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THE VETERINARY PROFESSION IN SOUTH AFRICA — WHAT OF THE FUTURE?

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In an article on the veterinary profession in South Africa the writer (1952) gave a brief review of its development up to that date. Figures were given showing the number of veterinarians in different forms of employment and in the conclusion, some of the possible developments were very briefly mentioned. The present article is in a sense a continuation of the previous one but confines itself to the future prospects of the profession in South Africa and to the lines on which it may develop.

According to Diesel (1953) the position as regards employment in 1952 was that there were 79 veterinarians in the state service, 12 in municipal service, 165 in private practice and 20 in the employ of firms etc., giving a total of 276.

Some of the existing and some of the possible avenues of employment will be discussed. For convenience they may be dealt with under the following headings:—

1. State Service.
2. Municipal Service.
3. (a) Private practice.
   (b) Subsidized private practice (Great Britain).
4. Veterinary Investigation Service (Great Britain).
5. Veterinary Club System (New Zealand).
6. Service with Farmers' Associations (Southern Rhodesia).
7. Employment with Stock Feed Firms, etc.

1. State Service.

At one time the main source of employment for veterinarians in South Africa was the State Service. The field service, more particularly in the combating of the big epizootic stock diseases, did and is still doing remarkably fine work. Under Theiler and his successors, the investigation of the etiology of stock diseases and methods for their control, the research service has made tremendous headway. The veterinarian in state service however was never able to do much in the way of treating the individual animal, that is to indulge in general practice. He could only do this when the exigencies of his other work permitted, with the result that he did not give the service in that direction that the private practitioner is able to. As a result the latter has established himself in most places where it is possible to make a living and the state veterinarian in those areas no longer has the variety to be obtained from doing what practice he previously did.

In a recent article Diesel (1953) made a plea to graduates to join the state service and outlined its advantages. The writer (1953) pointed out how interesting and satisfying a career in research could

be, realizing however that it would be mainly those with an inclination towards scientific investigation who would take it up.

In view of the recent improvements in salary scales it is likely that more veterinarians will join the state service. The veterinarian is inclined to be an individualist however and it is possible that the conditions of service more particularly in the field, as they exist at present, may prove unsatisfying and he will not remain in the service..

It is true that the first duty of a field veterinarian is to administer the Stock Diseases Act and in the past, more particularly in East Coast Fever areas, this was often a full time job or nearly so. There have been other epizootic diseases occurring on a big scale, such as foot and mouth, lumpy skin disease, etc., which required skilful organization to combat, but there are still many big problems which have not yet been tackled systematically. To mention two only, tuberculosis and brucellosis, not much progress has been made in their control and ultimate eradication.

The private practitioner cannot do very much in the way of investigation of stock diseases, though some use may be made of his services in work such as the initial testing of herds for tuberculosis, vaccination against brucellosis and the initial diagnosis of certain stock diseases.

In Great Britain, as mentioned elsewhere in this article, the practitioner is being made use of on a part-time basis under the Local Veterinary Inspector System to do some of the work referred to in the previous paragraph.

A small, highly trained field staff will always be required to deal quickly and efficiently with the major epizootic diseases and some of the other important ones. In most countries such a service exists. In Great Britain the Ministry's Divisional Veterinary Officers do this work and instruct the private practitioners who become Local Veterinary Inspectors, in their special duties. According to Dr. A. D. Thomas (personal communication) the young veterinary graduate in Sweden commences his career as an artificial insemination officer before becoming a general practitioner. The latter does most of the veterinary work in the country but there is a small government administrative staff chosen from suitable private practitioners to do the administrative work of the state.

At this point it may be opportune to mention two valuable services rendered by the veterinary profession, one in Holland and one in Great Britain.

The former, called "Veterinary Health Services" has been created in Holland. There is a laboratory in each of the eleven provinces and it gives very satisfactory laboratory services. It is responsible for diagnostic and educational work in connection with stock diseases, and helps with the organizational work for the combating of foot and mouth disease, tuberculosis and brucellosis. It does fertility tests and assists with the control of enzootic diseases. The farmers themselves pay for these services from a levy of 5 cents on every 100 kilos of milk. This gives about 2,000,000 gulden or

£200,000 per year. In Friesland this service was largely responsible for the eradication of tuberculosis in that province.

The latter, known as the Veterinary Investigation Service is proving very valuable in Great Britain. It forms part of the Animal Health Division of the Ministry of Agriculture and is directly responsible to the Director of the Veterinary Laboratory of the Ministry at Weybridge. The laboratory at Weybridge acts as the central one and the Veterinary Investigation Officer centres act as regional laboratories for the various areas. Each laboratory covers one to three or four counties according to the area, size and nature of the animal population. Some of the areas are too large at present and further centres will be set up when it can be arranged. The service is provided through the owner's veterinary surgeon, except in the case of poultry, in which the average practitioner had little interest when the scheme commenced. In certain sheep areas as well, where there is no regular access to a veterinarian, sheep are taken direct to the laboratory. The Director of the Veterinary Laboratory at Weybridge, Dr. Stableforth, who has kindly given the information contained in this article about the Veterinary Investigation Centres, is of the opinion that in a densely populated country like Great Britain a centre should not serve an area of more than 20 to 30 miles radius, depending of course on the stock concentration. This gives the practising veterinarians the opportunity to go to the laboratory to discuss their problems, a collaboration which is very fruitful. Details of the laboratory set up, accommodation required etc., have been obtained but for the purposes of this article it is not necessary to mention them here. In appendix three some particulars about the scale of charges, staffing and salaries, etc., are given. These of course naturally apply to Great Britain.

The investigation of local problems is encouraged, assistance being provided from Weybridge where needed, and where long term investigation is needed the problem may be taken over by the central laboratory. Weybridge on the other hand makes use of the V.I.O. Centres when it is necessary to make a survey of a disease or to try out new vaccines, treatments, etc.

2. **Municipal Service.**

M. C. Robinson (1953) gave details of the work of a municipal veterinarian. These comprise (a) the control of livestock markets and abattoirs, (b) control from the veterinary point of view, of the milk producing herds supplying a city or town, (c) veterinary supervision over the animals owned by the local authority. He considered that there would be a steady but limited demand for veterinarians who wish to make municipal service their career and felt that the scope and interest of the work had widened considerably in recent years.

At the present time some of our largest cities still have no veterinarian employed by their municipalities. Some years ago a committee of the Veterinary Faculty at Onderstepoort put forward the suggestion that in the more closely settled country areas it might

be possible for a private veterinarian to do the municipal work of a few of the smaller towns in his area, but the matter was not carried any further.

3. (a) **Private Practice.**

The development of private practice in South Africa in the last fifteen years has been remarkable. It is still capable of much further development on an unsubsidized basis but there is a tendency to crowd into the towns and more densely populated rural areas on account of small animal practice in the former and lower transport costs per case. At present it is not possible to say when saturation point will be reached in private practice. It depends on the economic state of the country and the profession will continue to expand with the development of food production to support the ever increasing industrial progress. Even if there is a recession, it is likely that the practitioner will be able to hold his own as was the case in the previous one after 1929.

