting after his election. It was thus very late in the day that I saw this rule; in the past we have always taken it for granted that it was not necessary to have a presidential address. I am sure you will all regard it as a waste of time listening to addresses when you can listen to scientific papers. However, before we begin, I wish to make a few remarks of a general nature.

If we look back over the past 12 months, one fact stands out and that is the change that has taken place in the Veterinary Division—or rather the Divisions—of the Department. After all, in South Africa, veterinary activity is very largely confined to the Government. During the last year the two old Divisions were combined under one direction. That in itself, I believe, represents progress in our work. The sad part, however, about this change was that the Department lost two most valuable officers—Sir Arnold Theiler and Mr. Borthwick; as far as the Association is concerned, I hope we have not lost them. Mr. Borthwick is still a member and we will have the privilege of his advice in the future as in the past. As to Sir Arnold, I sincerely hope that he is going to return to South Africa.

In regard to Sir Arnold Theiler, I wish to place on record, what we, as a profession, owe to him. I had occasion last year, during my absence in various countries in Europe, to compare the status of the veterinary profession in our country with that in other European countries. We in South Africa are to-day enjoying the respect of the entire population to a greater extent than is the case in most European countries. I do not say that we enjoy the undivided affection of every individual in the country, but certainly we are not regarded, as in many other countries, as belonging to a profession which is inferior to the medical or other professions.

In South Africa we are regarded with respect, perhaps with awe, by many people with whom we come into contact, and that position we owe to some of the great men we have had in the past, who have been the pioneers of veterinary science in South Africa. Among them may be mentioned the name of Dr. Hutcheon who placed Veterinary Science on a very high level in South Africa. That reputation has been kept up and enhanced by Sir Arnold Theiler. I feel that this tribute must be paid to him and this is the first occasion that we, as an Association, have of doing so.

In regard to the changes in the Division to which I referred, I need merely add here that whatever our present difficulties may be, and those we are bound to have in the future, I hope for closer association between research work and the application of research in the field. I am perfectly certain that every individual member of this Association, and more especially every individual Government Veterinary Officer will feel the result of this fusion in the future.

There is no doubt that in the past the officer in the field was frequently starved for information. Knowledge of what was going on in the research laboratories did not reach the man in the field and in many instances, it has been stated that the farmers in a district were better informed of what had been discovered in the veterinary laboratory than the Government Veterinary Officer in that district. Conversely, the Research Division was frequently unaware of new problems which cropped up in different parts of the country. I think that state of affairs is now over. We are all members of one Division and I am quite sure that this closer co-operation must redound to the credit and glory of Veterinary Science in South Africa.

When one speaks of the status of the profession in South Africa, one naturally thinks of the Veterinary Bill and I feel that it is my duty to refer to it in a few sentences. Unfortunately I cannot report great progress but I am optimistic enough to believe that we are

coming steadily nearer to the realisation of our wishes to see the Veterinary Bill become law. You will remember that this Bill was introduced by a private Member of Parliament, Adv. van Hees. When I last saw Adv. van Hees in Cape Town during last Session of Parliament he explained to me that the progress of the Bill would probably be greatly facilitated if our Bill were brought in immediately after the passing of the Medical Bill. It might be possible to let the Medical Bill go through the House first and then to rise and explain that certain sections of the Veterinary Bill were simply and literally a copy of the corresponding sections of the Medical Bill which had just been accepted by the House. He felt that he had every hope of getting the major portion of the Bill through immediately in this way and the remaining portion of the Bill in due course. This was the procedure which he proposed to adopt and, of course, we are prepared to leave the matter in his hands. You will see, therefore, that the fate of our bill depends largely on the fate of the Medical Bill, and I may state here that at a recent function the Minister of Public Health stated that he was quite sanguine that the Medical Bill would go through Parliament at the beginning of the next Session.

Perhaps I might also add a few words about the progress that we as a profession have made during the last year. I think that on the research side we can again tabulate a number of notable advances. I need not recapitulate them. The work of the Research Institute has been incorporated in the Annual Report, of which you will receive a copy in due course. From this I think you will be able to see the amount of fruitful work which has been done in the year. Of this work you will probably hear more during the next two days. I feel that great progress has also been made in regard to the field work. Of East Coast Fever we cannot speak of without a sigh, but I think that at present there is a definite improvement, and in this respect we must thank the Government for the splendid way in which they have come to our assistance. We realise that the burden of East Coast Fever has begun to weigh heavily on the country, and it is only, I think, by our united effort that we can hope to lessen this burden. Our Government has seen that we can only hope to make progress if we continue the work in concentrated form, if I may so express it. We must increase our forces if we want to make progress. Here and there we get a setback and although the position may not be as

favourable as we had hoped, I think that in every Province, with very few exceptions, there has been great progress, and we must look forward to the time when we shall be free of this disease. When you come out to the Laboratory to-morrow, we shall be pleased to demonstrate East Coast Fever in a few cases there.

I am not going through the list of diseases, but mention must be made of Scab in which there has been undoubted progress. I think the most hopeful sign in the Scab position to-day is that we know where the infection is. In the past, districts were frequently reported free of Scab, but were in reality still infected. Through some of the methods which have been introduced during the last year we are making definite progress in the eradication of the disease.

Of the other diseases, I must mention Tuberculosis, but we will have an opportunity of discussing that when Dr. Viljoen reads his paper.

I hope the time will come when it will be our duty merely to keep diseases out of the country—to look after the health of the stock, which I hope will then have greater value per head than it has to-day.

SOME ECONOMIC PROBLEMS CONFRONTING THE VETERINARY PROFESSION IN SOUTH AFRICA.

By A. GOODALL, F.R.C.V.S.

In presenting this paper which probably strikes a new note in our Society debates, I do not wish to make any apology. I can only hope that its novelty, and the somewhat unorthodox views expressed, will raise a good discussion, and possibly give us some food for reflection when we all return to our respective spheres of usefulness.

I suppose all of us on entering our chosen profession started off with some ideal beyond the main incentive of making a living. Most of us, I expect, in the "good old days," were encouraged to start on a Veterinary career by the inducements it held out for a sporting life in the open air, and, it is to be hoped, a real love of animals; but deep down in all of us, even in our most irresponsible days, must have been the genuine desire to prove our usefulness to the community amongst whom our lot was cast.

The conditions of modern times have brought about many wonderful changes in all walks of life, but our profession has felt them more than any other during the past twenty years, and South Africa has probably felt these changes more than any other country. We need not be very old to remember what an important part the horse played in the economic life of the country, and how anyone who had been trained to keep it in working order was one of the most popular and respected members of the community. Now, of course, the ubiquitous motor has completely changed this aspect of our usefulness, and the South African Veterinarian has probably had this brought home to him more forcibly than his confreres in any other country, owing to the fact that horses were nearly always kept for strictly utilitarian purposes, and were not much used for sport or pleasure, with the very limited exception of the racehorse and polo pony.

At this point I would ask your indulgence in briefly tracing the history of our profession in South Africa. As you are all aware, it was only during the last half century that real Veterinary science was known in South Africa, although there were doubtless many estimable men who did their best in the treatment of the diseases of animals long before this. The late Duncan Hutcheon of the Cape was, as far as I know, the first qualified Veterinarian to be appointed*

* *The late Samuel Wiltshire was appointed Colonial Vety. Surgeon, Natal, on 28/10/1874. Prof. Branford was the first C.V.S. of the Cape Colony and was succeeded in 1880 by the late Duncan Hutcheon.—Editor.*

in South Africa, to be followed later by Sir Arnold Theiler in the Transvaal and by Veterinary Officers in the other provinces. The usefulness of these pioneers having been grudgingly acknowledged by their respective governments, Veterinary staffs were gradually established in all the present provinces of the Union, and the great Rinderpest epidemic of the nineties probably gave a final proof to the public of South Africa that the Veterinary profession could not be dispensed with as a safeguard.

When compared with other countries, however, the history of our profession is peculiar, inasmuch as we have started and practically continued with the State Veterinarian, who to-day forms by far the largest part of our total number, whereas in other countries this official was generally an afterthought, and the profession was brought into being and kept going by the private practitioner, in much the same way as the medical profession has been in this and other countries. This has, to my mind, made a great difference in our relationship to the public and I propose alluding to this later on.

One must presume that in every profession, trade or calling, its members are paid by the general public for "value received," or in other words, people who do not have special knowledge of any special work pay those who do possess it. Our profession is no exception to this rule, and we are paid for preserving domestic animals, and endeavouring to keep them in a healthy state so that they can be profitable to their owners. Sentiment may play a small part in our relationship to the owners of favourite animals, but generally speaking, it is a matter of business, and we must prove our usefulness on the purely £ s. d. basis in the open market.

I cannot help thinking that we are now rapidly approaching a sort of "parting of the ways" in regard to our relations with the public in this country, when it will become necessary for us as a profession to undertake a sort of general stocktaking, and this process is just as essential for a profession as for the individual. As I have stated previously, the great majority of us in this country are State Veterinarians, and as such are very liable to lose sight of the business side of our job, particularly if we are employed year in and year out, as so many of us unfortunately are, in carrying out regulations and supervising a staff of dipping inspectors, etc.

There can be no doubt to anyone who has had the opportunity of watching agricultural developments in South Africa during the last quarter of a century, that conditions are changing very quickly; the old extensive or ranching conditions giving way rapidly to the

more intensive methods. The inexorable law of the "survival of the fittest" is going on, and farmers who attempt to carry on as their fathers and grandfathers did are rapidly going to the wall. We are now in a sort of "transition stage" in this respect, and it is the main object of this paper to endeavour to bring a few facts before you in connection with these changes, so that our profession can take its rightful place in the van of progress in this direction.

Value of Animals.

Referring once more to the business side of our profession, it is obvious that, as our services amongst the agricultural community are entirely governed by business principles, the value of the animals to the owner must have a very direct bearing on the value he places on our services. Those of us who have been in private practice know what a difference it makes when one is treating animals for an owner to whom they are real assets. By this I do not mean to imply that they need necessarily be thousand guinea bulls, rams or racehorses—I have heard quite a lot of gratitude expressed for curing a costermonger's "moke"—but the point is that the owners must realise that the animal possesses a real value.

Now it must be confessed that the ownership and value of animals in many parts of South Africa present many difficult problems which are unknown in other parts of the world. To those of us who think about these matters, the animals owned by natives form a problem which is very closely associated with the whole native question, which is always looming over the life of the country, and is now engaging the earnest attention of our politicians and other thinking men. At the present time natives own more cattle in the Union than Europeans, and if matters continue on their present lines there is every indication that in ten year's time this excess of native over European-owned cattle will be enormously increased.

Now it is all very well to talk lightly about doing away with native cattle, but anyone who has only a very rudimentary knowledge of native habits and customs must realise that cattle play a very important part in their social life, and that it would be a most dangerous and ill-advised policy to interfere suddenly with age-old customs in which the ownership of cattle means the difference between a man of standing and a worthless vagabond. The trouble is that the value set on his cattle by the native, and the European or market value, are two utterly different ones, and is an example of the difficulties one encounters in a country with a mixed population.

I am now going to make a statement which will probably bring a storm of criticism on my head, but I make it on the broadest possible economic grounds, and that is that the Veterinary profession is largely responsible for the enormous number of scrub cattle in the country at the present time. Our protracted and very thorough dipping campaigns, particularly in native areas, have so reduced the number of ticks that the percentage of calves reared has been enormously increased, the losses from tick-borne diseases so lessened, the grazing of sheep rendered possible in many areas where even a few years ago it was out of the question, that one wonders how cattle exist at all on their tramped out grazing grounds. One hears a great deal of talk about improving scrub cattle, but one must remember that only animals which have "adapted themselves to their environment" can live under these conditions, and consequently the despised scrub, which is practically useless from the European or market point of view, is the only animal which can survive. I sometimes wonder if our profession has not got a bit too far ahead of the times in this direction.

I alluded previously to changing conditions in South Africa, and there can be no doubt to anyone who observes these things that many farmers are still trying to ranch under absolutely unsound economic conditions. In the agricultural history of the world ranching has always been the "pioneer" form of farming, on the cheapest of land of practically unlimited extent. Directly these conditions cannot be fulfilled, and the land becomes more valuable and limited, ranching ceases to become an economic proposition, and yet how many farmers still stick to their herd of nondescript cattle, which take up grazing which could be used far more profitably, and are of little, if any, real value to their owners ? When one surveys the position in the Union to-day the real ranching land is very limited, and will become more so every year as other forms of farming are carried out. Before leaving the subject of scrub cattle, one is compelled to admit that the mixed population of South Africa has again helped to prolong their existence longer than would have been possible if farmers had had to supply a purely European consuming public, and the compound and Kaffir trade, although an extremely useful outlet for inferior meat, is undoubtedly a handicap to the development of our meat industry.

Personally, I think the time is not far distant when the finishing off and fattening of good class cattle produced on outside ranches will develop in this country, as it has done in America and elsewhere, and will prove a big impetus to the cattle industry, and of inestimable value to the improvement of small farms generally.

The dairy industry, although it has made enormous strides during the last twenty-five years, is still in its infancy, and there can be no doubt that it is, and will be, one of the main sheet anchors of the small man. One can only hope that it will not be long before all owners on comparatively small farms will realise that there is more profit in keeping and feeding a few good dairy cows than in a herd of nondescript rubbish.

Before leaving the subject of cattle generally in South Africa one is compelled to make some allusion to the working ox. Under existing conditions he plays a very large part in our agricultural activities—probably more than in any other country in the world. Whether he will continue to do so, when farms become smaller and more intensively developed, is extremely doubtful, as it is hardly likely that farmers will be able to limit their agricultural operations by the amount of grazing they can spare for their oxen. Oxen have already disappeared from the highly developed grain and horticultural districts of the Cape, and it is probable that equine and mechanical transport will gradually replace the trek ox when farms become more intensively used. One cannot lose sight of the facts that the great charms of trek oxen at present are that they can be worked by the rawest native labour, and that when they have finished their allotted span of usefulness they can be passed on to the consumer in the towns. Whether this state of affairs will continue, however, is open to grave doubt. Personally, I consider that the days of the working ox on intensively developed farms are numbered.

From the present somewhat depressing subject of the South African cattle industry I will pass on to our most important and staple animal industry in this country—the woolled sheep. Here, whilst at present the industry is in an extremely flourishing condition, signs are not lacking that with the enormous increase in the number of sheep year by year we shall soon be faced with serious Veterinary and economic problems in connection with these animals. I need only allude to the present system of trekking with sheep from the high to the low veld. This is a relic of the "good old days," but it is obvious that it cannot continue indefinitely. It has already come to an end in many parts of the country, and when it has ceased altogether we shall be confronted more and more with the problems associated with the keeping of highly specialised animals under intensive conditions.

I would just like to say a few words in connection with what may be termed the "side lines" of our main animal industries. There is no doubt that when the dairy industry continues to expand, the pig

While admitting that the larger consuming centres ought to employ whole time Municipal Veterinarians, I do not think it reasonable to expect that every small town should do so. But here I think Municipal duties ought to be a part of the work of the private practitioner, and might very easily be made the nucleus of a practice.

In outlining the changes which are taking place in South Africa to-day, and which are bound to go on even more rapidly in the future, I would like to impress on my colleagues, and particularly the younger ones, that it is up to our profession to take its rightful place in the forefront of this progress. That we have made wonderful strides, and probably from the Research and State Veterinarian side of our profession hold a unique place in the world to-day, is admitted, but are we not perhaps getting a bit top-heavy, and neglecting the purely utilitarian and business side of our job ?

Now the more I think and speculate upon the future of our profession in South Africa, the more am I convinced that before we can make any real advance on the business or utilitarian side, we must be protected, as every other profession is, by legislation. Let us admit that the time will come when the State will be unable to absorb the output of our graduates. I sincerely hope and trust that when that time arrives they will find good openings for private practice, possibly combined with part-time Municipal and State work like M.O.s of H. and District Surgeons in country districts, but it will be an unthinkable position if our young South Africans, who have devoted five of the best years of their lives to the study of their profession, find themselves, in all except one province of the Union, on an equal footing with every quack who cares to call himself a Veterinarian. Here again, I will be perfectly frank and admit that it has probably been the preponderance of State Veterinarians in our profession which has rendered this state of affairs possible for so long. If private practitioners had been in the majority and in as large numbers as the State Veterinarians, I venture to state that a Veterinary Act would have been on the Statute Book years ago.

I would not like any misunderstanding to creep into the remarks I have made about our relationships with the public in the past. Every thinking person will admit that if it were not for the untiring and wonderful efforts of the old Research and Field Staffs, farming, with cattle at all events, would still be impossible in many parts of South Africa to-day. The point I wish to emphasize is that in my humble opinion, the time is rapidly approaching, and has already arrived in many parts of the country, when the practical application

of all the knowledge gained will have to be disseminated on more intensive lines, and that it will not be possible or fair to the general taxpayer to expect that this should continue to be almost entirely a charge against the revenue of the country. Here again I do not wish to be misunderstood—I am sure all of us feel a deep sense of gratitude to the Government of the Union, and the outside Administrations of the Sub-Continent, for the interest and fostering care they have bestowed on our profession. The point rises, however, that this State aid has now probably gone about as far as can be expected, and the time is coming when we shall be compelled to stand more and more upon our own feet.

Personally, I hope, for the benefit of our profession in the future, that this change will begin to take place soon. I must confess that I do not think it healthy for a learned profession such as ours to be regarded almost entirely by the outside public and even "the powers that be" as a huge State Department, or a charitable institution. We are taken at our own valuation in this world, and if we permit this state of affairs to continue indefinitely, I am afraid that we shall not take our proper place in the scheme of things. Then again the great bulk of the public do not, and are never likely to, have much faith in the gratuitous services of professional men, and I do feel that for the State Veterinarian to continue indefinitely in the rightful province of the private practitioner is undermining our prestige and ultimate usefulness.

Now in outlining very briefly the changes which are taking place in agriculture in this country and our relations to them, I would exhort my professional colleagues, and particularly the younger ones, "to be prepared." The changes I have referred to are bound to take place, and it is up to us as a profession to assume our rightful place in connection with them. Even on the grounds of self preservation in the future, the more people who are making a good living out of their animals, the better it will be for us. It therefore behoves us to employ every means in our power to assist farmers in this direction and give them sound advice.

In the old days most of us were—or fancied ourselves to be—good judges of horses, and as such were held in great esteem by the general public. I am very much afraid, however, that we have not, as a profession, adapted ourselves to the changed conditions and demonstrated our special knowledge concerning other domestic animals, but have allowed others to take our place. In fact I have, on more than one occasion, heard the remark passed that the average Veterinarian only interests himself in horses.

I hold very strong views on this point, and consider that the Veterinarian should, by virtue of his training, be the only person fitted to give advice on all matters affecting the care and management of livestock in health and disease, in fact, in practice, it is difficult to draw any definite distinction. I consider that the Veterinarian in country districts should be a recognised authority on livestock generally. He should have a good knowledge of the various breeds of cattle, know their special suitability for various conditions, and general management. He should also possess a good knowledge of sheep and their management and, personally, I do not consider it in any way beneath our dignity to be able to advise people on modern methods in pig and poultry farming. In other words, it should be our earnest endeavour to fit ourselves to take our proper place in the development of the great livestock industry on sound lines, not only for patriotic and altruistic motives, but also because our own future welfare as a profession is so closely bound up in it.

I know there are some of us who may argue that the class of animal and its value are no concern of ours, and that we should attend to animals on a sort of "their's not to reason why" principle. I do however maintain that, for the future, it is going to make all the difference as to how the public regard us and our profession whether we have been the pioneers of good, profitable livestock or not.

In conclusion, I would desire to state that the views put forward in this paper are entirely my own in my capacity as a member of this Association, and must not be regarded in any way as "official." I can only hope that some of you will disagree and that we shall have a good discussion. I can give you the assurance that everything I have said has been prompted by a genuine desire to promote the welfare of the profession we all desire to see in its rightful place in this country. If we hold different views as to how this is going to be attained, so much the better, it will make us think about the matter, and not fall into that pleasant state of lethargy which is as fatal for communities and professions as it is for individuals.

DISCUSSION.

Dr. du Toit :

thanked Mr. Goodall for his address which he stated everyone had appreciated. It was necessary for us as a profession to take stock occasionally, not only to do our own job and to build up the scientific side of our profession but also to look to the economic problems which cropped up now, and would be greater in the future.

Col. Williams :

congratulated the writer on his paper which he said had gone to the root of the matter. He considered that as things were in South Africa to-day, it would be a good many years before the private practitioner took his place in the scheme of things as he had done in other countries.

Mr. Chalmers :

also congratulated the essayist and said the paper had given them all food for reflection. He emphasized the fact that Agriculture and Veterinary Science were inter-dependent and that the value of cattle made all the difference in the way the Veterinary Surgeon was regarded by farmers. He alluded to the way South Africa had lagged behind other countries, notably the Argentine, in the production of good cattle suitable for overseas markets.

Dr. Viljoen :

remarked on the sentimental value natives and many European owners placed on their cattle and this made any scheme for the improvement of cattle by eliminating the scrub very difficult in South Africa. He also referred to the value of the trek ox and the habit of trekking with stock which made our Veterinary problems more difficult.

Mr. Verney :

considered there was very little scope for private practitioners on the same lines as medical men (district surgeons). He agreed with the essayist that the Veterinary Surgeon should assist farmers in all matters appertaining to livestock. He also contrasted the conditions prevailing in most parts of South Africa with those in other countries, and expressed grave doubts if the country, owing to its enormous native population, would ever become a closely settled European farming country.

Mr. Melck :

alluded to the different conditions prevailing in South Africa on account of drought, native population, etc., to those in other countries and thought that on the whole the South African farmer had a good deal to be proud of. He said that one of our greatest handicaps was the lack of feeding in times of drought which made the rearing of high class stock a precarious business. He did not think that the conditions prevailing in most parts of South Africa held out much hope for the private practitioner.

Mr. Paine :

thought that the farmers had now got so used to calling on the Government Veterinary Officer that they would never be likely to support a private practitioner. He said it was a mistake to think that the G.V.O. should only deal with contagious diseases; his work in connection with other diseases was of enormous economic value to the country, and thought that, in the future, their number would increase rather than decrease. He also thought that the administration of regulations was purely professional work.

Dr. du Toit :

emphasized the fact that the scrub cattle problem affected the Veterinary profession very largely, inasmuch as when farmers went in for better bulls, etc., their great trouble was to keep them alive. The question of feeding animals also interested us as Veterinarians very much, and in this connection cited the prices realised for the experimental cattle at Vryburg as the result of bone meal feeding. He also considered that as the problems which faced the Veterinarian changed, so would there be more scope for the profession. He thought that when this state of affairs came into being, the Veterinarian would still remain a state official, but the question of asking farmers to contribute towards the services they received might be considered, particularly as the value of these services increased. The Government must also realise that it is a sound investment in actual money value to employ Veterinarians and increase the wealth of the country.

Mr. Goodall :

briefly replied to the points raised by the various speakers. He regretted that the discussion had not been more fierce, but in thanking members for the way his paper had been received, remarked that if it had given them some food for reflection, and if it would tend towards putting the profession they were all so proud of on a sound basis for the future, he felt he had not spoken in vain.

TUBERCULOSIS IN SOUTH AFRICA.

By P. R. VILJOEN, M.R.C.V.S., Dr. Med. Vet.
Deputy Director of Veterinary Services.

The following is a short summary of the remarks submitted by Dr. Viljoen :—

I have been asked to introduce the subject of Tuberculosis for discussion at this meeting, with the special object of obtaining the views of various officers on the methods to be employed for its eradication.

I wish to apologise for not having a written paper on the subject to submit to the meeting, but time did not permit of such a paper being written.

THE IMPORTANCE OF TUBERCULOSIS.

The importance of the disease is recognised throughout the world, so that this need not be emphasized. We have to consider the disease not only from the Veterinary but also from the public health point of view. In regard to the former the loss of animal life and depreciation in the value of infected herds are serious enough, but the danger to which public health is exposed constitutes a far greater problem.

The reduction or elimination of this danger falls on the Veterinarian who controls the diseases of livestock and who shares with his medical colleague the responsibility of safeguarding the public health against diseases transmissible from animals to man.

It is hardly necessary to detail the manner in which human beings can contract tubercular infection from animals. In this regard we must expect animal products to play the biggest role and of these products there cannot be any doubt that milk and its products constitute the greatest danger. Tuberculosis in cattle has a tendency to remain localised and B. tuberculosis does not commonly circulate in the blood stream, so that it is not often that the organisms can be demonstrated in the beef. Moreover, beef is almost invariably well cooked in this country and meat inspection is fairly well organised. Furthermore, Tuberculosis is uncommon in beef cattle in South Africa, so that all things considered the danger of human beings contracting the disease from consumption of meat is not very great.

The position in regard to milk and its products is entirely different; here we have to face a real danger, as will be readily seen from the following :—

(a) Tuberculosis is fairly common in dairy herds.

(b) There is not the same control over milk and its products, as is the case with meat.

(c) Milk or its products (butter and cheese) is commonly consumed in the raw state.

(d) There is very little control over dairy cattle and proper control is difficult on account of the widely scattered position of dairy herds.

(e) The native milker in South Africa constitutes a further complicating factor.

It is well known that Tubercle bacilli are frequently found in milk and that they are invariably present in cases of tubercular mastitis. Tubercle bacilli also find their way into milk in the so-called "open" cases (tubercular enteritis, pneumonia, metritis, etc.). It is also known that bovine tuberculosis is fairly common in children, especially of the alimentary tract. On account of this well recognised danger there has recently sprung up a universal outcry for a **clean milk supply** and tuberculosis-free dairy cattle.

Milk hygiene is therefore of the greatest importance to the Veterinarian and when we speak of milk hygiene we think first of all of the control and eradication of Tuberculosis in Dairy herds.

PREVALENCE OF TUBERCULOSIS IN SOUTH AFRICA.

Until about 10 years or so ago the disease was almost confined to dairy herds in the Western districts of the Cape, but more recently Tuberculosis has become increasingly prevalent in dairy herds in other parts of the Union. What the exact percentage of infection is, is impossible to say, but it is believed to be not more than about 10 in the northern parts of the Union. This could be determined only by systematic veterinary inspection and tuberculin testing of dairy herds on a large scale, neither of which has been carried out.

The incidence of the disease is, however, well known in **slaughter cattle**, since here we have abattoir figures available. In the Durban Export abattoirs the percentage infection was found to be only 0.05 in 62,000 head of cattle slaughtered.

In the same abattoirs a heavy infection was found to be present in pigs, 9% of 6.500 pigs examined. Many of these pigs were from dairy farms but the type of organisms, whether of bovine, human or avian origin, was not determined. This is now receiving attention.

SAFEGUARDING THE PUBLIC HEALTH.

The public can be protected to a very large extent by adopting some of the following methods :—

(1) **Efficient Veterinary Inspection of Dairy herds.**

In a widely scattered community like we have in South Africa, and with the comparatively few Veterinarians we have available, this is not easily carried out. To be of value veterinary inspection must be carried out frequently (say once a month) so that cases of tubercular mastitis or " open " cases may be detected early and excluded from milk production.

(2) **Pasteurization of Milk.**

This method is now largely practised in Europe and America, and is also adopted to some extent in parts of the Union. The main objections to the method are that the process is believed to destroy vitamines, and that it does not always effect the destruction of tubercle bacilli. Public opinion in many parts is against it, fresh milk being preferred. It is certainly a valuable method where other methods for eliminating the danger of tubercular infection cannot be applied.

Until proper methods for controlling and eradication of the disease in South Africa can be applied, pasteurization certainly should be adopted more widely.

(3) **Eradication of the Disease in Dairy Herds.**

This is the ideal method from the Veterinary and public health point of view, but there are many difficulties in the way, the greatest of which being the expense involved.

Before recounting the position in South Africa, it is perhaps as well to mention very briefly the methods employed in other parts of the world.

(a) In the United States of America, the method of **complete eradication** in the shortest possible time is being practised. The campaign was commenced in 1917 and since then tuberculin testing has been carried out on a large scale. Reactors are destroyed, with practically full compensation, and the tested herds are then accredited as tuberculosis-free. To show the magnitude of this campaign, it may be mentioned that up to this year (i.e., after 10 years work) over 13 million cattle have been accredited. The total cattle population is said to be 65 million, so that roughly 20% has already been accredited.

The American system is the ideal one, if the country's finances can stand it.

(b) Then we have the **Bang system** which has been applied successfully in Denmark, Norway and Sweden. This system is a voluntary one, and consists of testing herds, segregating the reactors from the non-reactors and building up a clean herd from the latter as also from newly born calves which are brought up on clean milk. Here slaughtering is applied only to clinical cases, so that the expense involved is very small. It means, however, that 2 separate establishments (infected and non-infected) have to be kept going and this is no easy matter. The system can only be successful when one has to deal with intelligent farmers who are willing to co-operate to the fullest extent.

(c) In Germany reliance is placed on Veterinary inspection and elimination of clinical cases. Clean herds are built up from calves.

(d) In Great Britain the Tuberculosis Order of 1925 is now in force. Under this order Tuberculosis of the udder, chronic coughs, or clinical signs and tubercular emaciation are notifiable. The trouble here is that owners do not know the disease and therefore fail to report. Moreover, the administration is in the hands of the local authority who can order examination of only the suspected cases. Disease in the rest of the herd will then remain undiagnosed.

(e) **In the Union of South Africa** the necessary powers for dealing with the disease are contained in the Stock Diseases Act. These may be referred to briefly, as follows :—

(1) Measures directed against the introduction of the disease from other countries especially from overseas.

These measures are applied to their fullest extent, no cattle being allowed to land in the Union unless they have passed through a tuberculin testing station overseas (at present Holland is the only country where provision for this testing exists) or have been submitted to and passed the tuberculin test at the port of entry. These provisions are sufficient to prevent further infection being imported into the Union, but as matters stand at present, one has to ask oneself whether such strict measures are really necessary when the disease is already in the country.

(2) The provisions of the Stock Diseases Act and Regulations require notification by the owner of any clinical cases or suspected clinical cases, and empower the Minister to carry out slaughter of clinical cases, to apply the tuberculin test to in-contacts or susceptible stock and to slaughter or isolate reactors to the test. Owing to the expense involved, the

provisions of the Act and Regulations have not been applied to any extent. All that has been done was to deal with clinical cases and to subject to the test any cattle definitely suspected to be infected. Here and there testing of the whole herd was carried out in the case of breeding animals.

As a matter of fact, no definite effort has been made to eradicate the disease, and in cases where the Department took action, such action was not of any great value.

It is practically useless getting rid of a few clinical cases, when the rest of the herd is left alone and further clinical cases may develop later without detection.

We must not forget, however, that the Union Veterinary Staff has had its hands full with other more urgent disease problems and that large sums of money are spent annually on the eradication of such diseases as East Coast Fever and Scab.

Yet we all feel that the time is ripe for taking drastic action in the case of Tuberculosis. The disease has perhaps been left alone too long and may be more prevalent to-day than we know of.

As already mentioned, the most ideal method of dealing with Tuberculosis is that adopted by the Americans; this method aims at complete eradication in the shortest possible time. Whether it can be adopted in this country will simply depend on our financial position during the next few years; I have no doubt whatever that it will be the cheapest method in the long run, especially since we believe that our herds are not so grossly infected—we hope not more than about 10% on an average. A definite policy has to be adopted and our campaign against the disease has to be outlined very clearly. Before this can be done and before we can hope to get the Minister's sanction to launch our campaign, we must be able to submit approximate figures showing the average percentage of infection in our dairy herds and, following on this, the approximate cost to the State.

Steps are now being taken in this direction and we hope to arrive at a rough estimate within the next few months. It is not proposed to start any campaign on a big scale, since before that can be done a great deal of propaganda work will have to be done among stock owners, our Veterinary staff will have to be increased and the necessary funds will have to be made available.

What we should do, however, is to commence the work in dairy cattle supplying milk to our big towns. In this way public health will be looked after first and from the town cattle we would be able to work back to the breeding herds.

Whether or not, and to what extent, slaughtering of reactors will be resorted to, must depend on our financial position; it seems likely that segregation methods may be applicable in many cases, especially on farms where valuable breeding cattle are present.

It need hardly be stated that where eradicative measures are in force, careful control will have to be kept over the introduction of new cattle; they will have to be proved tuberculosis-free before entering a clean herd.

We also have to work in the direction of obtaining better stable hygiene and regular inspection of dairy cattle and with this object in view we shall have to press for the appointment of Municipal Veterinary Officers, wherever possible.

Another aspect that requires immediate attention is the **diagnosis of the disease.** Under South African conditions the subcutaneous tuberculin test is often difficult to apply and the interpretation of results offers still more difficulty. We must, therefore, think of simpler and, under our conditions, more reliable methods. There is no time to go into this question very fully, but I must refer you to the work recently done in England by the Medical Research Council. In a report issued by them the intradermal and ophthalmic tests are referred to specially and it is known that a great deal of reliance is also placed on these tests by the American authorities.

The intradermic test has not been used extensively in this country, but it is hoped to work out the most suitable and reliable system of testing during the next six months.

DISCUSSION.

Dr. du Toit :

I wish to thank Dr. Viljoen very much for his interesting address. I am not going to discuss it now, but just wish to tell him that it certainly would be of great value, not only to those present now but more particularly to those who did not have the privilege of attending this meeting, if he could put his views more extensively on paper; it would be very valuable indeed. As he explained, the object of this paper is to stimulate discussion. I would be very glad if those of you who have had experience of this disease would express your views.

Mr. Parkin :

agreed with Dr. Viljoen that it was very necessary and desirable that all the animals of herds should be tested and registered. Animals would take on an increased value.

Mr. Smith :

I have had a little experience of this disease in America and among Friesland cattle in the Cape. The spread of the disease must be stopped before we can start eradicating it. A Board of Health could be approached to help in the matter. If a farmer could get a certificate that an animal was free of tuberculosis, he certainly would pay more for that animal. A great many of the farmers in the country really did not know what tuberculosis was. If we educate them first of all to realise what the disease was we would go further later on.

Mr. Goodall :

I think we are all very grateful to Dr. Viljoen for the way he has brought this matter before us. We all appreciate our responsibility in this matter and with what care it should be approached. Now seems to be the time that we should act, before things get worse. One direction in which we should get busy is the supply of milk and the public could do a tremendous lot to help. There are pure milk campaigns where a great deal of talk is gone in for and propaganda generally carried out on a most extensive scale throughout the country. If the public could realise the importance of and demand only pure milk we should soon make enormous strides in the control of the disease. It is a recognised thing that suppliers of milk cannot get more for the pure article than for the ordinary milk. If people wanted tubercular free milk and they would be willing to pay more for it, it would go a tremendous way to furthering the propaganda; also through the medium of the press a great deal of good could be done.