One of the chief reasons for graduates preferring private practice is that in it they are able to make use of a great deal of what they have been taught and there is the sense of individual freedom as well. At present there are 32 private practitioners in the Witwatersrand and Vereeniging areas alone and there still appears to be room for more. If some form of government subsidy were introduced to induce veterinarians to settle in the less populated areas, then there would still be a great deal of room for expansion. The subsidy should be on a sliding scale, the highest being paid in areas where it is difficult to make a living in the ordinary way.

3. (b) **Subsidized Private Practice.**

An alternative to an actual subsidy is to pay the practising veterinarian to do some of the work now done by the state veterinarian when available. This is being done on a big scale in Great Britain and the Tuberculosis Scheme in its intial stages is mainly carried out by the private practitioner.

Before going on to describe the duties of a Local Veterinary Inspector in Great Britain, as the private practitioner doing state work is called, the functions discharged by the State Veterinary Service will be detailed. They are:

(a) Diagnostic enquiries into, and control of, certain notifiable diseases.
(b) Veterinary inspection of animals at markets when required.
(c) Examination of cattle for public health reasons e.g. tracing cattle responsible for infected milk.
(d) Tuberculin testing and inspection of cattle in connection with production of tubercle free milk and other quality milk.
(e) Duties in connection with official schemes for disease eradication or control (e.g. eradication of tuberculosis, vaccination of calves against brucellosis).
(f) Duties at quarantine stations..
(g) Duties at ports.

The volume of the work is large and the Local Veterinary Inspectors, who are private practitioners working part-time for the government on a fee basis, assist in this work. The panel of these L.V.I.'s is in two sections, a general panel and a special panel. Members of the general panel may carry out most, but not all, of the functions mentioned and those on the special panel, all of them.

For reasons of economy and for professional reasons, L.V.I.'s in general carry out their duties for the Ministry on the farms of their own clients. They are required to have served at least one year in general practice before entering the Ministry's service. At present there are about 1,550 L.V.I.'s on the panel.

The conditions on which Local Veterinary Inspectors are appointed for the purposes of the Diseases of Animals Act 1950 and the scale of fees, are given in appendices 1 and 2 at the end of this article.

Southern Rhodesian Farmers' Associations.

In Southern Rhodesia a scheme has been initiated in which Farmers' Associations guarantee veterinarians a certain income to practise in their areas. It is not a state scheme but a business arrangement between the veterinarian and the local Farmers' Association. The Southern Rhodesian government has given an undertaking to pay a subsidy to any association which requires it, of £625 p.a. for three years. This subsidy has been granted to encourage the outlying and less settled areas to employ veterinarians. It is likely that the offer of a subsidy will not be made use of by the well established Associations, though it would not involve any degree of government control. The guaranteed salary for the veterinarian is £1,250 per annum for three years. If he does not make it, the Association will pay the deficit, if he makes more it pays nothing and he can keep the surplus.

Although there is a committee of farmers in each local association, the veterinarian is a free agent and can attend to the animals of non-members, but is expected to give the members preference. The veterinarian meets the committee, not as an employee, but as a professional man fulfilling a contract. In practice the scheme appears to work well. At the end of the three years there is nothing to prevent a further three year's contract being arranged but it is felt that if the veterinarian has established himself satisfactorily he will probably wish to be independent. There is no intention at present of converting these contracts into a state scheme with the veterinarian as a salaried official.

Stewart (1953) in a letter to the Veterinary Record from which most of the information about the Rhodesian scheme has been obtained, considers that it has none of the disadvantages of the New Zealand Club System. It is still too early to express any opinion about the Rhodesian scheme as it has only just commenced to operate.

The New Zealand Club Veterinary System.

In New Zealand in 1946 the government decided to introduce

legislation to make provision for the subsidizing of veterinary services. One half of the necessary funds came from the Meat, Wool and Dairy Boards and the other half from the government. A Veterinary Services Council of 13 members was established of which five are veterinarians, but at present there is no private practitioner on it. The Club veterinarian is paid a salary up to £1,200 per annum. The individual club is administered by a committee of farmers with a president and secretary, and the veterinarian is a member of it. All fees are paid to the club secretary and credited to the club. In the event of dissension between the veterinarian and the committee, the matter is referred to the council, and the Chief Executive Officer, who is a veterinarian holding his office as a full time post, may come to the scene and adjudicate. If the veterinarian makes more for the club than the amount of his own salary, he does not receive the surplus, which is credited to the club movement and helps to subsidize the poorer clubs. The government subsidy amounts to £400 per club per annum, £200 capital expenditure is granted for pharmacies and a £600 loan free of interest is available for the construction or purchase of veterinarians' residences.

To commence with, a club must have a minimum of 300 members, membership being based on a fee of a minimum of £1 and a maximum of £3, irrespective of the value of the property. A charge of 15/- is made for the veterinarian's first visit, 10/- for the second and 7/6 for the third and subsequent ones, irrespective of mileage. The charges vary to some extent with the district but the above would be about the average. Stewart (1952) from whose article the preceding information has been obtained considers that an attempt is being made to oust the private practitioner. He feels that the scheme has its value as a means of promoting veterinary assistance to farmers until they become used to employing veterinarians but that it should then cease to function. The government's idea appears to be to make it a permanent State Scheme. Stewart mentions that it is not easy for farmers who are not club members to get veterinary assistance and judging by the number of resignations and the amount of changing from club to club, the conditions of service do not appear to be entirely satisfactory.

Other Avenues of Employment.

Although the great majority of veterinary graduates will go into the state service, municipal service or private practice a number have found other spheres of activity. Some have been employed by stockfood firms, or firms producing remedies for stock diseases or dipping materials, etc. One veterinarian is being employed full time by the S.P.C.A. in Johannesburg and one by a big dairy combine in the Orange Free State. These types of employment will undoubtedly increase in the future.

The veterinary services of neighbouring states will employ some of the South African graduates but there will be a tendency, when he is available, to employ the British graduate.

A few veterinarians will continue to go in for farming when favourable opportunities present themselves, combining private practice with the farming in some instances.

In this article the writer has attempted to explore the possible avenues of employment for the South African veterinary graduate, more particularly in view of the proposed increase in the number of students to be trained in the future. The underlying idea has been to stimulate thought on the subject and to provoke discussion. If these objects are achieved, the writer will feel that his time has been well spent.

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APPENDIX I

Memorandum of the Conditions on which Local Veterinary Inspectors are appointed by the Minister of Agriculture and Fisheries for the purposes of the Diseases of Animals Act 1950

1. (a) Veterinary surgeons in private practice appointed by the Minister to act as Local Veterinary Inspectors will be required to carry out, in accordance with the Ministry's instructions, on the premises of their own clients, such of the following duties of a veterinary inspector under the Diseases of Animals Act 1950 as they may be instructed by the Ministry's Divisional Veterinary Officer to perform :

> The tuberculin testing of herds, the veterinary inspection of dairy herds, the diagnosis of tuberculosis and the vaccination of calves against contagious abortion. In addition they may be required to carry out the veterinary inspection of animals and poultry in markets.

(b) Certain Local Veterinary Inspectors may also be required to carry out, in accordance with the Ministry's instructions, on any premises.

(i) the diagnosis of notifiable diseases (other than tuberculosis) and other duties of a veterinary inspector under the Diseases of Animals Act 1950, not specified in subparagraph (a) above, and

(ii) the duties specified in subparagraph (a) in herds which are not attended by a veterinary surgeon who is a Local Veterinary Inspector.

2. **General.** The engagement of a Local Veterinary Inspector may be terminated upon one calendar month's notice being given on either side, and the Certificate of Appointment and any other authorisation issued to him must be returned to the Ministry on the termination of the engagement. The engagement may be terminated forthwith on the discontinuance of residence of the Local Veterinary Inspector at the centre previously approved by the Ministry.

The engagement may be suspended or terminated forthwith if the Local Veterinary Inspector infringes the conditions of appointment, performs his duties unsatisfactorily or is guilty of conduct which in the opinion of the Head of the Department makes immediate suspension or termination desirable in the public interest.

3. Assistants or salaried partners will be considered for appointment as Local Veterinary Inspectors on the following conditions:

(a) Application for appointment must be made by the principal with the consent of the assistant or salaried partner.

(b) An assistant or salaried partner must have had at least twelve months' experience in agricultural practice after graduation, including at least three months' with his present employer.

(c) The appointment will be terminated when the engagement with the employer is terminated.

(d) The fact that an assistant or salaried partner has held an appointment as Local Veterinary Inspector will not entitle him to reappointment on engagement in another practice, but an application from the new employer may be considered after the assistant or salaried partner has been in the practice for at least one month.

(e) An assistant or salaried partner will not normally be appointed Local Veterinary Inspector unless the principal also holds appointment.

(f) Assistants and salaried partners appointed Local Veterinary Inspectors will be held personally responsible for official duties carried out by them and must sign all certificates and notices relating to those duties.

4. The services of a Local Veterinary Inspector will not normally be retained after he reaches the age of 65 years.

5. A Local Veterinary Inspector will have no claim to superannuation allowance or to any gratuity or compensation whatever on retirement or termination of appointment.

6. (a) With the exception of calf vaccination duties [see (b) below], a Local Veterinary Inspector is to deal personally and not by deputy with cases allotted to him.

(b) The vaccination of calves under the Calf Vaccination Scheme may be carried out by a veterinary surgeon who acts as assistant to a Local Veterinary Inspector but who is not himself appointed Local Veterinary Inspector, on the understanding that the Local Veterinary Inspector is fully responsible for the work of the assistant. Accounts for fees must be rendered by the Local Veterinary Inspector.

(c) A Local Veterinary Inspector will normally be expected to undertake personally his own microscopical examinations for diagnostic purposes, but the preparation of slides may be entrusted to assistants. Until further notice, however, a Local Veterinary Inspector may, if he so desires and at his own expense, send milk samples for microscopical examination to a laboratory approved by the Divisional Veterinary Officer.

7. A Local Veterinary Inspector will be expected to supply the equipment and waterproof clothing necessary for the efficient performance of his duties.

8. A Local Veterinary Inspector is expected to give precedence to duties entrusted to him by the Ministry and to arrange such duties with due regard to considerations of economy.

9. A Local Veterinary Inspector must notify the Divisional Veterinary Officer when, by reason of absence from home or of illness or other cause, he is not available for duty. As long notice as possible of impending absence from home should be given. He must also notify the Divisional Veterinary Officer immediately if for any reason he is unable to carry out promptly any duty allotted to him.

10. A Local Veterinary Inspector appointed for the purpose of the examination of imported animals at approved ports of landing or for the purpose of the examination of horses intended for shipment will be required to assist the Veterinary Officer in charge of the approved Landing Place or Imported Animals Wharf, or of the place of shipment for exported horses, as the case may be, when called upon; and on such days as he is employed as a substitute for that officer he will be required to examine the animals landed or horses intended to be shipped and proceed in accordance with the standing instructions for the time being in force, full details of which are in the possession of the Veterinary Officer in charge.

11. **Fees.** Fees will be paid in accordance with the rates set out in Appendix I to this memorandum.

12. **Travelling.** Travelling expenses will be allowed in accordance with the Instructions contained in Appendix II, provided that in the case of duties carried out by a Local Veterinary Inspector on the premises of his own clients under paragraph 1 (a) above, no mileage allowance will be payable in respect of mileage outside a radius of ten miles from his surgery or branch surgery as the case may be, except in special circumstances where the Ministry has authorised a variation from the ten-mile limitation. [N.B. — This proviso does not apply to duties carried out in accordance with paragraph 1 (b) above, where the full mileage travelled on official business will be allowed.]

Where two or more Local Veterinary Inspectors are in partnership, and the partners reside in different towns, instructions will be addressed normally to the firm but travelling expenses will be calculated from the address of the branch of the practice nearest to the point of the official call.

13. **Subsistence.** When a Local Veterinary Inspector is *necessarily* absent from his place of residence on official duty for a night, a Subsistence Allowance of 15s. may be charged. No day subsistence allowance may be charged.

14. **Payment of Accounts.** Claims by a Local Veterinary Inspector for fees, travelling expenses and subsistence allowances must be submitted punctually and in accordance with the instructions on the forms of account supplied for the purpose. Payment will be made quarterly. Claims by assistants and salaried partners appointed as Local Veterinary Inspectors must be countersigned by the principal of the firm, to whom payment will be made.

In the case of partnership, payment will be made to the partner who has carried out the duties.

APPENDIX II
MINISTRY OF AGRICULTURE AND FISHERIES

Scale of Fees for Services rendered by Local Veterinary Inspectors in connection with Duties under the Diseases of Animals Act, 1950

	£	s.	d.
1. *Anthrax*			
Diagnostic inquiry, including microscopic examination and report	1	8	0
2. *Foot-and-Mouth Diseases*			
Preliminary examination of animals in report cases	1	8	0
Examination and report on contact animals on other premises	1	8	0
3. *Glanders*			
Diagnostic inquiry, including Mallein Test (one animal) and report	1	8	0
Additional animals, including Mallein Test and report, per head		6	8
Additional, for post-mortem examination and report, per head		14	0
(N.B.—If Mallein is not provided by the Ministry the L.V.I. will be re-imbursed for necessary expenditure on Mallein.)			
4. *Parasitic Mange*			
Diagnostic inquiry, including microscopic examination	1	8	0
Subsequent visits		6	8
5. *Rabies*			
Diagnostic inquiry, including post-mortem examination and report	1	8	0
6. *Sheep Scab*			
Diagnostic inquiry, including microscopic examination and report and individual examination of up to 50 sheep on premises	1	8	0
Individual examination of each additional 50 sheep on premises (up to 50 sheep in the case of last animals examined)		6	8
Individual examination of contacts on other premises (on instructions from Ministry) up to 50 sheep	1	8	0
Each additional 50 sheep on premises (up to 50 sheep in the case of last animals examined)		6	8
7. *Swine Fever*			
Inclusive fee for first and second visits	1	13	4
For each subsequent visit		14	0
8. *Importation of Animals*			
For absence from home:			
1 hour or less		14	0
Exceeding 1 hour but not exceeding 2 hours	1	8	0
Exceeding 2 hours but not exceeding 4 hours	2	2	0
Exceeding 4 hours but not exceeding 6 hours	2	16	0
Exceeding 6 hours but not exceeding 8 hours	3	10	0
Exceeding 8 hours on any one day	4	4	0