With regard to the control of the disease Dr. Viljoen has given us a great deal of valuable information as to methods which could be adopted and which have been adopted in other countries. My own experience is that temperatures are unreliable things and if we could eliminate it, it would be of tremendous assistance to us. I must confess that the Ophthalmic test has grave objection in a country like this. Then comes the Indradermal test which requires a great deal of technical skill and practice. Judging by the reports I have read recently this new test which the British Medical research people are bringing out has added considerably to the difficulties of the test. I think it would be a very valuable aid in this country especially under our conditions. The Research Division might propose undertaking experiments with this method to ascertain whether it held out any hopes as a diagnostic method for the eradication of the disease. We have all seen what grave difficulties people are put to who come

forward on their own to have their herds cleaned up. They have the bad end of the stick any way and their neighbours laugh at them. We have to be careful in any method of eradication and apply them all round. Clean herds must be built up in this country; I believe there are a couple of herds which are known to have been clean for some years. As regards the application of the Bang and Ostertag methods in this country, I think there would be greatest difficulty in carrying them out under present conditions. The continual veterinary inspection of the herds would practically be out of the question unless there were Government Veterinary officers close at hand. I do not think tuberculosis is so widely spread in South Africa at the present moment; I find that cattle that we get in the veld are free from tuberculosis. It is only when you get to the more intensely settled parts that this disease is much of a danger to cattle.

The point that we want to take into consideration is that tuberculosis is spreading rapidly among the natives in this country and they are the ones who attend the animals and we must make one combined effort to get to the natives in this respect first.

Mr. Chalmers :

I have to thank Dr. Viljoen for his lucid summary. It is a pity that we have no summary of this kind when we have to discuss this disease outside, as we do not know where to begin or to end, so to speak. I have had experience in testing cows and have 3 herds tested in the Witwatersrand. The conditions under which these are tested is that no fresh cattle are to be introduced until the others have been tested; they have been tested for years. (Mr. Chalmers cited his experiences in regard to the testing of herds of cattle.) One remark made by Mr. Goodall is one that we should remember and that is that the natives themselves are the cause of the disease spreading. Although all the dairies are under municipal control the regulations are not carried out properly; the overalls that the natives are supposed to wear, are only donned when they expect an inspector to come along. I have pointed this out to owners and they reply that the expenses of keeping the natives in overalls are prohibitive. As Dr. Viljoen suggests, I think that complete destruction of all reactors in South Africa would be the best. This is the only method for complete eradication. If a campaign against the disease is going to be started in a centre like Johannesburg it will be necessary for the authorities to interview the owners concerned because they are very rabid about the slaughtering of their reactors. Mr. Chalmers cites the position in Johannesburg at present. As regards the application of the test to be decided upon, I have not

seen the test carried out mentioned by the British Medical Association. The subcutaneous test is the one I have seen carried out. If you check the taking of your temperatures correctly and providing everything is prepared exactly and you study the feed, you will have no trouble with this test. As regards a certificate of merit being obtained from a tubercular-free herd, I do not think that procedure is going to help to better prices at all. There must be a tremendous amount of agitation by the public to make them appreciate this merit. This will be one of the difficulties you will have to face.

Mr. Nicol :

If this matter is to be tackled it must be done thoroughly; this is our experience in the Cape. (Here Mr. Nicol cited his own experience). And if the matter is to be tackled, one feels that the Cape cows should be tackled first of all and no Cape cows come round our way.

Mr. Melck :

Dr. Viljoen asked for figures of tubercular herds. I have no figures, but perhaps Mr. Spreull may give us some. We have no authoritative figures in the country. The only ones that might be found in the pigeonholes are of the tests which were carried out in the Cape, Middelburg, Stellenbosch and Paarl districts, and I think those figures are still obtainable. The tests carried out in those districts represent, I think, the only figures which we have available to-day. Unfortunately the Cape has been looked upon as the nursery of tuberculosis, but on the other hand, dairying and intensive farming was carried on successfully.

This scheme of tuberculosis fighting should be carried out directly on municipal areas and where dairying is carried on and milk is sold. Last year I was asked to give a lecture at Stellenbosch and I was severely criticised for talking quite a lot on the subject of tuberculosis and milk. They came to me afterwards and told me that I had done a lot of harm by talking about it; I was asked to go to the newspapers and ask them not to publish what I had said; naturally I did not do so. The reporter of " Die Burger " refused to withhold the remarks I had made and there was a great deal of correspondence on the matter.

With regard to compensation for cattle slaughtered, I think it is absolutely unwise for us to pay out full compensation as is done in America; I think a little sideline would soon be developed and then we would have the speculators getting busy and buying up all the suspected cattle and having them destroyed for the compensation paid out. We will have to suggest reducing the compensation some-

what. Some compensation will have to be paid but I think 25% is quite enough. Perhaps it would be worth while to consider some sort of a scheme to meet the expenditure in connection with the compensation, and an idea that has occurred to me is that a levy on all cattle in the country would be one method of trying to meet the expenditure. The fruit farmers have a levy for their propaganda work and I do not see why a small levy of so much per head throughout the country cannot be undertaken in connection with the matter.

As regards the disposal of reactors, I think Mr. Chalmers is right, the only thing is complete destruction. We would like to make a few exceptions, such as in the Agricultural Colleges, etc., where imported animals are reactors and it is possible to have them isolated, but destruction is the only possible thing.

Mr. Power :

I am sure we all appreciate Dr. Viljoen's comprehensive summary which will be of great use to all of us. Mr. Power cited his experience in this matter.

It is of course a really difficult matter and means a great deal of guess work to mention any percentage of animals and unless any definite steps are taken to ascertain in more ways than one to what extent tuberculosis is in the Union this information will not easily be forthcoming. The percentage of tuberculosis in pigs is very high. One would think that if infection in pigs would be of bovine origin then more cases of tuberculosis should be found in bovines. We have investigated the source of infection in many cases. I do not feel quite satisfied that all this tuberculosis is of bovine origin—it might come of human origin. I am glad to hear that most of the speakers here suggest no delay with this matter. Tuberculosis is a disease in which we cannot barge in and deal with it as with others. We have to go very slowly indeed; a couple of steps in the wrong direction will create a lot of harm. I know the position we have to contend with on farms where there are good pure bred cattle and farmers come and ask for advice. Two chief sources of infection amongst cattle are the dairy herds and the natives. I am sure our Chairman realises what a big work this is and the amount of time it will take to proceed on a very small scale. With regard to tests, from what I have seen of these the double indradermal test will be far more suitable in this country than the subcutaneous. The temperatures have to be taken in so many difficult areas and for that reason I think the indradermal test will be the more useful.

Mr. Alexander :

This subject has been treated all the time from the aspect of cattle. I have had the privilege of working with Mr. Mitchell for years, the recognised authority on poultry in this country, so would like to enter a plea for poultry. I am unable to give you any correct figures, but I recollect one outbreak of tuberculosis in a flock of birds in Natal. Mr. Alexander then stated his experience in connection with tuberculosis in poultry while working with Mr. Mitchell at Allerton.

The poultry industry is a rising industry and deserves speaking of. I recommend the introduction of the word "poultry" in the Stock Diseases Regulations and that this question be taken up in the immediate future. The people interested in poultry would have no objection to this word being included.

Mr. Snyman :

I would also like to enter a plea for the pigs which are infected with tuberculosis. Pigs are heavily infected especially in all the native locations. About 50% of the pig breeders have tuberculosis amongst their pigs.

Mr. Spreull :

I thought it would be a good thing if the younger men were to speak first, that is why I have not been on my feet before. I have been agitating for something to be done in this matter for years, but every time I have touched on tuberculosis it has got me into trouble. Unfortunately the results derived were very few. On one occasion 22 cattle were sold on a privately-owned farm. They were well-bred Frieslands and went to something like 16 different places but we knew that they were tubercular and followed them up and 16 of them had to be destroyed. They were full of the disease and had raised a storm of talk along the Rand.

We were talking about statistics. There are certainly statistics in the office at Capetown somewhere but will take a lot of searching for after piling up there for years. Even these have not been of very much value for the simple reason that we have tested for dealers who were sending stock up to the Transvaal and Natal. Many of these dealers knew well where to get good stock; they knew the infected places and kept away from them. We believe there is a good deal of tuberculosis in the Cape Peninsula and around it, not only in the dairies but on the farms. We have not much in the way of statistics but we have abattoir statistics which are of little use to us for the simple reason that they are killing South West cattle. We must tackle the problem with some proper scheme again, and

we have a good suggestion from Dr. Smith when he states we might go through the breed societies; it might do a great deal of good. We would first prevent the spread of the disease by means of bulls from our best herds in the country and prevent the spread of fresh sources of infection, if we got the breed societies together. As a matter of fact, I was once told by a breeder that he sent forward his bulls with a certificate to the effect that they were free of tuberculosis and this fact actually militated against them at the sale; he was told that if he had no tuberculosis amongst his cattle he would not have had them tested. This is a most unfortunate position and one which we will have to combat. Mr. Spreull outlined his experiences in taking tests and stated that he had never had to have an animal killed without finding lesions in it.

I do not think full compensation should be paid for reactors, but I do think that at the present time the compensation paid is inadequate, nor that the full burden of compensation should fall on the State. We should come forward with a campaign of propaganda and get people interested and the municipalities to take action along the lines of disinfection of premises. It would also help if we could get them to have a campaign on a general "clean-up" line. This is being done in hundreds of towns in America. It would be a distinct step forward if milk supplies could be obtained from tubercular free herds. Beginning in a small way in this country we could make progress and get the public, dairymen and everybody else to join us. I find the dairyman difficult to deal with and one has to be very careful all along the line in every step you take.

Dr. du Toit :

I think we could carry on with this discussion very much longer if time would permit. Dr. Viljoen will now reply to any questions.

Dr. Viljoen :

There are of course very many points to reply to, but since it is getting late, I shall refer to the more important ones only.

First of all I must express my gratitude to the gentlemen who have come forward and discoursed on this subject. Any little trouble I have taken over the subject has been very amply repaid by the assistance that has been given to us. Indeed there are one or two extremely important points which we have to discuss. Many speakers seem to feel that we should not come forward with any scheme until we have public opinion behind us or until the cattle breeders or dairy owners have been educated up to the importance of tuberculosis. The point is this that unless we have something definite to work on we have no right to make any propaganda. We

must first of all obtain the Minister's approval of a definite policy before we can enlist the sympathy of the public. Practically all testing has been stopped, as far as the Department is concerned, except of course in cases where it is purely for diagnostic purposes. We are even worse off than we have ever been before, so that we must formulate a policy, get the Government to agree to that policy and then go forward with some big propaganda. We should preach tuberculosis all over the country and for this propaganda work we have one or two excellent films which we obtained from the United States and which they have been using in their campaign. In connection with the statement made by Mr. Spreull that people are bound to give trouble, I feel that if we went forward with a definite policy we would get people to listen. As soon as details of the campaign have been settled and as soon as they know that we mean business we will have less trouble than in the past. If the campaign is carried out in a spasmodic manner people will object, and quite rightly too, but if it is adopted generally we will not have much opposition in regard to the eradication of the disease.

It has been repeatedly brought up this afternoon that we should start with breeders and not municipalities. The position is simply that at present the public health aspect is of great importance and the Public Health Department is bringing pressure to bear on this department.

As to the question of compensation, we have many differences of opinion. Our files reveal that farmers consider the compensation paid too low and that it is no use launching a campaign until the rate of compensation is made larger. As regards the local authorities contributing towards the compensation, I am very much afraid it cannot be done. We have to carry out the Stock Diseases Act.

The idea of the levy which has been brought forward is a very good one. If it could be put through not only in connection with this disease but with other diseases as well, but those of you who know our farmers will realise that they will not accept this lying down and submit to even a levy of 1d. per head. Apart from this, you have heard our friend state that well bred cattle are the worst infected ones. Now are we to make a levy on that type ?

With regard to the question of Avian Tuberculosis, I am pleased that this has been mentioned. I do not know the extent to which it has been found present in poultry in this country, but it appears likely that it might have a bearing on tubercular infection in pigs. We have asked for material from all parts to be sent forward to the laboratory for the purpose of investigation, especially with the view to determining the types of organisms present.

I once more thank the speakers for the assistance they have given me in trying to evolve some method of tackling this problem.

BOTULISM IN THE DOMESTICATED ANIMALS.

By Prof. E. M. ROBINSON, M.R.C.P.S., Dr. Med. Vet.

BOTULISM in the domesticated animals has been investigated during the last 10 years in the U.S.A. and much work has been done on it recently in South Africa. Human botulism has been shown to be due to an anaerobic sporulating bacterium, Clostridium botulinum, now recognised to occur in two varieties, A and B, serologically distinct. The Cl. botulinum produces a very powerful exotoxin which causes symptoms when taken in by the mouth, but it is very much more toxic when given subcutaneously or intravenously. The bacteria when washed free from toxin are harmless. The spores are exceedingly resistant. Symptoms seen in human botulism are those of a bulbar paralysis.

Investigations into forage poisoning in cattle and horses in the U.S.A. showed that it was frequently due to eating food containing the toxin of Cl. botulinum, usually the B type. The symptoms were those of a paralysis with implication of the tongue and throat muscles in many cases. Spoiled silage was incriminated in some cases, but chicken foeces produced it in one outbreak. "Limber neck" in chickens, a paralysis, was shown to be due either to Cl. botulinum A or B toxin in food, or to a third or C type occurring in decomposing fowls and produced by ingestion of Lucilia caesar larvae from the carcases. "Limber neck" probably occurs in South Africa especially in ducks.

There is little evidence as to the occurrence of botulism in domesticated animals in Europe but in Australia "bush sickness" and "midland disease" of Tasmania are due to botulism of the C type, and the organism responsible was named B. parabotulinus by Seddon. It was isolated from carcase material.

In South Africa botulism is widespread in animals but rare in the human being. "Lamsiekte" of cattle is botulism due to an organism of the C type which produces a powerful toxin in decomposing carcase material in certain parts of South Africa.

Several outbreaks of botulism in equines have been investigated in South Africa. They occurred chiefly in stabled animals and were due to contamination of the food by the carcases of decomposing rats. In one outbreak the toxin producing organism was isolated in pure culture and shown to differ from the organism of "lamsiekte" serologically, but to belong to the C type of the botulinus organism.

In some cases of equine botulism the bacteria were isolated from coecal contents when the original infective material was not traceable. The part played by decomposing vermin in forage stores is an important one in botulism of equines.

By producing antitoxins against various C types of the botulinus organism it can be shown by toxin antitoxin tests that there are several distinct varieties. The C types are very similar culturally and morphologically but differ in certain cultural characteristics from the A and B types.

The treatment of botulism is not hopeful and the prognosis is bad. Antitoxins can be used prophylactically but are of little use in treatment. Preventive measures are the most effective means of dealing with the condition and consist of removing the animals from access to contaminated food material.

The general symptoms of botulism in the domesticated animals are essentially the same whatever type of toxin has been ingested. The symptoms may be acute, subacute or chronic according to the amount of toxin taken in. Paralysis of the voluntary muscles occurs and the muscles of the tongue and throat are usually involved in acute cases. Recovery is rare but may occur and convalescence is slow.

Dr. E. M. Robinson read a paper on Parabotulism.

DISCUSSION.

Dr. du Toit :

In thanking Dr. Robinson for his interesting paper, I would like to add that his modesty prevented him from stating what a prominent share he had had in doing this work. Investigation has been going on for a great many years and although all the factors leading up to the disease had become fairly plain there always remained yet the last deciding point to get at, the isolation of the factor which caused the disease. He tackled this work and succeeded in getting this irksome part of the work accomplished. He has been busy on this work for some time now—as well I know, for I am his neighbour and experience the evil smells which he derives from his experiments.

Mr. Chalmers :

I would like to state my experience in connection with the disease; it was first brought to my notice as occurring in Germiston. When I first saw the animal it had what I termed parabotulism. Other animals had died and I noticed that a tremendous amount of saliva was running out of their mouths. The symptoms described by Dr. Robinson were exactly those shown by these cattle. I tried

all kinds of drugs on these animals. They lasted for some days and then died; some lasted four or five days before death set in. It was then that I suggested salted water, or pickled water. The animals were of a good type and the owner was getting anxious about it when I suggested the pickled water (saturated solution of common salt). The next time I went there, there had been no more deaths.

Mr. Chalmers then cited further experiences of his in connection with this disease. This disease evidently is contracted through dead rodents, although in one case a dead kitten was found in some forage that had been eaten. The kitten was sent to Dr. Robinson and he stated it contained a very virulent toxin of the parabotulinus type.

SMEAR EXAMINATION AT LABORATORIES.

By Prof. C. P. NESER, B.A., D.Sc., M.R.C.V.S.

WITH the permission of the members of the Association, the title of the paper was changed to the above, the original title being "Pitfalls in smear diagnosis."

Dr. Neser :

briefly outlined the various difficulties experienced by Officers examining the smears at laboratories, and pointed out that the diagnosis given by Officers were for the particular smears that they examined. Naturally, one is under a disability because no one at the Laboratory can state with certainty that the smear which he examined is actually the smear which is supposed to have been taken from a particular animal. "I, therefore, make an appeal to those colleagues who find it impossible to examine their own smears to make it their duty to see that smears are sent to us in a proper manner. The reason for this appeal will be obvious if I point out to you that on one single occasion every examining Officer had to do 170 smears in one day. You can imagine the strain after a period of months. This would have been a trying experience for anybody even if the smears had been good, which unfortunately is very often not the case. The Field Veterinarian should, therefore, impress upon the Stock Inspectors under his charge the necessity of making good smears and of packing and sending these properly so that when we receive smears at this end, there should not be the slightest doubt as to where they come from, who sent them, etc. It should also be an instruction to Stock Inspectors to give a little information because such information is often very helpful.

In order to bring home to you the absolute necessity of having good smears, I shall make a few remarks about East Coast Fever. One Officer examining a badly made smear thinks that there is a possibility that the smear was made from an animal that had died from East Coast Fever. This smear is then referred to a senior Officer, who perhaps holds a different view. The smear is then referred to a third Officer who may side with one or other, and in this way the smear may ultimately find its way to the Director to give a final opinion.

As to the reasons why smears arrive here in such a state that a diagnosis is difficult, I think that you are all fully aware of these. I, therefore, briefly mention the most common cause of indifferent smears. Undoubtedly to my mind this is due to the fact that the carcase is allowed to lie too long before the smear is made. Another

difficulty that we very often experience is that smears arrive from the post, sometimes with the wrappers, sometimes without the wrappers, and this is undoubtedly due to faulty packing and because the smear was not properly wrapped up. I here again appeal to my colleagues in the field to see that every Stock Inspector is properly instructed as to the despatch of smears. If smears are not properly packed, they may be lost in transit. The points raised concern matters of such national importance that I confidently expect that you will give effect to this appeal and that we shall in the future receive smears here properly made and properly despatched. I would like to point out that it is very much easier to examine 200 well made smears, and to feel confident of one's diagnosises, than 50 smears that are badly made. While making this appeal to you, I may state that I am not so optimistic as to expect an immediate improvement, but I do hope that the improvement will come about in the shortest possible time, both in the interests of the public and of the Officers who have to undertake the arduous duties of examining smears.

To those of you who will be undertaking your own smear diagnosis in the future, I want to give a word of warning. There are very many pitfalls in connection with smear examination, but the greatest of these is **over-confidence."**

Dr. du Toit :

"This interesting subject is now open for discussion."

Mr. Nicol :

pointed out that the smears from each district could be numbered so that mixing up can be avoided.

Dr. Neser :

"At Onderstepoort we have to deal with the whole of the Transvaal, the whole of Northern Natal, parts of the Free State and Colony, so that I am afraid the suggestion would lead to the greatest possible confusion here."

Mr. Howie and Mr. Chalmers :

contributed to the discussion, the former suggesting that the official stamp of the particular office should be used, and the latter pointing out that the Postal Authorities would not accept this.

Mr. Chalmers :

further pointed out that a good number of smears were actually taken by the Police. In many cases they were young recruits. He suggested that these Officers should be shown how to make smears properly and how to despatch them.

Mr. Goodall :

endorsed the remarks made by Mr. Chalmers.

Mr. Spreull :

suggested that the reverse side of a smear sent in by a native may often be found the better one.

Mr. de Villiers :

pointed out that smears from slaughtered cattle had to be sent to the Laboratory whereas they could be examined by the G.V.O. If the G.V.O. found any suspected cases, he could forward such smears to the Laboratory for confirmation or otherwise.

Dr. Neser :

" Are you not mistaken ? So far as I know, there is no objection to G.V.O.'s examining smears. On the contrary, Officers at the Laboratory would be only too delighted to be relieved of this burden of smear examination."

Mr. de Villiers :

reiterated that as far as he knew, all smears in the Transvaal had to be sent to Onderstepoort.

Mr. May :

" There is no objection to an Officer examining smears for his own information, but they must be sent to the Laboratory for confirmation in case of positive diagnosis. Moreover, when a farm has been placed under quarantine, all the smears can then go to the G.V.O. because he can examine such smears at his leisure. The main object of the examination of such smears is to make certain when the last case of East Coast Fever occurred. There is no very great need for haste in this matter seeing that the quarantine period extends to 15 months after the last death.

It is impossible to supply everybody who sends smears with the official stamp, and for this reason I am not in favour of the suggestion made."

Mr. Frean :

endorsed the remarks of Mr. May and further pointed out that it would lead to considerable saving because then it would be unnecessary to send wires from Onderstepoort.

Mr. Webb :

" It is a great surprise to me to hear of the rule mentioned by Mr. May. I thought that the G.V.O's. were encouraged to examine their own smears. For the last 16 years I have not sent a smear to the Laboratory. The practice of sending smears to the Laboratory must increase the work of the staff tremendously."

Mr. Pfaff :

stated that he always examined his own smears first and then sent them to the Laboratory for confirmation. He thought it was unnecessary to send all smears for confirmation.

Mr. Webb :

"Only when fresh outbreaks of East Coast Fever occur do I send smears for confirmation."

Mr. Howie :

pointed out that where the G.V.O. has a big area, he may find it practically impossible to do his smears. In some cases there is an actual saving of time in getting results to the farmer by following the practice of sending smears to the Laboratory.

Mr. Chalmers :

supported Mr. Howie's statement. "Along the Rand smears must be taken from every carcase, and it would be absolutely impossible for the smears to be examined in Johannesburg.

Dr. Neser :

In reply to Mr. de Villiers stated that it would probably come as a very great surprise to the gathering that during the last outbreaks of East Coast Fever several diagnoses were made for the first time from animals purported to be slaughtered. "A native suspects that the animal is suffering from a serious disease and destroys it straight away in order to make use of the carcase. The G.V.O. must, therefore, carry the entire responsibility for diagnoses or else it would be inadvisable to discontinue the old practice."

Mr. de Villiers :

pointed out that he only referred to animals which he knew to be perfectly healthy at the time that they were slaughtered.

Dr. du Toit :

"I just want to add that this question of smear examination will be discussed tomorrow as a departmental problem. There is considerable divergence of procedure at the present moment, but this also will be discussed tomorrow. We will simply have to change the present system. It cannot go on. If a Field Officer comes back from a long day's work feeling tired and disinclined to do smears, he can post them to the Laboratory. I can assure you that the Officers at Onderstepoort, at any rate, whether they are tired or not, have no option but to examine all the smears sent to them. The position has become intolerable to my mind. Last year we reported the fact that we had 18,000 smears to deal with. This year we have already dealt with over 50,000 smears and the probability is that by the end of the year the number will be well over 100,000. This smear work is paralysing all the activities at Onderstepoort. However, the whole question will be discussed tomorrow. I wish to thank Dr. Neser for opening the subject for discussion and also have to thank all those members who took part in the discussion."

LIVER FLUKE IN SHEEP, GOATS AND CATTLE.

Its Treatment with Carbon Tetrachloride.

By G. H. MELCK, M.R.C.V.S., Worcester, Cape Province.

THIS disease is caused by the presence in the liver of a Trematode worm, the commonest species being the Distoma Lanceolatum and Distoma Hepaticum. [The species occurring in S.A. are Fasciola Hepatica (Distoma Hepaticum) and F. Gigantica. Dicrocoelium Dendriticum (Distoma Lanceolatum) has so far not been found in S.A.; it is not effectively destroyed by Carbon Tetrachloride, nor by Male Fern preparations.—Editor]. The fluke is flat and more or less round and leaflike in shape and brownish in colour. It is seldom more than an inch long and little more than half as broad.

The adult fluke is found in the ducts of the liver where it may exist for a long while. It is there that the fully-developed fluke lays a vast number of eggs which pass out along the bile-ducts into the intestines and thus get distributed on the pastures. Eggs that fall on dry ground will never develop further but those that get to water or damp places hatch when the temperature is suitable. To complete its life-cycle another host is necessary, and certain species of fresh water snails are suitable hosts.

When the embryo leaves the egg and comes into contact with a suitable fresh water snail it burrows its way into its pulmonary cavity. In the snail it undergoes further changes until the "Cercaria" stage is reached when it leaves the snail and attaches itself to the grass at the water's edge. There it is eaten by the sheep and so finds its way to the liver to complete its life-cycle and develop into mature flukes.

In combating this disease one therefore realizes the necessity of not only attacking the fluke in the liver but also destroying the essential snail and rendering the conditions impossible for the development of the fluke and snail.

The fresh water snail is a small brownish snail with a spiral cone-shaped shell ¼ to ½ inch long.

Symptoms.

Slightly infected sheep will not show any apparent symptoms but badly infected cases somewhat resemble sheep suffering from wire-worm. The sheep appears dull, the ears droop, and condition is lost. The animal becomes weak on the legs and is easily tired when driven. A dropsical swelling appears between the angles of the lower jaw. If the infection is bad the sheep will gradually become weaker until it dies.

On Post Mortem examination the chief symptom is the presence of the Fluke in the ducts of the liver. In chronic cases the liver has become cirrhotic (fibrous and hard). It is also paler in colour and altered in shape and when cut produces a gritty feeling. The large bile ducts are conspicuous as white, fibrous cords. The body cavities including the heart-sac contain a serous fluid. Liver-Rot is known in most countries of the world and until an effective curative treatment was discovered to kill the fluke in the liver only preventive methods could be relied on. There are, however, localities where circumstances rendered it impossible to carry out these prophylactic measures thoroughly and in such localities sheep farming had become impossible. It will, therefore, be readily appreciated that the curative measures now known to us will prove a great boon to stock farmers in the infected regions.

Although the treatment with Carbon Tetrachloride explained below is so simple and effective it is nevertheless necessary always to keep in mind the preventive methods and practice these whenever possible. I will, therefore, briefly enumerate them.

Preventive measures must be directed not only at the Fluke but also at its essential host—the fresh-water snail. The latter cannot live without moisture and the first essential is, therefore, to **drain** all swampy places.

If drainage is not possible such places should be fenced off and sheep kept away from it—the sheep should rather graze on the higher veld where it is dry. Stock should, if possible, not drink at infected dams—the best way is to let them drink out of troughs fitted with a stop-cock. The circular concrete tank with a trough built round its base to the outside is an ideal invention.

The distribution of salt or lime on swampy pastures has been found to destroy the snail but Copper Sulphate—(Blue Vitriol) (used in a solution of one in a million) is more effective, cheaper, and more easily applied, and I recommend this for use in dams, etc. At that strength it is harmless to stock.

Sheep that have regular access to a salt lick will seldom be seriously infected with fluke. A suitable lick consists of a mixture of salt, bone meal, and Copper Sulphate. Such a lick is beneficial for many other evils besides liver fluke and is an essential factor in successful sheep farming. Use 1 part Copper Sulphate to 100 parts salt and bone-meal mixture.

There are, however, certain localities such as irrigation areas where stock can only be kept on the irrigated fields below the furrow. These camps are constantly being infected by the water from the irrigation canals; the canals in turn being infected from the main

river or reservoirs. Here it is difficult to tackle the snail and apart from the lick mentioned above one can only rely on curative drugs.

I have experimented with powdered Kamala, Male Fern preparations and Carbon Tetrachloride. Kamala was fairly effective but not so good as the other drugs. Male Fern preparations destroyed the fluke alright but its price is prohibitive. Carbon Tetrachloride destroyed the fluke, is very effective, safe, easy to administer and very cheap. My method of administering it is as follows :—

The dose is from 1 to 2 c.c. for Sheep and 3 to 4 c.c. for Cattle, and the drug is mixed with milk, or linseed oil. A convenient way is to use a 10 c.c. syringe, pour the drug into a cup and the milk or oil into a bowl. First draw up the required amount of the drug and then fill the rest of the syringe with milk or oil.

The sheep is held standing, the nozzle of the syringe inserted inside the pouch of the cheek and the contents slowly emptied into the mouth.

The drug is best given in the morning, the sheep may go to water and graze at once, but they should not be driven or allowed to walk much for the next 2 or 3 days.

It is harmless to in-lamb ewes.

The flukes will be dead in 24 hours and after that the sheep will recover their condition rapidly.

Infection usually takes place during the Spring or Summer months and it is therefore advisable to dose at the end of summer and again before the Winter or preferably every 4 months in badly infected areas.

Carbon Tetrachloride can be obtained from all chemists. Great care should be taken that only absolutely pure Carbon Tetrachloride is purchased. The drug is used commercially for various purposes and frequently contains impurities which cause deaths amongst stock dosed with it. A 1 lb. bottle is sufficient for 150 to 200 sheep and will cost less than ½d. per sheep.

Syringes are obtainable from the Director of Veterinary Services, Onderstepoort, Pretoria.

By practising the preventive measures as much as possible and administering Carbon Tetrachloride at regular intervals the probabilities are that you will clean your farm of infection.

(Sgd.) G. H. MELCK.

DISCUSSION ON LIVER FLUKE IN SHEEP.

Dr. du Toit :

Thanked Mr. Melck for his interesting paper which was much appreciated.

Mr. le Roux :

Referred to the early history of liver fluke in sheep and Mr. Hutcheon's investigations in 1883. He also spoke on the life history of the fluke and the rapidity with which it increased.

He was of opinion that cattle were more susceptible to poisoning by Carbon Tetrachloride than sheep. Cattle were not so easily infected as sheep where the grazing was not too short. It is believed that immature flukes are not killed in treatment. He was of opinion that January to March were the most dangerous months for infection in S. Africa.

Dr. de Kock :

We have carried out quite a number of experiments here with Carbon Tetrachloride as a result of correspondence received from Govt. Vety. Officers. From information received it appears that satisfactory results have been obtained by using C. Tetrachloride and Mr. Melck suggests giving 2 c.c. We have tried to ascertain if larger doses would be safe. Unfortunately our observations are not yet conclusive. Dr. de Kock gave details of experiments undertaken at the laboratory. He found that a dose of 5 c.c. affected the liver. As experiments carried out at the laboratory had not been satisfactory he advocated further investigation before advocating the general use of the drug.

Dr. Viljoen :

Expressed his appreciation at the way Mr. Melck came forward at a moments notice to read a paper. The value of the experiments were enhanced by being carried out under field conditions. He hoped that it would be possible in the future for field officers to assist by doing more research work in the field and recording their own observations. The results of experiments carried out in S. Africa were of greater value to us than similar experiments conducted in other countries.

Mr. v. d. Vyver :

Stated that he had experimented with Filmaronic Acid but had had unsatisfactory results as the flukes were not killed. He thought they became infected during the winter as they died towards the end of the year.

Dr. Monnig :

Spoke on the life history of the fluke and explained that fluke could live for a long time and thrive under suitable conditions of temperature and moisture. In winter snails are quiescent and the chances of infection are then reduced.

Mr. Verney :

Mentioned that he had recently found areas in Basutoland heavily infected with snail and fluke, and he was going to give Carbon Tetrachloride a thorough trial. He had used this drug for worms in houses and found it very effective and easily administered in capsule form.

Mr. Payne :

Raised the question of destroying infection in dams and reservoirs.

Mr. Goodall :

referred to the big economic problem connected with the question of Fluke destruction on the large irrigation areas. With the addition of new irrigation schemes this problem became a more difficult one. He thought it possible that the vehicle with which the drug was administered might effect its efficacy.

Mr. Melck :

in replying to the discussion endorsed Mr. Verney's statement that it was an excellent Vermicide for horses. In S. Africa sheep could become infected with fluke almost throughout the year although Spring was the most likely season, and the symptoms became most apparent in late Autumn or Winter when grazing was bad. Dosing should be started in Spring. He preferred Milk as a vehicle—it was handy to use, cheap and did not effect the efficacy of the drug. Capsules are hardly so handy for sheep as with horses and are much more expensive. He found that even 6 c.c. doses of C. Tetrachloride did not prove toxic to sheep. It is possible that the drug will more easily have a detrimental effect on an animal of which the liver is badly infected and in a diseased condition. He found large doses were easily toxic for cattle and that it was not advisable to drive or exite the cattle during the next 24 hours. 1 c.c. of Carbon Tetrachloride was sufficient to kill fluke in sheep but it was the minimum dose and 2 c.c. was recommended to allow for wastage and accidents and the influence on the drug of the grazing, stomach contents and vehicle used.

The drug should not be used without a vehicle. He did not approve of mixing the drug and the vehicle in bulk as the Carbon Tetrachloride did not mix well and only remained suspended or sunk to the bottom. At least ten thousand sheep had already been dosed in the Western and S. Western districts and excellent results were obtained in every flock. He recommended treating dams and reservoirs with Copper Sulphate to kill snails and other parasites.

THE POISONOUS PLANTS OF SOUTH AFRICA: A Further List of Plants Proved Toxic.

By H. H. CURSON, F.R.C.V.S., Dr. Med. Vet. Veterinary Research Laboratories, Pretoria.

INTRODUCTION.

HAVING spent some years in the Veterinary (Field) Division,[1] the writer has realised the need for the compilation of data bearing on toxic plants, especially in this country where the flora is so rich and varied. Field veterinarians are so frequently called upon to investigate outbreaks of disease of apparently obscure origin, that the necessity for reliable information in concise form on poisonous plants cannot be over emphasised. At present much of this data is scattered throughout the literature, such as the Reports of the Director of Veterinary Research, Agricultural Journals and Proceedings of Scientific bodies. Recently, however, Phillips (1926) has rendered, not only the veterinary profession, but also the farming community, a great service by the publication of a memoir entitled "A preliminary list of the known poisonous plants found in South Africa." Although fulfilling a most useful purpose, especially as a basis for future guidance, Phillips' paper, essentially a botanical guide, does not furnish the information most required by the veterinarian, e.g., symptoms, post mortem appearances, etc. The existence of this lacuna was remarked upon by Sir Arnold Theiler, who at the beginning of the year, requested the writer to list the references relating to the growing section of Plant Poisons.

(1) The amalgamation of the two Veterinary Divisions of the Department of Agriculture, viz., Field and Research, was consummated on April 1st, 1927.

PROPOSED PAPER.

It was intended to submit a paper giving the names of plants which had been definitely proved toxic, along with all relevant data. Phillips' paper was to be taken as a basis, but as he lists several species which have not been proved definitely poisonous, it was proposed to adopt the following grouping :—

(a) species definitely proved toxic (Table I); and

(b) suspected species (Table II).

e.g., Haemanthus punicus, Lessertia brachystachya, Mundulea suberosa, Agapanthus umbellatus, etc. No doubt, several of the plants included in the latter group are toxic, but until positive experimental evidence is forthcoming, there can be no justification for regarding them other than suspects. [Continued on page 48.

TABLE III.