9.	*Exportation of Horses*		
	For each attendance at Port	16	8
	Each horse examined	1	0
10.	*Quarantine Station*		
	Examination of animals, including mouthing of cattle, for admission to the Quarantine Station and inspection of all remaining animals on the farm	1 8	0
	Subsequent visit if necessary	14	0
11.	*Tuberculin Test*		
	For the first 5 cattle	1 8	0
	For the next 40 cattle, per head	3	4
	For additional cattle, per head	2	8
	Notes —		
	(1) The fee includes the clinical examination of animals tested.		
	(2) Where a number of small lots of cattle in close proximity to each other are to be tested at the same time, e.g., as in the crofting districts of Scotland, the Ministry reserves the right to combine such lots of cattle into groups for the purpose of the application of the above scale.		
12.	*Tuberculosis (including Tuberculous Milk Investigations)*		
	Diagnostic inquiry, including microscopic examination, valuation and report	1 8	0
	Post-mortem examination, per animal	14	0
	Further visit, where necessary (e.g., for valuation, sampling, revisiting in Tuberculous Milk Investigations)	14	0
	Note.—The first visit in a Tuberculous Milk Investigation is regarded as a Tuberculosis diagnostic inquiry for which a fee of £1. 8s. is normally payable. If so desired, however, the inspector may claim instead the fee appropriate to a herd inspection under the Milk and Dairies Acts and Orders (see Item No. 15 below). The fee for a further visit, viz., 14s. is payable in respect of any subsequent visit that may be necessary, and includes microscopic examination, valuation and report.		
13.	*Contagious Abortion*		
	Vaccination of calves in:		
	(i) Herds to be tuberculin tested:		
	Up to five calves	6	8
	Each additional calf	1	4
	(ii) Other herds to be clinically inspected, per calf*	2	6
	(iii) Other herds, per calf*	3	6
	* No minimum herd fee.		
	Mileage is not payable for calf vaccination duties.		
14.	*Inspection of animals and poultry in Markets*		
	According to size of market .... 14/- to	2 16	0
15.	*Milk and Dairies Acts and Orders*		
	Clinical inspection of herds up to 5 animals	14	0
	Additional animals per head		8
	Revisit on instructions from the Divisional Veterinary Officer	14	0
	Note. If a tuberculosis diagnostic inquiry arises at a herd inspection the Inspector may claim for the combined herd inspection and inquiry *either* the fee appropriate to the herd inspection *or* the fee of £1. 8s. for tuberculosis diagnostic inquiry (see Item No. 12).		

Note.—The above scale of fees, except in the case of Items 8 (Importation of Animals), 11 (Tuberculin Test) and 13 (Contagious Abortion) **is subject to a maximum of £6 6s. for all services rendered by an Inspector on any one day.** Where an Inspector is engaged on the same day partly on importation of animals work and partly on other duties an appropriate intermediate maximum will be applied. For each visit for purposes of a tuberculin test one-half of the standing fee of £1. 8s., i.e., 14s., will be taken into account in connection with the daily maximum.

APPENDIX III

V.I.O. Scale of Charges

All services are free to Veterinary surgeons, except:—

A (i)
B (i)
C (i)

A.	*Agglutination Tests*	
	(i) *Brucella Abortus* (cattle and horses)	1/- per sample up to 10. 9d. for each over 10. 2/6 per certificate.
	(ii) *Pullorum disease*	2d. per sample. Minimum fee 2/6d.
	(iii) *Other salmonella* (usually duck or fowl bloods)	3d. per sample. Minimum fee 2/6d.
B.	*Microscopical examinations*	
	(i) *Examination of milk for Tubercle bacilli*	2/6d. per sample.
	(ii) *Examination of discharges*	2/- per sample.
	(iii) *Skin scrapings*	2/- per sample.
	"QUARTER SAMPLES" are charged	1/3d. *each*
C.	*Bacteriological examinations* (i.e., cultural work)	
	(i) *Examination of milk samples for mastitis*	5/- per cow. 2/6d. per series.
	(ii) *Examination of other fluids, discharges, etc.*	2/6d. per sample.
	"QUARTER SAMPLES" are charged	1/3d. *each*
D.	*Histological examinations*	5/- per tissue.
E.	*Worm and egg counts (from Faeces)*	2/6d. per sample.
F.	*Biological examination*	£1. 1s. per sample.
G.	*Simple chemical examinations,* e.g., urine for sugars, proteins, etc.	2/6 per sample.
H.	*Post-mortem examinations*	
	(i) *Poultry* (a) Chicks up to eight weeks (no specific number)	5/-
	(b) Adult birds (no specific number)	3/-
	(ii) *Rabbits* (no specific number)	3/-

V.I.O. Service

Charges: Are set out in attached memorandum, but veterinary surgeons are not charged where the laboratory examination is made in order to establish a diagnosis. Items A (ii) and H (i) and H (ii) are examinations undertaken for the public direct and for which charges (to the sender) are made.

Staffing. Some centres are not yet fully developed; others have smaller livestock populations than those in the bigger areas. A typical centre would be under the charge of a V.I.O.; with one (perhaps two) Assistant V.I.Os.; a senior technician; one or possibly two junior (skilled) technicians; an unskilled technician; and an animal attendant; with a clerk-shorthand-typist.

Salaries.

Veterinary Investigation Officer	£1,150 –£1,450 p.a.
Assistant Veterinary Investigation Officer	550 – 1,100 ,,
Senior Scientific Assistant	480 – 650 ,,
Scientific Assistant	215 – 455 ,,
Temporary Scientific Assistant II	170 – 355 ,,
Laboratory Attendant	£2. 7s. 0d. – £6. 14s. 0d. per week.

AN ACUTE EPIZOOTIC, DUE TO SALMONELLA ENTERIDITIS VAR DUBLIN, AMONG GUINEA-PIGS (CAVIA PARCELLUS)

G. MARTINAGLIA
Durban

Paratyphoid diseases are known to occur among cavies. Wilson-Jones and co-workers (1953), in their article on the Onderstepoort small animal colony, mentioned the easy spread of Salmonella typhimurium in overcrowded cages.

This article records a sudden and severe outbreak of Salmonellosis among the guinea-pigs of our laboratory breeding stock, due to Salmonella dublin, an organism that is also the main cause of calf-paratyphoid in South Africa.

Lesions observed in autopsies were strikingly similar to those recorded by Viljoen and Martinaglia, among calves in the Marico district of the Transvaal (1923-24). On many farms, the disease was diagnosed bacteriologically as due mainly to S. enteriditis. In 1939 the aetiology was confirmed as S. enteriditis var dublin, by Henning who used the latest serological techniques of Kaufmann and White.

After the recent local outbreak among the guinea-pigs was recognised and bacteriologically diagnosed, two cultures were despatched to Onderstepoort, one of the world Salmonella-typing centres, to ascertain serologically, the antigenic structure of this Salmonella. Henning reported that both cultures conformed to Salmonella dublin type.

This disease in laboratory animals is serious and since it is one of the zoonoses, our main object was to isolate and eliminate the infected animals. No experiments were conducted during the short course of the epizootic, time being devoted to the cause, symptoms, pathology and vaccination in order to terminate the infection as soon as possible.

In the early stages occasional deaths occurred but soon the mortality reached epizootic proportions and out of twelve hutches, five were infected. All ages contracted the disease and there were cases of abortion. Lactating sows lost their milk and of the young born during the outbreak, none survived. Death occurred within three days after birth.