Species.	Distribution in S. Africa	Proved Toxic by	Publication.
Mesembrianthemum tortuosum .	C.T.	Meiring, I.	Meiring (1897)
Cynanchum africanum	Littoral	Curson, H. H.	Curson (1926).
,, capense	,,	Henning, O.	Henning (1893)
Raphionacme purpurea	N.	Watt, J. M.	Watt (1926)
Arthosolen polycephalus* ...	C.	Robertson, W.	Robertson (1905).
Cotyledon ventricosa	,,	Soga, J. F.	Soga (1891).
,, ecklonii	,,	Curson, H. H.	Curson (1926).
,, cacalioides	,,	Du Toit P. J.	—
,, decussata	,,	Kamerman, P.	Kamerman (1926).
Equisetum ramossissimum ...	T.	Curson, H. H.	—
Euphorbia genistoides*	C.	Crowhurst, J.W.	Crowhurst (1895).
Moraea spathacea	C.N.	Curson, H. H.	Curson (1926).
Elephantorhiza burchellii ...	T.	Steyn, D.	—
Lotononis oxyptera	C.	Le Roux, P. L.	—
Ornithogalum saundersiae ...	T.	Quin, J. I.	Quin (1927).
Urginea capitata	C.N.T.	Le Roux, P. L.	—
Melia azedarachi	Ubiquitous	Steyn, D.	—
Ranunculus pinnatus	C.N.T.O.	Le Roux, P. L.	—
Datura tatula	Ubiquitous	Targett	—
		Adams, P.	Mitchell (1923).
Gnidia ovalifolia	C.N.	Hutchence, M. A.	Hutcheon (1904).
Ampelopsis heaeracea	Ubiquitous	Curson, H. H.	Curson (1926).

C=Cape Province ; T=Transvaal ; * Species not definitely known.
N=Natal ; O=Orange Free State.

TABLE III. (Continued).

Chief Active Principle	Evidence of Toxicity	Chief Condition Produced.	Further Remarks.
Alkaloid	Frog	Narcosis	No vety: evidence of toxicity
—	Sheep & horse	"Krimpsiekte"	——
Alkaloid	Sheep & ox	do.	——
—	Cat	Depressant CNS	Tuber investigated
—	Ox	Acute gastritis	——
Cotyledontoxin	Goat	"Krimpsiekte"	Disease entirely different to that produced by Cynanchum spp.
—	Sheep	do.	
—	Goat	do.	
Cotyledontoxin	Guineapig & rabbit	do.	
—	Ox	Diarrhoea	European E. arvense contains Equisetic acid
—	Ox	Duiresis	——
—	Ox	Diarrhoea	——
—	Sheep, guineapig & rabbit	Gastro-enteritis	Seeds investigated
? HCN	Sheep	Cf HCN	——
—	Sheep, ox, horse, dog, rabbit and guinea-pig	Gastro-enteritis	Bulb material investigated.
—	Sheep	Gastro-enteritis	——
—	Pig, sheep, rabbit, guinea-pig	Gastro-enteritis (sheep) Paralysis (other species)	An Exotic. Seeds investigated.
—	Sheep	Gastro-enteritis	——
Atropine and hyoscyamine	Man	Excitant CNS	An Exotic. No veterinary evidence of toxicity.
—	Ox	Gastro-enteritis	——
—	Sheep	——	An Exotic.

Feeding tests although generally necessary for animals, are not essential in the case of man as the vegetable material ingested is easily controlled. In any case, such investigations could not be considered. Also valuable, are chemical and microscopic methods of investigation, e.g., poisoning due to Datura spp. and Senecio spp. in man. Well known toxic plants in foreign countries would naturally be placed under Group (a) if field experience here confirmed the findings described abroad, e.g., Nerium oleander. The mere fact that a plant contained some active principle would be insufficient to class it as a toxic plant. It might, however, be grouped with the suspects. All the veterinary material for the paper in question is available but owing to the limitation of space, the above groups cannot be dealt with in this paper.

It is, therefore, proposed to discuss briefly a third group of plants, viz.: poisonous plants not included in Memoir IX[1]. These have been listed according to Families, and the most important facts have been summarised in tabular form (Table III) pages 46 and 47.

(1) The list could be extended still further by the inclusion of plants known to be toxic to man, e.g., Cannabis sativa.

SUMMARY OF CONCLUSIONS.

1. This paper is to be regarded as a continuation of Phillips' Memoir IX.

2. Whereas several of the species enumerated by Phillips have not been definitely proved toxic, it would seem advisable to class the plants as follows :—

(a) those definitely proved toxic (Table I) ; and

(b) Suspects (Table II).

3. The chief features of the plants dealt with in this paper have been summarised in tabular form—Table III.

ACKNOWLEDGMENT.

It is a pleasure to refer to the indebtedness of the writer to those gentlemen who assisted in the furnishing of the necessary particulars. These included Dr. Phillips of the Division of Botany, Mr. P. Kamerman of the Division of Chemistry, and my colleagues Dr. du Toit, Director of Veterinary Services, and Messrs. le Roux and Steyn.

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1926 Curson, H. H.—"Some little-known South African poisonous plants and their effects on stock." Paper read 30/9/26 at meeting of S.A.V.M.A.

1893 Henning, O.—An: Rpt. of C.V.S. C. of G.H. for 1893, p. 22.
1904 Hutcheon, D.—An. Rpt. of C.V.S. C. of G.H. for 6 months ended 31/12/04, p. 7.
1926 Kamerman, P.—"The toxicity of the Genus Cotyledon, the cause of the disease Krimpsiekte." S.A. Jn. Sc. XXIII, p. 185.
1897 Meiring I.—"Notes on some experiments with the active principle of M. tortuosum." Jn. S.A. Phil. Soc. IX.
1923 Mitchell, J. A.—Rpt. for year ended 30/6/1923. Dept. of Public Health.
1926 Phillips, E. P.—"A preliminary list of the known poisonous plants found in South Africa," Memoir IX; Botanical Survey of S. Africa.
1927 Quin, J. I.—"The Toxicity of Ornithogalum saundersiae" S.A. Jn. Sc. XXIV.
1905 Robertson, W.—An. Rpt. to C.V.S. C. of G.H. for 1905. p. 63.
1891 Soga, J. F.—C. of G.H. Agric. Jn. III, p. 140.
1926 Watt, J. M.—"A note on Raphionacme purpurea," Bantu Studies. Oct., 1926. p. 333.

(1) Annual Reports are given date of year to which they pertain, and not date of publication.

After reading his paper, **Dr. Curson** asked the gentlemen present to read through the list of poisonous plants (see Table III) supplied to the meeting and if further information were required, he would be pleased to supply it.

Dr. du Toit. "We should be very grateful to Dr. Curson for supplying this information. The poisonous plant in South Africa plays an enormously important role. The list supplied, of course, is not complete; it is merely a list of the plants not referred to by Dr. Phillips in his recent Memoir."

Mr. Quin next gave a description of a plant known as "wild cucumber" (Cucumis myriocarpus) on which he was at present engaged. It had been sent from the Free State and was reported to be responsible for mortality of stock in Mr. Canham's area (Bloemfontein), where the veld was poor owing to drought. It appeared that under such conditions cattle ate the plant which when over-ripe was particularly dangerous. According to Mr. le Roux who carried out feeding tests on sheep at Ermelo, large quantities of green, fresh, crisp Cucumis Myriocarpus fruits proved non-toxic and altogether harmless to sheep, the material being eaten ravenously by them. Symptoms, however, observed suggested that Cucumis might be one of the causes of so-called "Geilsiekte." Mr. Quin described the course of the malady set up experimentally in rabbits and dogs. In

the latter species vomition was severe, and might occur an hour after administration. In some cases pure blood was passed indicating that the active principle was a gastric irritant. Finally Mr. Quin stressed the importance of investigating the toxicity of suspected plants and asked colleagues to submit flowering specimens of such plants for determination.

Mr. Verney cited an instance where colic in horses was probably due to ingestion of the dried fruit of Cucumis along with hay.

Mr. Quin added that sheep ate the plant ravenously even in the wilted state.

Mr. le Roux : " My experience is that if I feed sheep on Cucumis, they thrive on it; they are turned on to land and the first thing they eat is the " wild cucumber " and nothing happens to them. It has been proved that the soil has something to do with it. I had a chance of testing it at Ermelo where this plant was growing on the kraal walls. The sheep were turned into it and the old sheep continued grazing but the young ones ate the " wild cucumber " and several died very shortly afterwards. I might also mention that Dr. Henrici told me that certain of these plants yield more toxin than others."

Mr. Mcgg as Botanist asked the gentlemen present to send forward any suspected poisonous plants about which they required information; if possible to send a flowering portion of the plant. It was very difficult to give reliable information unless one had reliable data.

Dr. Curson. " We are indeed grateful to Mr. Quin for giving us the latest information about his investigations. With the rapid increase of our knowledge on poisonous plants it is difficult to keep up-to-date. Geilsiekte as encountered in the Cape Province undoubtedly included the malady set up by the ingestion under certain conditions of **Dimorphotheca spp."**

Dr. Neser suggested that Juncus sp. and Sium thurnbergii be added to the list in view of the investigations carried out by Mr. Mcgg and himself.

Dr. du Toit concluded by thanking Dr. Curson for his paper.

TUBERCULAR METRITIS IN CATTLE.

By PROF. JOHN QUINLAN, M.R.C.V.S., Dr. Med. Vet.

TUBERCULOSIS of the uterus, is a common concurrence with tubercular lesions in the peritoneum and lungs in bovines. It has been found in 18 per cent. of tubercular cows destroyed during these investigations. The percentage of tubercular cows affected with genital lesions recorded by different observers differs greatly. Lungwitz found 58% of cows suffering from peritoneal lesions with concurrent uterine tuberculosis. V. Ostertag found 65% of cows with generalised tuberculosis suffering from genital lesions. Meyfarth recorded 11.04%. Büchli recorded 17%. Winkel recorded 22.5% out of 7,517 cows slaughtered because of open lesions in the lungs. Uterine tuberculosis in the absence of open tubercular lung lesions was recorded by Winkel in 35 cases only, out of the enormous material slaughtered by him in the Netherlands during the years 1905-07. Herschel, working in the Berlin slaughter house found 6.47% of cows with general tuberculosis suffering from tubercular metritis. Krupski recorded 24% of tubercular cows as showing uterine lesions.

Pathogenesis.

The most common route through which the bacillus reaches the uterus appears to be the Fallopian tubes, from an infected peritoneum. This route of infection is agreed upon by most observers, including Frei, Aschoff and Kaufmann.

There is no doubt that infection also occurs through the blood stream. In this case, however, one must expect a miliary tuberculosis of the uterus (Aschoff). It is probable that the bacilli reach the uterus through the blood stream in generalised tuberculosis. The bacillus frequently reaches the uterus through other routes as well as the Fallopian tubes. This is supported by the fact that tubercular lesions in the uterus are occasionally met with in the absence of tubal tuberculosis.

Infection can also occur as an extension through the muscular wall from the uterine peritoneum per continuitatem. This is probably a common route when tubercular perimetritis co-exists with peritoneal tuberculosis. There would also appear to be tubercular infection of a primary nature by extension from the external genitalia. However, it would appear that primary tubercular metritis is extremely rare (Kaufmann, Aschoff). The majority of cases are secondary in nature. Frei states that the secondary nature of the uterine lesions can as a rule be established by the fact that the lesions are older and

more pronounced towards the ovarian extremity of the tubes. Some of the cases which have been examined here have shown younger lesions in the uterus, even in the absence of tubal lesions, than the lesions in other organs. However, in the majority of cases Frei's views have been supported. The lesions decreased in number and age from the apex of the horn to the cervix. During these investigations tubercular metritis has not been met with in the absence of tubercular lesions elsewhere.

Primary infection in this country would appear to be of rare occurrence. That such a possibility of transmission by coitus exists must not be lost sight of, but tubercular lesions in the genitalia of the bull have only once been encountered at this Institute. Frei and Williams draw attention to the possibility of transmission during the manipulation of the female genitalia in parturition or in the treatment of sterility. That there is a probability of transmission during the treatment of sterility cannot be doubted, especially when antiseptic precautions are not at all that can be desired. In the early stages of tubercular invasion of the uterus diagnosis is not easy and it may be mistaken for a metritis chronica catarrhalis and treated as such. Infection with the catheter during uterine irrigation possibly takes place frequently.

Symptoms.

The insidious nature of tubercular invasion does not allow of an early diagnosis. The disease must be well established before it can be detected. The first symptom is the appearance of a slimy catarrhal discharge from the vulva, which is continuous. The discharge is opaque, catarrhal to muco-purulent in nature, but not foetid. It gradually increased in volume and may show blood streaks. The tail and buttocks are continually soiled. It appears to increase during and for 4 to 5 days after each oestral period. Williams says that the discharge is greatly increased if copulation is allowed. Owing to the frequency with which the tubes and the ovaries are involved the oestral periods are usually irregular with abnormally long interovulation periods. Sterility and nymphomania with its resulting deformity of the rump are also common sequelae. Williams mentions that the uterine discharge is favourably influenced by uterine irrigation, but the improvement is not long maintained.

Rectal examination allows of a more intimate knowledge of the pathological changes and with the aid of the tuberculin test usually permits a correct diagnosis. At the onset rectal palpation does not reveal any change in the uterus. It is not increased in volume. However, since it is the rule that the tube is first involved, tubal palpation

may establish the tubal lesions. The somewhat characteristic tubal lesion, the uterine catarrh, the tuberculin test and microscopic examination for tubercle bacilli usually enable a definite diagnosis of uterine tuberculosis to be established in an early stage of the disease. As the pathological changes become more pronounced the uterine horns increase in size and the wall becomes firmer. Careful palpation reveals the presence of tubercular nodules in the wall. As a rule the nodules can first be felt towards the apex of the horn. It is not uncommon for one uterine horn to become larger than the other. However, both horns are as a rule symmetrically involved. At this stage the discharge is profuse, muco-purulent and non-foetid. The neighbouring sacral lymphatic glands are frequently involved. They are firm and enlarged.

The ducts of Gaertner are sometimes invaded, most likely by contamination from the uterine exudate. One cow showed tubercular abscesses in the ducts. Invasion of the ducts has been referred to by many observers; Fröhner and Zwick, Hutyra u. Marek, Williams and others.

When infection takes place per continuitatem from a tubercular perimetritis rectal examination may reveal the identity of typical tubercular peritonitis with the formation of tubercles or it may be of the nature of fibrous adhesions passing between the uterus, uterine horns, ovaries or broad ligaments. Williams indicates that the absence of abscesses in the adhesions helps to differentiate tubercular perimetritis from the adhesions caused by other peri-uterine affections. The observations carried out here support Williams' view.

It is not uncommon for the serous surface of the uterus in tubercular metritis to remain free from infection. Williams suggests the probability of venereal infection in those cases especially if the oviduct is not involved. In one case of uterine tuberculosis post-mortemed at this Institute the uterine lesions were younger than those in the lungs and peritoneum. The serous surface of the uterus was not involved, nor were the Fallopian tubes. It is likely that a haemotogenous route would explain the infection in this case, especially as the herd bull could not be proved to be tubercular. Williams draws attention to the difficulty in definite diagnosis in the case of an enlarged sclerotic uterus, free from adhesions. It is certainly difficult to differentiate the condition from sclerotic metritis and primary actinomycosis by rectal palpation, but the tuberculin test and microscopic examination of scrapings made from the uterine mucosa by means of a small curette, usually establish the nature of the lesion. These scrapings should for preference be taken from the horns of the uterus with a small curette curved slightly towards its

extremity like a small uterine irrgation catheter. Cystic degeneration of the ovaries is a not uncommon concurrent condition with uterine tuberculosis. The cyst is usually the large type of Graafian follicle cyst which has been associated with nymphomania (Fröhner u. Zwick, Hutyra u. Marek, Williams).

Macroscopical Appearance.

In the beginning the tubercular invasion of the uterine mucosa cannot be recognised macroscopically. It is only when the tubercles are somewhat established that they can be recognised. The volume of the uterine body and horns are not changed. Later the wall becomes thickened and firm. On palpation it may be possible to feel nodules in the wall by rubbing the fingers over it or by palpating between the thumb and fingers. On section the mucosa is covered with a slimy mucous, later muco-purulent exudate mixed with caseous material. The tubercles are as a rule visible through the mucosa as greyish isolated spots which are raised above the surrounding mucosa, varying in size from a pin's head to a millet seed. On section these nodules are greyish in colour and opaque. They are as a rule chiefly confined towards the epithelial surface. In older cases there is ulceration of the mucous surface. It presents a rough uneven appearance, greyish to greyish-yellow in colour with some reddish spots. There is a greyish-yellow exudate, partly liquid, partly composed of necrotic and caseous floculi. Tubercles .5 to 1 c.m. in diameter project above the surrounding surface. On section of the wall the tubercles extend throughout the depth of the mucosa or even into the zona muscularis. Many of them are caseous or calcified.

It is most common that both horns are equally involved, but asymmetrical horns are also met with.

When the serous surface of the uterus is involved in the tubercular process there are adhesions to neighbouring organs, the broad ligaments, the ovaries, the Fallopian tubes or the mesosalpinx. Frequently one finds typical tubercles in these adhesions.

Histology.

The tubercle bacilli appear to enter the mucosa by penetrating between the epithelial cells of the uterine glands or of the mucosa between the glands. Ludolph states that the tuberculous process begins in the neighbourhood of the mouths of the glands. Altenbrun and Fischer maintain that the uterine mucosa is first attacked, while Fischer believes that invasion also takes place through the uterine glands. It appears more than likely that the bacilli can invade any part of the uterine epithelium, the glandular epithelium and the

epithelium between the mouths of the glands, since one frequently recognises the youngest tubercular processes under the epithelium in both these situations.

In the youngest lesions the overlying epithelium does not appear to be injured. Epithelial desquamation takes place only when the tubercles are well established. The progress of the tubercles in the uterus and in the Fallopian tubes appears to be identical. The tubercle begins as a small local centre underneath the epithelium, either of the gland or mucous surface. There is round cell infiltration around epitheloid cells and later giant cell formation. Neutrophiles can also be recognised but not nearly so frequent as the round cells. These small tubercles develop to invade the stratum cellulare and the epithelial covering. The epithelium becomes desquamated and removed leaving an ulcerated surface of granulation tissue, between these superficial ulcers normal epithelium may still be present, or a local stratification may be observed. The increase in the size of the tubercles and their coalescence, which frequently occurs, cause a diminution in the number of uterine glands or the closure of their exit into the cavum uteri. Some of the glands are filled with cell debris, and round cells which undergo disintegration. The glandular epithelium also undergoes change. The cells show local or diffuse desquamation. They become removed totally or partially so that the tubercle opens into the gland lumen. In this way the glands disappear until their remnants only can be recognised in the deeper layers of the stratum glandularis close to the muscular zone. Owing to the closure of some of the gland mouths and the continuance of more or less normal epithelium towards the fundus, the glandular secretion accumulates and gives the glands a cystic appearance. The epithelium of these cystic glands varies from cubical to flattened cells. In the older tubercles one recognises disintegration, caseation and calcification, surrounded by a zone of round cells in which giant cells are to be seen.

The surface of the mucosa is covered with a layer of necrotic caseous structureless material, and purulent exudate.

When there is extensive change in the mucosa the tubercular process may invade the muscularis either through the lymph or blood stream, according to Aschoff and Frei. Kaufmann describes a similar extension to the myometrium in the human female. The invasion of the myometrium is favoured by pregnancy and during the puerperium. Tubercular perimetritis is similar to the lesions caused by tubercular invasion of the peritoneum in other situations.

Cervical tuberculosis would appear to be of rare occurrence. Williams described such a case. Frei apparently has not encountered this condition. Williams says the uterus and oviducts were involved. The lips of the cervix were swollen and hard. The lesion in the cervix was closed with no discharge, but there was the usual tubercular discharge from the uterus. Kaufman says that the cervix is rarely involved in uterine tuberculosis in women. The condition has not been observed in the post mortem examination of tubercular cows at this Institution, although tubercular invasion of the ducts of Gaertner have been seen in one case.

Prognosis.

The prognosis is hopeless in as much as the cow affected with tubercular metritis is an unfit companion for her stall mates and also for the stud bull. She is suffering as a rule from open tuberculosis and is a source of danger not only to the stud bull, and to her companions, but to humans. The tail and hind quarters are contaminated with tubercle bacilli, and it is easy to realise the ease with which the milk can become contaminated during milking assuming that the udder has not already been invaded.

Sterility is a common sequel to tubercular invasion of the uterus. In view of the work of Wester in relation to spermalysin and spermatoxin it is easy to understand that the spermatozoa cannot long survive the pathological exudate, should they reach the uterus. In less severe cases early abortion may take place as a result of failure of the embryo to become embedded (Frei). Should the embryo become embedded, abortion may take place as a result of the extension of the tubercular lesions in the uterine wall interfering with nutrition of the foetus. Should the foetus go through its normal gestation period in a tubercular uterus there is the possibility of a congenital infection (Schlegel).

No treatment should be adopted. In uterine tuberculosis the danger of spread to humans and to the herd is a very real one. When the disease has been diagnosed the animals should be destroyed.

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Dr. Quinlan gave a further address on Sterility in Animals.

Mr. Verney :

This is a matter in which I am rather interested, and am very grateful to Dr. Quinlan for the information he has given us on this subject. This question is a most important one as there is nothing so disconcerting to a breeder as to find his stock sterile. I am certain that in sterility the feed factor is a most important item. We know how difficult it is to get fertility. In some cases sterility was associated with very dry seasons. I am very glad to hear that the Institute is carrying out these experiments, and that Dr. Quinlan is actually doing them in such a fruitful manner. I shall look forward very hopefully and wish him and his colleagues every success in this difficult matter. There is no doubt about it that breeders are beginning to wake up to this question of sterility through over-feeding, and we hope that people will show their sense and not give prizes at Shows to merely the fat over-fed stock.

Dr Quinlan then continued his discussion with the aid of lantern slides.

Dr. du Toit :

regretted that time did not permit of Dr. Quinlan giving them a more elaborate description of his experiments.

DOMSIEKTE IN PREGNANT EWES.

By S. VAN RENSBURG, B.A., M.R.C.V.S.,
School of Agriculture, Grootfontein, C.P.

THE purpose of the present note is to draw attention to a disease in pregnant ewes which assumed serious proportions in the Cape Midlands district in the year 1924, and which has been frequently observed during the years that followed. It has been observed only in pregnant ewes during the last few weeks of gestation, and is usually only characteristic during the few days preceding parturition. The characteristic outward manifestations are dullness and apathy, followed by progressive weakness ending in coma and death; and the name "Domsiekte," given to it by the farmers, is very appropriate in view of the general appearance of stupefaction displayed in the intermediate stages.

Occurrence.

During the last decade the Cape Midlands districts have passed through an unprecedented series of droughts, with the result that the vegetation has become greatly impoverished, and it is considered likely that the rise of the disease is related to this fact. Although it is probable that isolated cases of "Domsiekte" occurred unrecorded prior to 1924, it was not until this year that the disease occasioned alarm. Since then the condition has been noted each year, although the proportion of losses has varied considerably. The worst case recorded is that of a farmer in the Graaff Reinet district, who lost over 300 Merino ewes in one lambing season. A note-worthy feature of the occurrence is that no cases have been reported by farmers who habitually supply a bone-meal lick to their sheep.

Symptoms.

Ewes in apparently good condition are observed to stop feeding quite suddenly. They become dull and dejected, disinclined to move, and may stand with drooping head in the same spot for hours. In some cases there is blindness. Rapidly progressive weakness is shown, and in two or three days the animal is unable to rise, becomes comatose and may then either die in a few hours or linger on as long as 48 hours.

Autopsy is negative in so far as there are no characteristics macroscopic lesions. The carcase is often in good condition. The colon and rectum contain an unusually large amount of faeces, indicating sluggish peristaltic action. The uterus contains a fully developed foetus but the cervix uteri is firmly contracted and the os uteri closed. In ewes which have succumbed to the disease the

foetus is naturally also dead, but if the ewe is killed before death, even in the comatose state, and the abdominal cavity immediately opened, the foetus can be extracted alive. In this way many lambs have been saved.

Since this article was written, Dr. G. v. d. W. de Kock at Onderstepoort has found marked changes in the liver in Domsiekte. Extensive fatty infiltration is shown and the lesions are such as to offer a reasonable explanation of the symptoms shown before death.—EDITOR.

Treatment.

The observation that no cases occurred amongst sheep receiving a bone-meal lick, and that bone meal is recommended in any case on phosphorus poor veld, for the sake of improving the general nutrition of the flock, renders treatment less important that prevention.

No detailed studies in regard to treatment have been made, but it is of interest to record that dosing with bone-meal even after symptoms have appeared, may be beneficial. In the case of one lot of valuable stud ewes dosing was resorted to with the following results. Eight affected ewes, of which three were in a semi-comatose condition, were each dosed with a mixture consisting of bone meal 3 parts, salt 1 part with a cupful of Kerol added to 20 lbs. of the mixture. On the morning after the first dose two ewes were dead. The remaining six were dosed twice daily with the mixture and all had completely recovered by the fourth day. Of affected ewes observed on other occasions, but not treated, no cases of recovery were noted. It is intended to try Sodium phosphate on the next occasion which offers, since being soluble in water its effect should be more rapid.

As a preventive measure, however, bone-meal would appear to be useful, and the mixture mentioned above may be recommended as a lick. The purpose of incorporating a small amount of Kerol or Stockholm Tar, is that it prevents wastage by its binding effect on the mixture of bone-meal and salt, and that sheep appear to find it palatable.

Causes of Disease.

Although the preventive effect of bone-meal suggests that the occurance of the disease is related to phosphorus deficiency of the veld, the symptoms are not such as to warrant description of Domsiekte as a simple aphosphorosis. There is no parallel with the known aphosphorosis of cattle (Styfsiekte); and it is known that with cattle phosphorus deficiency may lead indirectly to other causes of mortality, including certain obscure types of plant poisoning. All that can be stated at present is that the cause of Domsiekte in sheep is probably correlated with aphosphorosis, but experimental research would be required to ascertain the full connection.

DISCUSSION.

Mr. Melck.

I had an experience amongst sheep in the Heidelberg district about 6 weeks ago. I had no idea then what was the cause of the trouble, but the symptoms and the history of the disease were almost identical with what has been reported. It was evidently due to the sour veld and deficiency of phosphates. I ordered bone-meal and the farmer promised to supply it to his sheep regularly. He promised to communicate with me in case of further trouble, but has not done so yet. The disease was also observed in ewes on the point of lambing.

Mr. le Roux.

spoke of ewes in lamb that died at Onderstepoort on the point of lambing, which appeared to have shown identical symptoms.

Dr. du Toit.

Experiments in this connection are in progress at the moment.

Mr. May.

This subject has been occupying my attention for the past 3 or 4 years. Experiments took place in Graaf Reinet where the farmers were suffering considerably through this disease.

THE SPAYING OF CATTLE AND BITCHES.

By G. PFAFF, B.V.Sc., M.R.C.V.S.

The Spaying of Cattle.

THE operation of spaying, by which is meant the surgical removal of the ovaries, has been performed in Europe for at least ninety-five years, and although the economic importance of the operation has been amply demonstrated in Europe and America, the amount of spaying done in this country is practically negligible. In America the operation is very extensively practised, and it is suggested that its wider application in this country might prove of much value to the individual as well as to the country.

This short paper, which contains nothing new, emphasises factors of practical importance, and aims at giving a description of the operation under field conditions.

The effects.

of spaying are to inhibit oestrum and pregnancy. Thus spayed heifers herd more quietly together and are more easily managed. They grow more rapidly, make better use of their food, and grow bigger. Thus they are brought to maturity more quickly and more cheaply than sexed heifers, and their meat commands as high a price as that of prime bullocks.

Spaying prolongs the period of lactation up to three and four years, and increases both the volume of milk and the amount of casein, fat, and sugar in it.

It has been suggested that in some cases of sterility the removal of one ovary might allow the other to function. As this paper is confined to the removal of normal ovaries, this aspect will not be considered.

The age

at which cattle should be spayed varies with the result desired.

Calves should be operated upon between the ages of two and four months.

Heifers are spayed as soon as they are big enough to stand the flank operation. The age therefore in this country is about eighteen months.

To stop cattle breeding and fatten them for slaughter, they may be spayed at any time.

To increase the milk supply and lengthen the period of lactation the operation should be preformed when the udder has reached its maximum development, which is usually about six weeks after the third calving. This gives the best results.

The season.

The vaginal operation may be preformed at any time of the year and while it is preferable not to preform the flank operation during fly-time, it may be done with safety if the operation wound be covered with a good layer of stockholm tar or other fly deterrent.

The operation should not be performed on a cow in season.

Mortality

is practically nil. It certainly should be no higher than that resulting from castration.

The operation

may be preformed through the belly, the flank, or the vagina. Each method will be described in detail consistent with the brevity of this paper.

The Belly Method.

This method is employed only on calves two to four months of age. The calf is starved for eighteen hours before the operation. It is restrained by being suspended by the hind legs at a convenient height. The field of operation is sterilised, and with the usual antiseptic precautions an incision is made through the linea alba, beginning about two inches in front of the brim of the pubis and extending forwards for about three inches. A finger is inserted into the abdominal cavity and hooked round one ovary, which is withdrawn, and while it is being held by the other hand the finger returns for the second ovary, which is likewise withdrawn, and both are ablated at the same time by an emasculator or ecraseur. The wound is closed by means of three or four interrupted through and through sutures.

The Flank Method.

This method may be employed on all female cattle. It is safer than the vaginal method, in that it avoids the unfortunate sequelae to which the latter is liable, such as haemorrhage from the iliac arteries, wounding of the rectum, and pouching of the peritoneum lining the vagina. The site of operation is easily anaesthetized, but a large skin wound is necessary, which is sometimes a disadvantage where flies are prevalent, and which to some extent reduces the value of the hide. It is the only method for spaying heifers, and should be employed on a cow with a diseased vagina.

Up to four months of age the calf can be spayed through a flank incision large enough to admit only two fingers. After that the incision must be large enough to admit the hand and fore-arm of the operator, so that the age at which an animal may be spayed depends upon its size.

The instruments

required are hypodermic syringe, clipping shears, scalpel, curved scissors, curved head spaying emasculator, needle and suture material.

An ordinary scalpel may be used, but Miles' hooked castrating knife is better. For ablating the ovaries I prefer the curved head spaying emasculator, though there are many other on the market of which I have had no experience. In an emergency the ordinary castrating ecraseur may be employed, but it is exceedingly cumbersome. A long curved needle does well, but it is easier to work with Mooy's or Miles'. No. 15 silk is the ideal suture material, although good suality twine of similar thickness answers the purpose admirably.

Preparation.

The animal is starved for twenty-four to thirty-six hours.

Restraint.

The operation may be preformed on the recumbent animal, in which position it is an advantage to have the forepart of the animal at a lower level than the hind part, and the front and hind legs stretched forwards and backwards respectively. It is more convenient to work on a standing animal, which should be confined so that it cannot lie down or move from side to side. The stocks may be utilised. The animal may be tied to a strong gate, the tail being drawn between the slats above the animal. Two reims or a long rope looped round the body and tied to the gate limit movements sideways. A race, such as is found in connection with dipping tanks, is very convenient. Where it is desired to spay a large number of animals the most convenient method is to erect three small pens by planting four stout uprights, six feet high, so as to form a pen eight feet long and two feet broad. Strong wooden struts about nine inches apart join those of the same side, those of the right side being fixtures and those of the left side removable, so that any may be removed for convenience in operating. A gate is fixed to the front of the pen. If all cattle were of the same size one might suggest measurements but as they are not the width of the pens must differ with the class of animals to be spayed. The width should be such as to reduce the movements of the animal to a minimum. When three pens are available there is a great saving of time, especially in this country where much assistance is usually obtainable. The pens are extended backwards, widening to open through a gate into the collecting kraal. Each pen has its own extension and gate. As soon as the animal is got into the pen it is secured by the head, cocaine injected and the field of operation prepared. At the same time another assistant is securing an animal which has already been prepared for operation, while the operator is working on an animal in the third pen. There is thus no

delay, and the operator is relieved of the arduous work of securing the animals and preparing the field of operation, while he is permitted to observe the important point of keeping his hands surgically clean.

As soon as the animal enters the pen its head is tied and the field prepared by clipping and washing. The body is then secured to the right side of the pen by means of two ropes looped round it and tied to the slats. The tail is drawn between two slats above the animal. It is also an advantage if the ground slopes so that the hind quarters are on a higher level than the fore quarters.

Sterilisation.

The knife is immersed in pure lysol for a few minutes, and then transferred to a 2½% solution, in which it is kept when not in use. All the other instruments are likewise kept in such a solution after they have been boiled for fifteen minutes. The solution soon becomes dirty, and should be renewed whenever necessary. The operator's hands and arms should be thoroughly washed in 2½% lysol, carbolic soap and a nail brush being freely used. After spaying an animal the hands should be rinsed in a 1% solution before tackling the next one. The operative field is clipped with clipping shears, and the whole triangular space between the last rib, the transverse processes of the lumbar vertebrae, and the tuber coxae is thoroughly cleaned with 2½% lysol, carbolic soap and a small brush, the hair beyond this area being damped to lay the dust. When this has been done the animal is tied, and the part again mopped with lysol solution and as a further precaution 2½% picric acid in rectified spirits may be painted along the line of incision.

Anaesthesia.

A general anaesthetic may be administered to the recumbent animal, and for this the method adopted by de Kock and Quinlan in the operation of splenectomy is probably the best, though I cannot speak from personal experience. They inject chloral hydrate intravenously in doses of three to four grams per hundred pounds dissolved in normal saline to produce a ten per cent. solution.

On the standing animal a local anaesthetic to the skin only is advisable. Four cubic centimetres of a 1% solution of cocaine is injected subcutaneously along the line of incision, one cubic centimetre being injected at intervals of an inch.

The operation.

An incision is made midway between the last rib and the tuber coxae through the skin only, commencing about two inches below the transverse processes of the lumbar vertebrae and extending downwards and slightly forwards for about four or five inches. The

incision must be big enough to admit the hand and forearm of the operator. This reveals the external oblique abdominal muscle, which at this position runs backwards and slightly downwards. An incision an inch long is made through the muscle in the direction of its fibres, and the knife is then put aside as it is no longer required. The index finger of one hand is inserted and forced through the underlying internal oblique abdominal, the fibres of which run downwards and forwards. The index finger of the other hand is forced in alongside the first, and by stretching the wound with these two fingers the fibres are separated sufficiently to admit the left hand. The internal abdominal fascia is now encountered. The index finger and then the whole hand is thrust through this and the next layer, the peritoneum, is likewise penetrated. The ovaries lie on the lateral walls of the pelvic cavity near the inlet, in the region of the middle third. If the hand does not immediately close over the ovary, as it usually does after a little practice, pass it down the left wall of the pelvis and it is almost sure to encounter the left ovary. If not, go back into the pelvic cavity and locate the body of the uterus, which lies between the rectum above and the bladder below. Follow the uterus forward until the horns are reached. Follow the left horn to its extremity, from about an inch of which the ovary will be found. Holding the emasculator in the right hand pass it into the abdominal cavity along the left forearm, and without removing the ovary close it over the ovarian attachments, and find the right ovary with the now free left hand by following the left horn to its junction with the right and then following that forwards to the right ovary. Both ovaries are now ablated, care being taken that a good portion of the attachments is removed and that only ovarian attachments are included in the emasculator jaws. The emasculator is now withdrawn, followed by the left hand containing the two ovaries.

The wound is sponged with lysol solution and then closed by four or five interrupted sutures through the skin only, and the lower extremity slightly opened to allow of drainage. The whole is cleaned with lysol solution and finally covered with a good layer of stockholm tar.

After-treatment.

The animal is turned out to pasture immediately. Any suppuration is treated on surgical lines, though this will not occur if cleanliness has been observed. The stitches should be removed eight to ten days later, though they can be left in without ill effect.