Methods of Dealing with the Disease :

Precautionary measures were taken to separate the infected animals from the healthy. Apparently fit animals were injected with vaccine, prepared at our hospital laboratory from a local guinea-pig strain. Infected survivors were humanely destroyed and

Footnote. From the C.S.I.R. Tuberculosis Research Unit, King George V Hospital, Durban.

autopsied. Of sixty animals vaccinated, only five contracted the malady, these probably had the disease in the incubation period during vaccine administration.

While the outbreak raged, food and water containers were sterilized. Hygienic conditions were maintained by cleansing and disinfecting the cages daily, while the presence of flies was controlled by liberal spraying of D.D.T. on the walls and bedding. An antigen was prepared and the rapid agglutination as advocated by Robinson and Lawrence in calf paratyphoid infection was introduced to detect carriers. After being dipped and vaccinated, newly acquired males were isolated for three weeks, before being introduced into the breeding pens. At the time of writing the animals appear healthy and the birthrate has returned to normal.

Symptoms :

When ill, there is a falling off in the appetite and weight of these naturally ravenous cavies. The coat is ruffled and the victim is somnolent and heavy-eyed and often sits tucked-up. There are signs of abdominal pain and diaphragmatic spasms. The temperature varies from 101° to 104.8°F. Blood-count reveals leucopenia and anaemia. In extremis the animal often lies on the abdomen with legs outstretched. (See Fig. 1.)

Fig. 1
Acute Salmonella dublin infection in guinea-pigs. Right one in extremis.

Morbid Anatomy :

In the acute form, the main post-mortem appearances are rigor-mortis and distention of the sub-cutaneous blood vessels. There is often an acute enteritis, hyperaemia of the liver and an enlarged spleen. In the more protracted form, the gross pathological

changes are more characteristic, especially in the liver. This organ is enlarged, mottled and friable, often displaying a few or many greyish-white necrotic circumscribed focal lesions, varying from a pinpoint to almost the size of a pea. In one case a few large foci had suppurated through the liver capsule and become adherent to the peritoneum, causing peritonitis. These focal points of necrosis are flat but may bulge slightly on the liver surface and extend throughout the parenchyma. The spleen is generally enlarged, often displaying greyish pinpoint foci. In one instance an acute pericarditis was noted. The lungs generally show no macroscopic lesions. There is often an acute gastro-enteritis, the stomach and intestine being filled with fluid and gas, and showing prominent blood vessels and occasionally haemorrhagic patches on the mucosa of the stomach, and necrotic lymph follicles of the small intestine. See Figures 2 and 3.

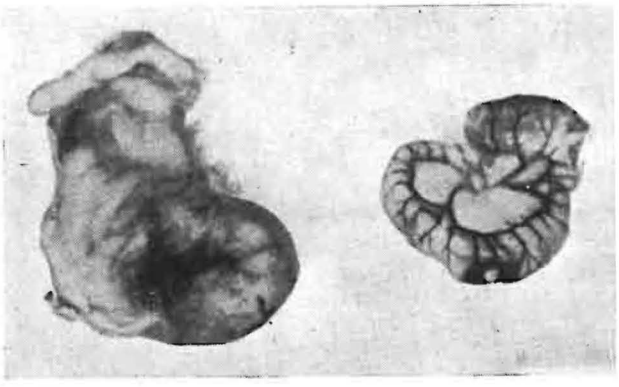

Fig. 2
Salmonella gastrointestinal lesions.

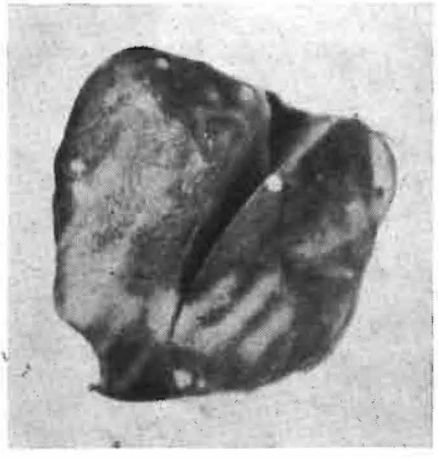

Fig. 3
Typical Salmonella dublin lesions on liver of guinea-pig.

PATHOLOGY

The microscopical pathology is very similar to that of calf paratyphoid. In this article only the main lesions will be mentioned as seen in the guinea pig.

Liver :

In the acute state there is a diffuse parenchymatous hepatitis. Later multiple focal necrosis with a marked reticulo-endothelial cell reaction; very often the lesion was perivascular and in some instances associated with a thrombosis of the vessels.

Spleen :

The spleen shows a large abscess with encapsulation; the cell reaction, however, is typically reticulo-endothelial. Throughout the pulp small ulcerative foci with reticular-cell reaction occur.

Intestine :

The mucosa is thickened and a marked proliferation of the

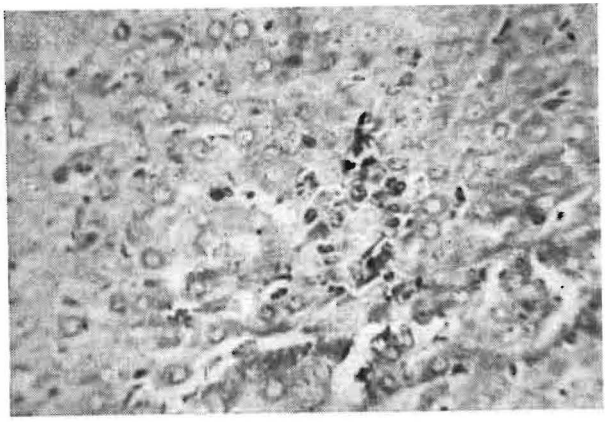

Fig. 4
Liver : Early necrotic focus X320.

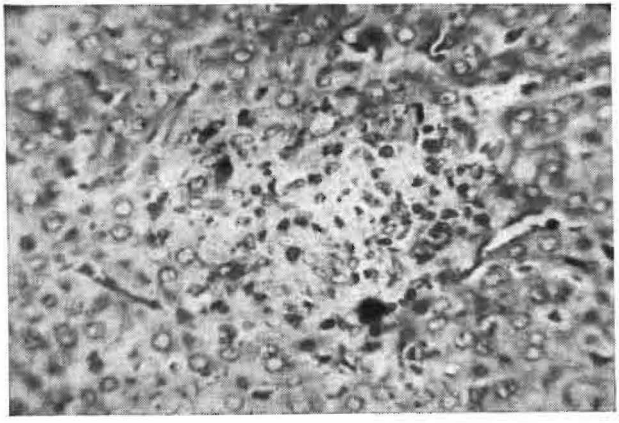

Fig. 5
Liver : Well-developed necrotic focus, with necrosis in centre · X320.

endothelial cells has taken place as well as a certain amount of fibrosis, small amount of leucocytic cell infiltration. It is, therefore, a typical chronic productive enteritis as seen in paratyphoid.

Aetiology :

Salmonella dublin produces an acute bacteraemia and can be isolated from all organs, especially the heart-blood, liver and spleen.

The main portal of entrance appears to be the mouth. During parturition, the vaginal aperture of the mother and the umbilical cord of the young are also sites of entrance of the organism.

The outbreak occurred during the hottest months of the summer when flies are prevalent. At the same time, the chief veterinary officer of Natal, in a public statement, mentioned the prevalence of paratyphoid in calves, thus showing the seasonal nature of the disease. In dealing with this disease-producing agent the following points are of interest to the investigator :—

1. Multiplicity in host adaptation and as a cause of food poisoning.
2. Role as a primary or secondary invader in disease.
3. Tendency to cause abortion during an acute epizootic.
4. Longevity when grown on sealed serum-sugar media and possibly, in nature, under favourable conditions.
5. Likelihood of creation of a natural reservoir.

Possible Vectors :

It was not possible to incriminate contaminated food or a vector but sparrows and Indian Mynahs are among the birds which enter into open runs.

The mesh wire-netting would not permit the entry of large rats, though it might be possible for fieldmice to enter. The attendant states that he has observed no signs of this. Cockroaches, too, have been considered as possible vectors.

Prior to the outbreak, new guinea-pigs had been introduced from a different province and we suspect that among them, were carriers of the disease.

One guinea-pig injected with the usual sodium-hydroxide treated and concentrated material, for the Tuberculosis biological test, died after one week in experiment. Autopsy revealed a large chronic nodular spleen infection.

From splenic abscesses, a pure culture of Salmonella was isolated but no acid-fast organism could be demonstrated. A repetition specimen from the hospital patient proved negative, biologically for tuberculosis after six weeks. The abscesses in the spleen must have been caused by the Salmonella or they were the result of some other infection in which the Salmonella survived in a secondary role.

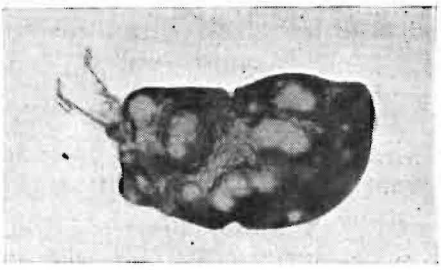

Fig. 6
Nodular abscesses in spleen of guinea-pig, associated with Salmonella dublin.

Differential Diagnosis :

In the experimental guinea-pig, it is important during autopsy, to differentiate Salmonellosis from brucellosis, pasteurellosis and tuberculosis. In the last-mentioned disease the post-mortem features are well known but in rare cases where a chronic nodular spleen alone is encountered and no acid-fast bacilli are found, a bacteriological examination for Salmonella, should also be carried out.

Discussion and Conclusions :

An authority on the diseases of laboratory animals, referring to paratyphoid, states: "All ailing animals and contacts should be destroyed. In most cases the only positive solution is to kill off the whole stock and start afresh."

Generally speaking, this holds, unless the disease can be diagnosed without delay and followed by meticulous hygiene and prophylactic measures. Treatment by present day antibiotics, although beneficial to some extent, is hampered by the time factor and is not practical.

The importance of a self-contained animal breeding-colony is stressed.

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HYALOMMA TRANSIENS SCHULZE: A VECTOR OF SWEATING SICKNESS

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Onderstepoort.

Sweating sickness is an acute or subacute disease of cattle, particulary calves, characterised by salivation, lachrymation, hyperaemia of the visible mucous membranes, epistaxis, profuse moist eczema and inappetence. Calves up to the age of eight months are highly susceptible, while older animals up to the age of two years (du Toit, 1923) and three years (Clark, 1933) apparently react less severely. This disease is widely distributed in Africa, occurring in Central, East and Southern Africa. Severe losses may be sustained during summer and early autumn. The morbidity rate in calves varies from 5 to 100 per cent, while the average mortality rate is 30 per cent (Clark, 1933).

All attempts at transmitting the disease artificially to calves by the intravenous and subcutaneous injection of blood and organ emulsions have failed. Nevertheless, epizootological observations have indicated that sweating sickness is an infectious disease, and that in all probability an arthropod vector is responsible for its spread (du Toit, 1923). Although the three species of bontpoot ticks, *Hyalomma rufipes rufipes* Koch, H. *rufipes glabrum* Delpy, and *H. transiens* Schulze, have been incriminated as possible vectors, it was only recently that successful biological transmission was achieved by means of the last mentioned species.

A fully engorged bontpoot female tick which was identified by Dr. G. Theiler as the two host tick, *H. transiens,* was obtained in April, 1953, from a calf reacting to sweating sickness in Zululand. Since the larval and nymphal stages of this species do not feed on cattle, they were reared on a rabbit maintained in a warm room during winter, July, 1953. Of the ensuing adults twenty were placed on the ear of a three months old calf in October, 1953. No history was available as to whether the dam of this calf had suffered from this disease during her lifetime or not. The ticks attached readily and after nine days the calf developed typical symptoms of sweating sickness. It died three days later. Three fully engorged females were collected between the ninth and eleventh days after tick infestation.

As these ticks had been feeding during the period of reaction, it was anticipated that a hereditary transmission of the infectious agent would occur as had happened previously. Acting on this assumption the progeny, larvae and nymphae, were reared on rabbits during December, 1953. Each of three calves varying in age from three to twelve weeks was infested with thirty of the ensuing adults at the end of February, 1954. No history was available whether or not the dams of these calves had ever reacted to sweating sickness. The ticks attached readily. Thermal reactions commenced in the seven weeks old calf on the fourth and in the three and twelve weeks old calves on the fifth day after tick infestation. The

oldest calf was slaughtered on the third day of reaction when it had a temperature of 106.6°F and showing salivation and epistaxis but no signs of a moist eczema. Specimens of various organs were collected for biological and histo-pathological studies. The youngest calf developed a thermal reaction (104-105°F) which persisted for four days accompanied by relatively mild but nevertheless typical symptoms. It made a rapid recovery. The seven weeks old calf exhibited all the characteristic symptoms of sweating sickness and died eight days after the initial rise in temperature. A total of 24 fully engorged adult females were collected from the three calves between the seventh and ninth days after tick infestation.

SUMMARY AND CONCLUSIONS

Consideration of these observations leaves no doubt that *H. transiens* is a vector of sweating sickness. The infectious agent is transmitted hereditarily in this tick. Infective ticks transmit the disease to calves in the adult stage. The short incubation period of this disease gives adult ticks every opportunity of reinfecting themselves while feeding on the reacting animal. It needs to be determined whether or not infective adults lose their infection when allowed to feed on immune or insusceptible animals. It is possible that the other two above-mentioned members of the genus *Hyalomma* can also serve as vectors. At present systematic dipping and hand-dressing is the only prophylactic measure available for combating sweating sickness.

Maintenance of the infectious agent in the vector will greatly facilitate further studies of this disease.

ACKNOWLEDGMENTS

The writer wishes to thank Dr. R. A. Alexander, Director of Veterinary Services, for his critical interest and encouragement and for the facilities placed at his disposal for these studies. Thanks are due to Miss L. Hay, Zululand, for the infective tick, and to Mr. F. B. Boughton and Mr. H. Walters for their valuable assistance in rearing the ticks.

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AZOTURIA IN POLO PONIES

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Pietermaritzburg.

Every year three major polo tournaments are staged in Pietermaritzburg, and there are, on some occasions, 500 to 700 visiting horses in the city. The majority of these horses come by train or trailers. The occurrence of Azoturia is not uncommon and it is felt that a record of our experiences may prove of some interest.

A significant feature is that the disease is almost always encountered in well nourished animals. Mares as well as geldings are affected and it does not appear to be any more common in one sex. All the cases observed have been in horses over 6 years of age, but no significance should be attached to this, as, practically all horses taking part in these tournaments are aged.