The Vaginal Method.

This method has advantages over the other but it should only be employed on cows with healthy vaginas.

The Instruments.

The instruments required are Colin's scalpel, to which is attached a length of string or tape about twenty-four inches long, William's vaginal speculum, and William's or Hobday's spaying ecraseur.

Preparation.

The animal is starved for twenty-four or thirty-six hours. Immediately before the operation backrake the animal, but do not give an enema, as this might cause soiling of the arm with liquid faeces due to the straining of the animal. If desired, the bladder may be emptied.

The operation may be performed on the recumbent animal though the standing position is more convenient, the animal being confined as in the flank operation, precautions being taken against kicking and boards passed under the belly and resting on the side slats, to prevent lying down, and a rope over the back to prevent arching and straining. Wash the upper third of the tail, anus, perinuem and vulva with .5% lysol. The vulva is opened and carefully cleaned with swabs soaked in .5% lysol, special care being given to the clitoris. It is unnecessary to flush out the vagina, though if it is done irritant antiseptics must not be used. The instruments and the operator are prepared as in the flank method.

The Operation.

After disinfection of hands and arms wash in sterile solution of sodium bicarbonate, which facilitates the passing of the hand and arm.

Pass the right hand holding the scalpel and speculum. Place the latter in the cervix, and the guarded scalpel against the roof of the vagina, about two inches from the cervix. Force the cervix downwards and forwards by raising the handle of the speculum held in the left hand. Immediately the vaginal wall is thus stretched unguard the knife and make a brisk incision an inch long backwards and upwards in the dorsal line. It is important to incise all the coats, including the peritoneum, in one stroke, otherwise when trying to cut the peritoneum it separates from the vagina and forms a pouch. Drop the knife on the floor of the vagina. One finger is thrust through this wound, which is enlarged to allow two fingers to pass. Usually it is possible to locate the ovaries with the two fingers, as they lie alongside the lower part of the base of the cornua, just anterior to the pelvic wall. If the fingers cannot reach them it is necessary, by stretching the wound, to enlarge it sufficiently to admit the whole hand. The speculum is now withdrawn and the ecraseur passed into the vagina. The ovary is withdrawn into the vagina, and ablated, care being taken to remove all of the ovary, and that nothing else is

included in the chain loop. The ovary is dropped on the floor of the vagina and the second ovary similarly removed. The ecraseur is now withdrawn, and then the right hand containing the scalpel and the two ovaries.

The dangers of the operation are wounding of the iliac arteries, which is avoided by pushing the vagina well down away from the rectum, and puncture of the rumen, prevented by cutting backwards, and not stabbing forwards. The rectum might also be punctured if it is not first emptied and if the vagina is not forced downwards and forwards.

No after-treatment is required.

There are a few points I would like to stress. The first is restraint. I think it unwise to attempt to spay an animal before it has been securely tied. If the animal is not securely tied the operation resolves itself into acrobatic surgery, and this, in a country where labour is plentiful, does not appeal to me, and it is half the battle to get the animal properly secured before the first incision is made.

The second is asepsis. If no attempt is made to obtain aseptic conditions, or if the animal, the instruments and the hands and arms of the operator are attended to in only a perfunctory manner, more animals can be spayed in a given time and fewer recover. By the procedure I have outlined, provided there is sufficient assistance, as is usually the case on our farms, and three pens, one can comfortably spay six to eight animals in an hour, and be practically sure that all will make a rapid and uneventful recovery. That seems preferably to spaying fifteen in an hour and have ten per cent. die. The cow can stand a lot, and does not easily succumb to peritonitis, but if extreme cleanliness is not observed, a suppurating wound is almost sure to result, and this delays healing considerably.

The third is the method of entering the abdominal cavity in the flank operation. If the muscles are incised with no regard to the direction of their fibres, the operation is also completed more quickly, but results in a gaping wound, which might give much trouble.

The Spaying of Bitches.

This will be dealt with very briefly.

Spaying inhibits oestrum and pregnancy, but also results in the bitch putting on fat. I have seen it mentioned that a spayed bitch will come on heat though she will not breed. That has not been my experience, and I would suggest that it might be due to the incomplete removal of the ovary.

The best age at which to spay a bitch is from three to four months of age. As an anaesthetic one grain of morphine sulphate and one hundred and fiftieth of Atropine sulphate is very convenient when no assistance is available. Some bitches are not sufficiently narcotized by this and to them a little A.C.E. mixture is administered.

The day before the operation the animal is bathed to rid her of fleas. She is then starved for twenty-four hours. Just before administering the morphine she is allowed a run, and she then usually empties the rectum and bladder. If she does not, an enema is given.

The field is prepared by shaving and washing with lysol, soap and a brush. The anaesthetic is injected, and immediately before the operation is commenced the whole field is painted with 5% picric acid in rectified spirits. The operation can be performed through either flank or through the mid-ventral line, the latter being greatly preferred. In the flank method the hind quarters are raised as much as is convenient, the hind and fore legs stretched apart, and an incision made through the skin only, commencing a little below the transverse processes of the lumbar vertebrae and mid way between the last rib and the tuber coxae. The incision is made downwards and slightly forwards and about an inch or two inches long. The muscles are divided in the direction of their fibres, and any bleeding vessels picked up by artery forceps. The wound is opened with a wound retractor and the horn of the uterus is readily seen, especially with the aid of a strong light. If necessary a finger may be inserted into the abdominal cavity and the ovary withdrawn, but this is not necessary. The ovary is withdrawn and an artery forceps applied to its attachments, a little behind the ovary, thus crushing the ovarian artery. The ovary can be removed by simply snipping the attachments between it and the forceps or preferably twisting it off with another pair of artery forceps. The safer and better way is to apply a silk ligature to all the attachments on that side of the forceps away from the ovary, and then removing the ovary by snipping the attachments close to the forceps on the side away from the ligature. This is an absolute safeguard against haemorrhage. The horn of the uterus is now returned and the other ovary likewise removed. The skin wound is closed by means of three or four interrupted sutures of No. 5 silk, the muscles not being stitched. The wound is cleaned with sterile water, or better still with acriflavine 1 in 1,000, and the bitch lightly bandaged. The following day the wound is examined and if necessary cleaned, and a pad of gauze soaked in acriflavine applied and a broad bandage put on to cover the whole body. It is usually sufficient to stitch this bandage on, but in roach-backed dogs, such as bulldogs, this tends to slip off. In that case the bandage is tied to

the collar by means of tapes. The dog is confined to a small cage for four days and not allowed the company of other dogs. The wound is not again examined unless the bitch goes off her feed or appears unwell or tries to get at the wound. If all goes well the wound is not examined until the eighth day, when the stitches can be removed.

The belly method is much more simple and gives by far the best results. The animal is strung up by the hind legs, for which purpose a door does admirably. This causes the intestines to drop out of the way. An incision is made through the linea alba and the peritoneum, about an inch and a half long and reaching down to within half an inch of the umbilicus. It is immaterial if the incision is a little to one side of the linea alba. The lips of the wound are retracted and the uterine cornua are at once apparent. The ovaries are removed one at a time as in the flank method.

The wound is sponged with acriflavine and closed with three or four interrupted through and through sutures of No. 5 silk.

The after treatment is similar to that described in the flank method.

DISCUSSION.

Dr. du Toit :

thanked Mr. Pfaff, and asked for discussion on the paper.

Dr. Quinlan :

agreed with Mr. Pfaff's remarks that this work should be confined to Veterinarians, and that the District Veterinary Surgeons should not be called upon to demonstrate the operation to the public. He thought the method described for operating upon calves a very dangerous one, and one very likely to cause hernia. In the flank operation he always cast the animal and gave an intravenous injection of Chloral Hydrate, this being quicker and more convenient than confining the standing animal.

Dr. Quinlan thought the vaginal method could only be used in big pure bred animals. He always found it a strain on the arm and much practice was required to make the incision through the vaginal wall. He now very rarely spayed through the vagina. Dr. Quinlan did not favour suspending dogs by the hind legs, and used nothing else but Ether in preparing the field of operation, both in cattle and bitches.

Mr. Verney :

regretted that there was not a practical demonstration.

Mr. Webb :

described how he ablated the ovaries simply by pulling them off with his fingers and without the use of an instrument.

Mr. Chalmers :

considered it essential in closing the abdominal wound to stitch each layer separately.

Mr. Spreull :

asked for information in regard to the spaying of donkeys. He had always advised the castration of the stallion.

Mr. Pfaff :

in reply said that the methods he described had been for application under field conditions, where instruments and professional assistance were very limited. From the nature of his duties he had been unable to refer to text books in the preparation of the paper, which described his own experience. He had only operated upon two calves and these had suffered no ill results. He found no inconvenience in operating upon cows per vaginam, probably because his arm was very thin. He had operated upon many bitches without a single mishap, either from his method of restraint or his method of suturing the wound. Picric acid was always used on account of its efficacy and its cheapness. It was unnecessary to stitch more than the skin in the flank method, and through and through sutures were all that were necessary in the Belly method.

In conclusion, he thanked members for their very kind reception of his paper.

Dr. du Toit :

I would just like to mention that even while Mr. Pfaff was a student in Edinburgh, his fame as a Surgeon had spread to South Africa, and his paper has certainly fulfilled this promise.

NOTES AND NEWS.

A. The following notes are taken from "Farming in South Africa," and refer to the following members of the South African Veterinary Medical Association, who have left the Service :

For nearly 25 years, **Sir Arnold Theiler** has been responsible for the veterinary research section of the annual departmental reviews, first as Government Veterinary Bacterioligist to the Transvaal Government, and later as Director of Veterinary Research for the Union. A survey of these departmental reports, and of his scientific reports as Director of Veterinary Research shows the progress that has been made during his tenure of office. The direct and indirect economic value of his brilliant researches to the livestock industry of the country can be evaluated only in millions. His pioneering record will serve as an inspiration to those who follow in his footsteps, but his personal advice will be missed by his old colleagues for many years to come.

Mr. Borthwick, a pioneer in veterinary administration, retired with the longest service record (38 years) in the Department of Agriculture. His yeoman services in the control of animal disease in South Africa, and in building up an effective veterinary field organisation will be remembered even longer.

The Division has lost another valued officer in the person of **Dr. F. Veglia,** Helminthologist at Onderstepoort for the last fifteen years. His valuable studies on the worm parasites of domestic animals in South Africa are well known through his scientific publications, one of his most outstanding contributions from an economic point of view being his description of the life cycle of Haemonchus contortus, the "wire worm" of sheep. It is upon this life cycle that the well known Government wire worm remedy was built up, and a great deal of the credit for controlling the disease therefore belongs to him. He returned to his native land, Italy, at the end of May, and is now associated with the University of Turin.

Early in the year, **Mr. R. M. Mettam** left the Division to take up an important post in Kenya. For several years he acted as Professor of Veterinary Anatomy, first at the Johannesburg University College, then at the Transvaal University College, and finally at Onderstepoort.

Obituary.

Joyce, J. F. (late Maior S.A.V.C.) Kroonstad. Graduated Edinburgh, 21st December, 1899. Died 30th August, 1926.

Maior Joyce served with Driscoll's Horse during the S.A. War, and at the end of hostilities was attached to the S.A. Constabulary, O.F. State. On disbandment of that Corps he was transferred to the Veterinary Division of the Agricultural Dept., O.F.S. He served with the S.A. Veterinary Corps during the late War, and later returned to the Veterinary Division of the Union Agriculture Dept.

B. The following Professional Staff changes in the Division of Veterinary Services (1-12-26—30-11-27) were effected :—

Allchurch, W. B.	Government Veterinary Officer.	Transferred : Butterworth to Umtata, 4/8/27.
Bengh, M.	do.	Transferred : Piet Retief to Middelburg, Tvl. on 3/11/27.
Cooper, V.	do.	Transferred : Nongoma to Eshowe 21/10/27.
Coles, J. D. W. A.	do.	Appointed 14/3/27 and lent to Research, Maritzburg.
Clemow, E. T.	do.	Transferred : Bloemfontein to Bethlehem on 19/10/27.
Canham, A. S.	do.	Transferred : Potchefstroom to Bloemfontein 23/6/27. Lecturer in Extension Division at Potchefstroom and field duties at Bloemfontein.
de Villiers, S. W.	do.	Transferred : Ermelo to Pietersburg, 31/10/27.
de Wet, G. J.	do.	Transferred : Pietersburg to Barberton, 12/11/27.
Flight, C. H.	do.	Appointed, Komgha 30/3/27. Transferred to Butterworth 9/6/27.
Frean, J. R.	do.	Transferred : Headquarters Sabie to Lydenburg, 1/6/27.
Garraway, R.	Senior Veterinary Officer.	Transferred 5/10/27 : South West Protectorate to Senior Veterinary Officer, Bloemfontein, i/c. Area V.
Hamlyn, W. P.	Government Veterinary Officer.	Transferred : Umtata to Komgha, 3/6/27.
Howie, A. M.	do.	Transferred : Greytown to Estcourt 29/7/27.
Joyce, J. F.	do.	Deceased, 30/8/26.
Jarvis, E. M.	do.	Transferred : Middelburg, Cape to Capetown on 23/6/27.
Keppel, J. J. G.	do.	Transferred : Potchefstroom to De Aar on 1/7/27.
Lund, A. E.	do.	Transferred to Potchefstroom on 4/6/27.
McNae, A.	do.	Transferred :: Thabina (Pietersburg) to South West Protectorate during December, 1927.
Pfaff, G.	do.	Transferred : Estcourt to Government Veterinary Officer in charge of Check Inspection staff. Headquarters Pretoria, 4/8/27.
Reid, J.	do.	Appointed Louis Trichardt 30/3/27. Transferred to Nylstroom 2/7/27. Transferred temporarily to Pietermaritzburg in November, 1927.
Snyman, P. S.	do.	Transferred : Durban (meat inspection) to Greytown, 20/6/27.

Starke, N. C.	Government Veterinary Officer.	Appointed Bloemfontein, 30/3/27. Transferred to Bethlehem, 30/6/27. Transferred to Pietersburg, 21/10/27.
Smith, P. R. B.	do.	Transferred : Vryheid to Pretoria, 17/1/27.
van Rensburg, S. W. J.	do.	Took over field duties in Middelburg, Cape on 10/6/27 in addition to his lecturing duties under Extension Division.
van Heerden, C. J.	do.	Transferred : Eshowe to Piet Retief, 31/10/27.
van der Vyver, B.	do.	Transferred : Pretoria to Vryheid on 13/1/27 after being at Pietermaritzburg for 3 months temporarily.
Wadlow, C. H.	do.	Retired 30/6/27.
Webster, G. C.	do.	Transferred : Richmond to Durban (meat inspection) on 6/6/27.
Williams, J. G.	do.	Transferred : Barberton to Ermelo on 5/11/27.

THE FACULTY OF VETERINARY SCIENCE.

UNIVERSITY OF SOUTH AFRICA.

THE Faculty commenced its activities in 1921 and, with a few exceptions, is now more or less fully established. In some respects its curriculum and teaching differ from those of the overseas schools. The training in this country has been adapted to the needs of the stock raising community, and embraces a full consideration of the important conditions peculiar to South Africa. For instance, an extended course in Botany is given and incorporates a full discussion of types of veld and poisonous plants. The special training of veterinarians in the Union has been admirably incorporated in the activities of the Veterinary Research Laboratory at Onderstepoort. No less than 15 of its research officers are at present directly concerned with the teaching. This combination of research and teaching has proved to be useful in many respects, and the student from the very beginning is brought into a scientific atmosphere, where he is kept in close contact with the problems of the day.

The following are the degrees in Veterinary Science conferred by the University of South Africa :

Bachelor of Veterinary Science : B.V.Sc.

Doctor of Veterinary Science : D.V.Sc.

Regulations for the Degree of Bachelor of Veterinary Science.

1. Every candidate for the degree of B.V.Sc. as an internal student, must attend as a registered matriculated student at a constituent college of the University for at least five academic years,

unless exempted from part of this attendance on the basis of studies completed at other educational institutions.

2. All candidates shall at some time during their curriculum pass an examination in French or German translation dealing with any of the subjects of the last three years of the curriculum.

3. The curriculum for the degree shall extend over five academic years. In addition evidence of satisfactory vocational practical experience, for such period as may be prescribed by Senate, shall be demanded before graduation.

4. University examinations shall be held in June or December according to the date of termination of the course in the subject concerned. A candidate must have passed in all the prescribed subjects of each year before admitted to the course of studies of the ensuing year, unless specially exempted by Senate.

5. In addition a supplementary examination shall be held before the commencement of each academic year, in subjects of the second, third and fourth years, if necessary; in the case of the final year any necessary supplementary examination shall be held in June. A candidate who fails in more than two subjects of the curriculum of any year shall not be entitled to a supplementary examination in the subjects concerned, but shall be required to repeat the curriculum of that year and pass such examinations as may be prescribed by Senate. A candidate who fails in any one subject at the supplementary examination shall be required to undertake such courses and pass such examinations as may be prescribed by Senate.

The curriculum of the B.V.Sc. Degree is as follows :—

First Year.

Botany I
Chemistry I
Physics I
Zoology I

Second Year.

Histology
Embryology
Chemistry II (organic and physical)
Botany II and III
Biochemistry I
Physiology I
Veterinary Anatomy I and II (Systemic)

Third Year.

Veterinary Anatomy III (Comparative & Topographical)
Biochemistry II
Physiology II
Pathol. Physiology
Bacteriology
Pathology I (General)
Pharmacology
Economic Entomology
Zootechnics
Hygiene I.

Fourth Year.

Hygiene II
Pathology II (Special)
Infectious Diseases I
Medicine I
Surgery I
Helminthology
Clinic

Fifth Year.

Infectious Diseases II.
Medicine II.
State Veterinary Medicine.
Municipal Veterinary Hygiene.
Surgery II.
Obstetrics.
Clinic.
Pathology III (post-mortems).