The predisposing factor is — animals in regular work on a good diet, a period of idleness with no reduction in the diet, and then exercise.

The following case illustrates the point very clearly. On 13/8/53 sixteen horses were railed from Mount Edgecombe and arrived at Pietermaritzburg on 14/8/53. These animals were well cared for and well fed, but for the ensuing four days received no exercise. On the afternoon of 18/8/53 they appeared on the polo field, and within one hour six of them went down with Azoturia. This illustrates very clearly the usual set of circumstances — regular exercise, rich diet, idle spell and then sudden exercise. In the above six cases symptoms developed in less than ten minutes in each case.

Symptoms:

The significant features are sweating, stiff gait and unwillingness to move. In all the cases seen the hind legs only were affected — generally both, but sometimes only one. In most cases the animals will not move at all, particularly forward or backward. If one tries to turn them round they merely pivot with difficulty on the hind legs. The muscles over the loins and quarters became extremely hard and tense and rocklike. The urine when voided is generally coffee coloured. Usually, however, urine is retained with distension of the bladder.

Prognosis:

The prognosis is good and animals may recover in a few minutes if treated promptly. In severe cases stiffness may persist for two or three days. No cases of mortality have been recorded. During the past few years well over a hundred cases have been treated.

Treatment:

Complete rest is essential and the animal must be blanketed and kept warm. The animal should then be given an intravenous transfusion of Calcium Borogluconate, usually 200-350 ccs. of 10% solution are given. In addition 1,000 units of Vitamin B_1 are given intramuscularly and in some cases 1.5 mgm. Neostygmine methylsulphate. This treatment is repeated 24 hours later if necessary.

Various forms of treatment have been tried in the past, such as injections of insulin, glucose saline, leucotropin and small injections of carbachol. These measures appeared to give some measure of relief but were not really satisfactory.

Prophylaxis:

Judicious feeding and exercise are essential. Horses which show a predisposition to the disease should be given a course of B_1 injections as this appears to be very beneficial.

IMMUNITY TO BRUCELLA OR ERADICATION OF BRUCELLOSIS*

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Onderstepoort.

Abstract.

Earlier and present tests for effectiveness of anti-Brucellosis work, carried out in South Africa and overseas and likely to influence the vaccination campaign in this country, are discussed.

The purpose of this report is to consider the history and results of some recent work on the immunological aspects of Brucellosis.

GREAT BRITAIN

McFadyean and Stockman (1909) were the first to test single massive doses of live *Brucella* organisms for vaccination of cattle. The use of live vaccines was, however, strongly opposed in England by the protagonists of the test and slaughter policy and of the policy of isolating reactors.

A large number of live and dead vaccines have been tested, for instance, at Moredun 1934 to 1941. It was found that immunity work on small animals was not conclusive; cattle had to be used (Taylor A. W., Ph.D. thesis, Edinburgh University). Experiments in cattle were eventually recommended by the Scottish Board of Veterinary Research. The site selected for this purpose was the Field Station of the Agricultural Research Council at Compton, Berks, directed by Dr. W. S. Gordon.

The strains used by English commercial firms were sorted out in guinea-pigs and two, McEwen's 45/20 and the American S19, obviously gave the best results. Experimental comparisons in cattle were made in six isolation units with 10 cattle in each, exposure being effected by cultures dropped into the conjunctival sac. Strain 45/20 was tested as a live vaccine against a small (1,000,000 organisms) and a large (150,000,000 organisms) infective dose of a stable virulent strain (Edwards et al. 1945) and strain 19 was tested against 15 and 150 million organisms (Edwards et al. 1946). Strain 19 was shown to be preferable as an immunizing agent. Of the S19 vaccinates exposed to a heavy infecting dose, two out of ten became infected, whereas of the 45/20 vaccinates, six out of ten

*Paper read at the 48th General Meeting of the S.A. Vet. Med. Assn. at Onderstepoort, 19/8/1953.

became infected. All the controls developed infection. Taylor and McDiarmid (1949) also found strain 45/20 to revert to high virulence on passage in cattle whereas S19 was a stable, relatively avirulent strain of *Brucella abortus*.

In 1942 the production of strain S19 vaccine on a large scale, was commenced at Weybridge, with the aid of Dr. Mingle from the U.S.A. Bureau of Animal Industry. Until 1943 the Public Health Authorities did not allow any living vaccine to be used in herds tested for T.B. and C.A. (unpasteurised milk). Hundreds of milks from cattle vaccinated with S19 were examined before it was eventually permitted. This vaccine was then also tested on pregnant cows and recovered from afterbirths of the 1-2% of cows showing abortion, but never from the milk of the aborting cows. A field experiment with vaccination of non-reactors in seven infected herds was carried out (Lawson and Dalling, 1949). In five years the incidence of infection was reduced from 42.1% to nil by normal wastage of non-productive animals. Only 2% of vaccinated animals became infected during the period. The number of abortions caused by *Brucella* was reduced from 23 to nil but the abortions from other causes increased from 3 to 14.

Vaccinating calves at 18 months old instead of at 6 months, is believed to result in better immunity, but experimental proof has not been reported. A second dose of vaccine results in less response but a longer persistence of reaction. Intradermal and intracaudal vaccination with a twenty-fifth and a fifth of the subcutaneous dose has been tested with good experimental results. In practice the technique of inoculation is apparently less reliable.

Finally an extensive experiment was planned and started at Compton in which a bird-proof compound with accommodation for 534 head of cattle, isolated in groups of ten, was used. Calves were obtained from *Brucella*-free herds in Scotland, fed on colostrum gathered on the farm at Compton and stored in the frozen state, and transported by road to the isolation units. They were vaccinated at different ages, inseminated (93% pregnant) and are being exposed at different ages. Full serological, biological and bacteriological histories are being kept. (McDiarmid 1952). The results are expected to give the answer to the following:—

(1) The duration of immunity.

(2) The vaccination age most suitable.

(3) The value of multiple vaccination.

In England at present, the policy is to get as much vaccine into as many cattle as possible. If vaccinates do become infected, they are less likely to abort and become spreaders. Revaccination after calving seems to be of little value. There are three schemes in operation by which 615,600 doses were inoculated in 1951-52.

(a) Calfhood vaccination which is done by a veterinarian who receives the vaccine free at the divisional office and collects 2/- per head from the farmers after inoculation.

(b) Fee paying, where the vaccine is sold to the practitioner at 1/6 per dose.

(c) Panel scheme, where a capitation fee per year includes vaccination against C.A.

There is a peak demand for vaccine in spring, when most calves are of the proper age. The vaccine is produced at the Weybridge Veterinary Laboratories, in conformity with the B.A.I. specifications. In addition to the regular tests, a safety test in guinea-pigs is carried out in which the spleen-count of guinea-pigs vaccinated 11 days previously is recorded in relation to the absence of *Brucella* organisms from the guinea-pig spleen at 6 weeks after vaccination. This is considered proof of the typical low virulence of strain 19. Some vaccinated guinea-pigs are then challanged with virulent strain 544 in a measured dose and 70-80% should be protected whereas all controls are infected 6 weeks later as shown by spleen weight–body weight ratio, spleen culture and titre.

The staff required for this work at Weybridge includes one professional officer, three technical assistants, approximately sixteen lay workers and a separate staff attending to the small animals.