Regulations for the Degree of Doctor of Veterinary Science.

1. Any Bachelor of Veterinary Science of the University of not less than four years' standing, or any person admitted to the status of Bachelor of Veterinary Science in the University who has held the qualification by virtue of which such admission was granted for a period of not less than four years, or alternatively, any Bachelor of Veterinary Science of not less than two years' standing, of which at least one year has been devoted entirely to research work at an Institution approved of by the Senate of the University, will be allowed to present himself as a candidate for the Degree of Doctor of Veterinary Science.

2. Any candidate holding a recognised foreign degree or diploma of sufficient standing may present himself for admission to the status of B.V.Sc. in the University of South Africa, provided that, if required by the Senate, the candidate shall complete such further work and pass such examination as may be prescribed, and such admission ad eundem statum shall entitle a candidate to offer himself for the degree of D.V.Sc., in terms of these regulations.

3. Every candidate for the degree of D.V.Sc. shall be required to present, for the approval of the Senate, a thesis or dissertion dealing with some subject connected with Veterinary Science provided that, if required by the Senate, the candidate shall also pass such examination as may from time to time be determined.

No thesis or dissertation shall be accepted, which does not show either original research undertaken by the candidate, or an advance on the current treatment of the selected subject.

4. The degree of D.V.Sc. may be conferred honoris causa " for labours in the cause of Veterinary Science.

STAFF :

DEAN :

Professor P. J. du Toit, B.A. (Cape), Dr. Phil. (Zurich), Dr. Med. Vet. (Berlin).

Chemistry :

General and Organic : Prof. D. F. du Toit Malherbe, M.A., Ph.D. (Halle).

Physical : Prof. F. J. Tromp, B.A. (Contab), D.Sc. (S.A.)

Physics :

Prof. P. G. Gundry, B.Sc. (Lond.), Ph.D. (Gottingen).

Zoology :

Prof. D. E. Malan, M.A., (Cape), Ph.D. (Zürich).

Botany :

General : Prof. C. E. Bremekamp, Ph.D. (Utrecht).

Special : Lecturer : A. O. D. Mogg, M.A. (Cantab).

Anatomy :

Professor : H. H. Curson, Dr. Med. Vet. (Hanover), F.R.C.V.S.

Lecturer :

Physiology :

Professor :

Lecturer : J. I. Quin, B.V.Sc. (S.A.).

Biochemistry :

Professor : H. H. Green, D.Sc. (Glasgow).

Lecturer :

Pharmacology :

Lecturer : D. C. Steyn, B.Sc. (Stellenbosch), Dr. Med. Vet. (Vienna).

Medicine :

Professor : P. J. J. Fourie, M.R.C.V.S.

Lecturer :

Pathological Physiology :

Professor : C. P. Neser, B.A. (Cape), D.Sc. (S.A.), M.R.C.V.S.

Pathology :

Professor : G. v. d. Wall de Kock, Dr. Med. Vet. (Berne), M.R.C.V.S.

Lecturer :

Infectious Diseases and Bacteriology :

Professor : E. M. Robinson, Dr. Med. Vet. (Berne), M.R.C.V.S.

Tropical Diseases and Protozoology :

Professor : The Dean.

Hygiene :

Lecturer : A. Goodall, F.R.C.V.S.

Entomology :

Professor : J. C. Faure, M.A., B.Sc. (Cornell).

Zootechnics :

Lecturer : J. H. R. Bisschop, B. Sc. (Agric.), B.V.Sc. (S.A.).

Helminthology :

Lecturers : H. O. Mönnig, B.A. (Cape), Ph.D. (Zürich), B.V.Sc. (S.A.)
P. L. le Roux, B.Sc. (Edin.), M.R.C.V.S.

State Veterinary Medicine and Municipal Hygiene.

Professor : P. R. Viljoen, Dr. Med. Vet. (Berne), M.R.C.V.S.
Lecturer : A. Goodall, F.R.C.V.S.

Surgery and Obstrectrics :

Professor : J. B. Quinlan, Dr. Med. Vet. (Hanover), M.R.C.V.S.
Lecturer :

The B.V.Sc. degree has been conferred on the following :

1925 : Quin, J. I.
Bergh, M.
Bischop, J. H. R.
Green, W. J. B.
Mare, C. v. E.
Martinaglia, G.
Snyman, P. S.
Williams, J. G.

1926 : Alexander, R. A.
Bekker, J. G.
Daly, L. L.
Lawrence, D. H.
Allchurch, W. B.
Cooper, V.
Graf, H.
Lund, H. E.
Marais, I. P.
Shulz, K.

1927 : Coles, D.
Dickson, J. L.
Flight, C.
Mönnig, H. O.
Reid, J.
Starke, N. C.
Thomas, H. D. AvD

All these graduates have received positions in the Government Service of the Union.

The D.V.Sc. Degree was conferred "honoris causa" in 1925 on Sir Arnold Theiler, K.C.M.G.

RULES OF THE SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION.

TITLE.

1. The Association shall be called the South African Veterinary Medical Association.

The objects of the Association shall be :—

(a) To discuss subjects relating to the theory and practice of the arts and science of Veterinary Surgery and Medicine.

(b) To advance Veterinary Science, introduce and discuss other matters relating to the Profession.

(c) To exercise supervision over and protect the Profession and its pecuniary interests.

(d) To elevate its social status.

(e) To establish, promote and maintain a good and friendly understanding amongst the Members.

CONSTITUTION.

2. The Association shall consist of :—

(a) Members and Honorary Associates.

(b) Executive Officers, viz. :—A President, a Vice-President, a Treasurer, a Secretary, and eight members who shall be styled the Council.

MEMBERSHIP.

3. The Council shall have the power to recommend for membership any Veterinary Surgeon, provided they are satisfied that he is a fit and proper person to be elected a Member, and such Member shall then only be elected as laid down in Rule 4.

ELECTION OF MEMBERS.

4. Every candidate for admission as a Member shall be proposed and seconded at a general meeting by Members of the Association, who shall notify the candidate's name and residence in full to the Secretary, to be entered in a book provided for the purpose. Such candidate shall be declared elected if four-fifths of those Members voting ballot in his favour. The Secretary shall inform the candidate of the result of the ballot, and, if elected, furnish him with a copy of the Rules and Regulations of the Association.

4a. The Association may elect Honorary Life Vice-Presidents from amongst its Members.

HONORARY ASSOCIATES.

5. Honorary Associates shall be elected under the following conditions :—

(a) That they be persons who occupy in Society a distinguished position, either as teachers, writers, scientific practitioners, discoverers, or benefactors to Veterinary Science.

(b) They shall be nominated for election, their names submitted to the Council, and, if approved, they shall be balloted for as in the case of Members.

(c) When elected, they 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.

MEMBERS' AND HONORARY ASSOCIATES' ADDRESSES.

6. For all the purposes of the Association the name and residence registered by the nominator of a candidate shall, if elected, be his address until otherwise notified, in writing, to the Secretary.

SUBSCRIPTIONS.

7. Each Member shall pay on election the sum of £1 1s., which shall be the first annual subscription, and after the first year or part of a year an annual subscription of £1 1s., which shall fall due on the first day of June in each year.

ARREARS OF SUBSCRIPTION.

8. The Treasurer shall report to the Council any Member whose subscription is 12 months in arrear. Such Member may be suspended and shall not resume his privileges as a Member until all arrears have been paid.

RESIGNATION.

9. Any Member wishing to withdraw from the Association shall give written notice to the Secretary before the 1st day of June. Such resignation shall be read at the next general meeting.

EXPULSION.

10. The Association shall, upon the recommendation of the Council, passed at a meeting specially convened to consider the matter, call upon any Member to resign by a majority of not less than three-fifths 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 one month, shall cease to be a Member of the Association.

11. Questions for the consideration of the Council, with reference to Rule 10, shall be first made in writing, and the Council shall be empowered to call for such evidence in support thereof as the Council may deem fit and proper.

GENERAL MEETING DATES.

12. The meetings of the Association shall take place once a year or more often at centres and on dates to be decided upon by the Council. Members shall be notified by circular issued by the Secretary in accordance with the instructions of the President. This circular shall indicate the time and place of meeting, and such other business as may be put forward for consideration, and shall be posted at least fourteen clear days prior to the meeting.

ORDER OF BUSINESS.

13. The order of business at general meetings shall be as follows :—

(1) Reading of minutes of preceding general meeting by the Secretary.

(2) Signing of minutes by President if approved of by those present.

(3) Nomination of candidates.

(4) Election of new Members.

(5) Election of Office-bearers.

(6) Routine and other business.

(7) The introduction and consideration of any other matters not provided for in the foregoing rules of procedure to be at the discretion of the President, with the general approval of the meeting.

(8) Reading of papers and discussion thereon.

(9) Exhibition of specimens with observation thereon.

COPY OF ESSAY.

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

ELECTION OF OFFICE-BEARERS.

15. (a) The Secretary shall forward nomination forms to all Members during the first week of January in each year, on the following lines :— **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.....

(b) On the nomination form it must be clearly stated the office for which any Member is nominated.

(c) The nomination form must be signed by the person nominated, signifying his acceptance of office if elected.

(d) The nomination form must be returned duly completed to reach the Secretary on or before the 31st day of January in each year.

(e) The existing office-bearers shall at the termination of office be eligible for re-election without nomination, and their names shall appear on the voting paper, in the event of an election being held.

(f) After the date fixed for the receiving of nominations, the Secretary shall prepare and forward to every Member a voting paper setting forth the names of the nominees, together with the names of the existing office-bearers.

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

(h) The office-bearers shall be elected at the next annual general meeting from the voting papers received by the Secretary.

CASUAL VACANCIES AMONGST OFFICE-BEARERS.

16. In the event of a vacancy arising amongst the office-bearers, the Council is empowered to fill such vacancy.

COUNCIL MEETINGS.

17. Meetings of the Council shall be held at the discretion of the President and Secretary and at such time and place as they may determine, notice to be given ten clear days before the meeting.

SPECIAL MEETINGS.

18. The President shall instruct the Secretary to convene a special meeting of the Association whenever he may deem it necessary, and at all times on the requisition of ten Members.

QUORUM.

19. At a meeting of the Council three shall constitute a quorum, while ten shall be a quorum for general or other meetings of the Association; and the Members assembled shall wait half an hour prior to dispersing.

INABILITY TO ATTEND MEETINGS.

20. Any Member unable to attend a general meeting may express his views to the Secretary, in writing, on any question, and these views will be read out at the Meeting.

DUTIES AND AUTHORITY OF PRESIDENT.

21. The duties of the President shall be to declare the meeting open, preside thereat, regulate all the proceedings of the Association and Council, state and put questions, maintain order, see to the execution of the provisions of the Rules of the Association, and close the meeting on the conclusion of the proceedings. In addition, he shall deliver an address to the Members of the Association at their first meeting following his election.

22. When a vote is taken, the President shall, in case of equality, have a casting vote in addition to his vote as a Member.

PRESIDENCY OF MEETINGS.

23. In the absence of the President, the Vice-President or, in his absence, a Member shall be elected to the chair, and he shall be invested with all the powers of the President during such occupancy.

CONDUCT OF DEBATE.

24. The ruling of the President in all subjects under discussion shall be considered final, but he may, should he consider fit, or should such a course be proposed and seconded by any Members present, take the feeling of the meeting on any question of controversy.

25. A Member in the act of addressing the Association shall rise and first address the President, who shall obtain and maintain for him an orderly and impartial hearing. It shall be the duty of each Member to strive earnestly to render these meetings not only agreeable and profitable, but intellectual and scientific.

26. In the event of two or more Members rising at the same time to address the meeting in discussion, the President shall name the Member who is to receive the attention of the meeting.

27. The President can at any time call upon a Member to conclude his remarks should he, in the President's opinion, be trespassing on the time of the meeting, or should his language or the substance of his remarks be considered by the President in any way irrelevant or objectionable. If any Member feels himself aggrieved at any remarks uttered by another Member during the debate, the attention of the President may be called to same, who shall, if he deem it of sufficient importance, request a withdrawal.

LENGTH OF SPEECH AT MEETINGS.

28. No Member shall be entitled to speak more than ten consecutive minutes on the subject under discussion, except with the permission of the President, and after all who wish to have spoken the essayist or mover of a resolution shall be entitled to reply.

29. No motion shall be discussed until it has been seconded.

TREASURER'S DUTIES.

30. The duties of the Treasurer shall be :—

(a) To receive the subscriptions of the Members, give a receipt for same, and keep an account thereof in a book provided by the Association.

(b) To pay the Association's accounts.

(c) To give notice of defaulters in payment of their subscriptions at the annual meeting.

(d) To furnish for the annual meeting an audited statement of accounts.

(e) To deposit the funds of the Association in a Bank approved by the Council.

GRATUITOUS DISBURSEMENTS.

31. No gratuitous disbursements shall be made from the funds of the Association until same shall be considered by the Council and approved by the Association.

DUTIES OF THE SECRETARY.

32. The duties of the Secretary shall be :—

(a) To keep a book, provided by the Association, in which shall be entered (1) the Rules of the Association; (2) a complete list of the Members of the Association; (3) the minutes of every meeting.

(b) He shall convene all meetings.

(c) Carry on the correspondence of the Association, retaining copies for reference.

(d) He shall, in addition, submit a report at the annual meeting of the Association.

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

AUDITING OF ACCOUNTS.

34. Two Auditors from amongst the Members present at an annual general meeting shall be appointed to audit the accounts and report back to the annual general meeting.

ALTERATION OF RULES.

35. The alteration or rescinding of any of these rules, or the promulgation of a new rule, shall take place only at the general meetings. Notice of motion for any such alteration or rescinding or promulgation shall be notified to the Secretary in writing at least 21 days before the date of any general meeting, so that it may appear on the agenda.

36. In the event of a rule being rescinded or altered, or a new rule added, a printed slip of such alteration shall be forwarded by the Secretary to each Member.

LIST OF PRESIDENTS.

1920-21 : Major R. EUSTACE MONTGOMERY.
1921-22 : Col. JAS. IRVINE SMITH, C.B.E.
1922-23 : Col. JAS. IRVINE SMITH, C.B.E.
1923-24 : Col. JAS. IRVINE SMITH, C.B.E.
1924-25 : Dr. P. J. DU TOIT.
1925-26 : Dr. P. J. DU TOIT.
1926-27 : Dr. P. J. DU TOIT.

Hon. Life Vice-President :

Col. JAS. IRVINE SMITH, C.B.E.

LIST OF MEMBERS.

SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION.

Amos, S. T. A.
Allchurch, W. B.
Alexander, R. A.
Andrews, W. H.

Bush, J. G.
Brummer, B. J.
Buck, J.
Borthwick, J. D.
Bergh, M.
Bisschop, J. H. R.
Bekker, J. G.

Carless, F. J.
Chalmers, J.
Chase, W. H.
Clemow, E. T.
Crowhurst, J. W.
Curson, H. H.
Canham, A.
Clayton, N. M.
Cooper, V.
Coles, J. D. W. A.

de Kock, G.
Dixon, R. W.
Donaldson, J.
Dunning, F. J.
Dykins, W. A.
du Toit, P. J.
Diesel, A. M.
de Villiers, S. W.
de Villiers, O. T.
Daly, L. L.
de Wet, G. J.
Dickson, J. L.

Edgar, J. I.
Elder, W. A.
Ewing, S. H.

Ferguson, J. D.
Fern, E.
Forrest, J.
Fourie, P. J. J.
Freer, G. W.
Footner, W. E.
Frean, J. R.
Flight, C. H.

Garraway, R. S.
Gavin, F. C.
Goodall, A.
Grist, A. G.
Gray, C. E.
Green, W. J. B.
Graf, H.

Hamlyn, W. P.
Harber, A. F.
Hay, W.
Henning, M. W.
Henderson, G. T.
Howie, A. M.
Hutchinson, F.
Huston, P. D.

Jackson, S. T.
Johnston, S. I.
Johnston, C. F.
Jones, W.
Jarvis, E. M.

Kehoe, D.
Kellett, E.
Keppel, J. J. G.
Kirkpatrick, A. C.

Lee, G. W.
Lyons, J. H. L.
Lund, A. G.
Lawrence, D. A.
le Roux, P. L.

Maag, A.
Matthew, A.
MacIntyre, J. F.
May, G. B
McCall, D. B. J.
McIntyre, G.
McKie, W.
MacNae, A.
Mare, C. V. E.
Maybin, J. A.
Marais, J. P.
Monnig, H. O.
McNeil, J.
Melck, G. H.
Mitchell, D. T.
Montgomery, R. E.
Morton, D. D.
Martinaglia, G.

Nelson, E. C.
Neser, C. P.
Nicol, J.
Neser, M. M.

Osrin, R. B.

Paine, R. R.
Parkin, B. S.
Power, W. M.
Pfaff, G.

Quinlan, J. B.
Quin, J. I.

Robinson, E. M.
Reid, J.

Scheuber, J. R.
Snyman, P. S.
Steyn, D. G.
Schultz, K.
Stranaghan, D.
Starke, N.
Smith, I. R. B.
Schmidt, G.
Sharpe, C. M.
Simson, W. A.
Sigwart, H. H. S.
Spreull, J.
Smith, Jas. Irvine
Strachan, C. H.

Tate, J. M.
Theiler, Sir A.
Tyler, C.
Thomas, A. D.

van der Vijver, B.
Verney, F. A.
Viljoen, P. R.
van Rensburg, S.
van Heerden, C. J.

Wadlow, C. H.
Walker, J.
Webb, H. M.
Webster, G. C.
Woolatt, S. B. E.
Wilson, E.
Webb, J. L.
Williams, J. G.

AT THE SERVICE OF THE FARMER.

CONGRESS OF OFFICERS OF THE DEPARTMENT OF AGRICULTURE, PRETORIA, JULY, 1928.

Frontispiece.