OTHER COUNTRIES

Brucella abortus strain 19 vaccine was originated by the B.A.I. in America. Its value was determined by exposing vaccinates to suspensions of virulent cultures dropped into the conjunctival sac. Extensive field trials were undertaken with calfhood vaccination in infected herds. Although there is no doubt as regards the production of immunity, it must be stressed that the protection obtained was limited. Birch, Gilman and Stone (1944) found infection in 58% of vaccinates and in 66% of non-vaccinated controls. These authors mention a four year duration of immunity, but recently it has been reported from the United States (Anon. 1953) that the immunity or resistance to infection is of long duration in vaccinates and not significantly increased by reinoculation of older cattle.

In Australia, Campbell and Rodwell (1949) and Gregory (1952) have assessed the immunity produced by *Brucella* vaccine by exposing pregnant vaccinates in a camp with a constant supply of artificially infected aborters. The results here have been outstanding:—23 out of 41 controls aborted within two years (1st pregnancy) whereas only 4 out of 37 animals vaccinated by the usual subcutaneous dose aborted. Only 12.2% of non-infected full term calves were produced by the controls against 62.2% by the vaccinates. The disturbing fact is that 38% of the vaccinates became infected animals, whilst only 88% of the controls became infected, i.e. 12% of control animals resisted natural infection.

A year later the animals which resisted exposure during the

first pregnancy were re-exposed with vaccinated and non-vaccinated controls with the following results:—(Gregory, 1953)

TABLE I.

	Vaccinates				
	Re-exposed		First Exposure		
	Subcut.	Intra-caudal.	Subcut.	Intra-caudal.	Controls.
No. of cattle	22	22	17	20	21
Infected	2	4	6	8	20
Aborted	—	—	1	5	11
Premature calves	1	1	1	—	6
Normal calves	1	3	4	3	3
Non-infected calvings	20	18	11	12	1
Infection percentage	9.1%	18.1%	35.3%	40%	95.2%

Obviously the vaccinates which had not broken down to the first exposure possessed some extra measure of insusceptibility. It suggests that natural resistance may be augmented by breeding and selection as well as by vaccination.

The Test and Slaughter Policy is favoured in Denmark because of the great possibility of an early completion of the campaign. This is possible because all beef consumed, is obtained from dairy animals. To reduce labour costs the Milk Ring Test is of great assistance for screening herds. (Countless milk ring tests in Norway, where no Brucellosis exists, have not revealed a single reaction). Thus in Denmark, where a reaction is found in 3-monthly bulk milk tests, serum tests of individual cows are immediately instituted and reactors removed by degrees. For instance Bornholm island came out of occupation some years ago with 30% reactors and there are no more today; yet the cattle population has been maintained.

Authorities here have much experience of non-reacting carriers of Brucella and some aim at removal of all bovine reactors to the titre of 1 : 10 which is only one fourth of the internationally accepted positive titre. Semen and vaginal mucus of suspected animals are also tested for Brucella antibodies in Denmark. (Jepson, e.a., 1951; Christensen 1948).

SOUTH AFRICA

The anti-Brucellosis work in this country has been guided chiefly by the British experience. Eradication policies were unsuccessful and were given up, to be followed by a haphazard system of vaccination. In 1934 the American strain 19 was adopted for vaccine production but vaccination was carried out only on infected farms and only as a last resort.

The quality of the vaccine was tested as prescribed by the B.A.I., Washington. Density and purity tests were performed on all batches. In 1947 a viability count and an additional test for

safety and immunizing qualities in guinea-pigs was included. The latter was a simple protection test carried out with the virulent field strain of *Brucella* (No. A 4716 G) which on primary isolation produces marked lesions in male guinea-pigs within 4-6 weeks, viz. a marked splenic enlargement and epididymis of the abcesses with testicular atrophy. (See table 2 and figures a, b and c). The

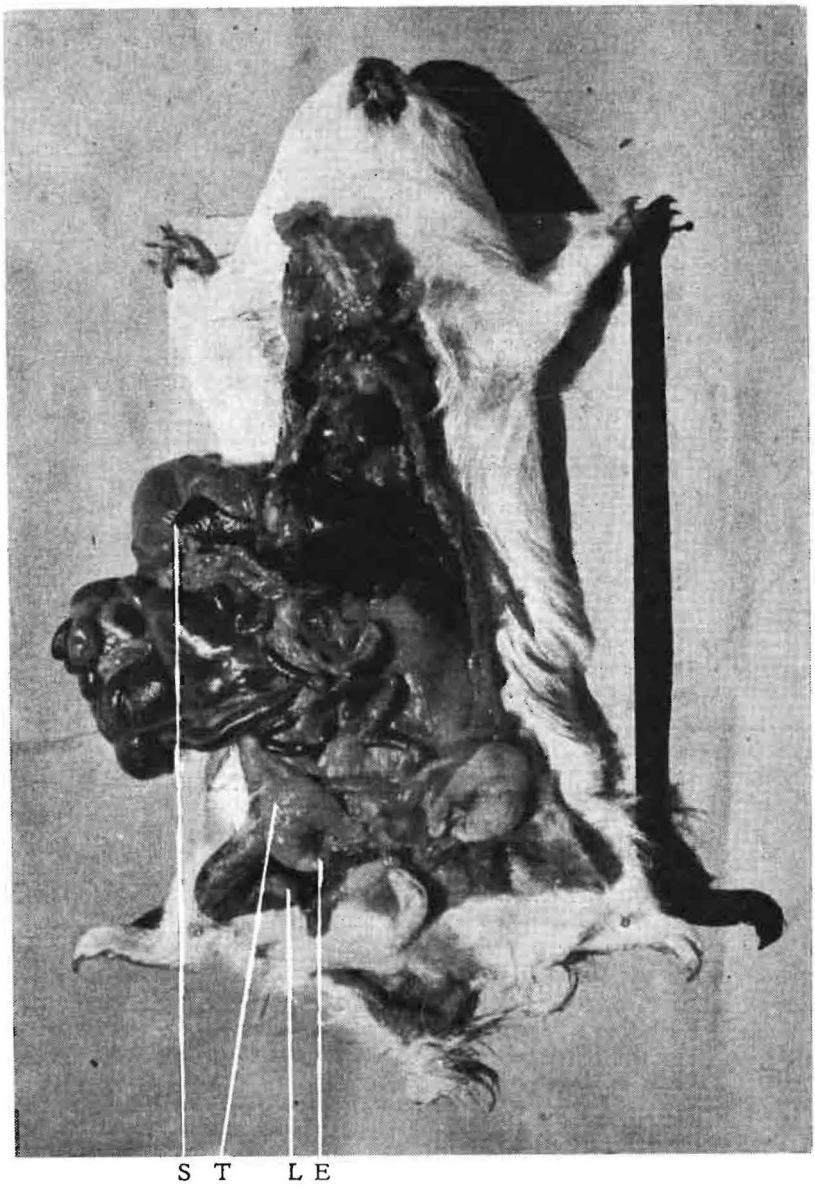

Figure a.

P.M. appearance of spleen (S), lymph glands (L), testicles (T) and epididymides (E), of a normal guinea-pig.

vaccinated pigs when inoculated after 6 weeks failed to show the marked lesions. The test was terminated after the lyophile material of the virulent strain had been used up, because the strain had lost its exceptional virulence for guinea-pigs on subculture.

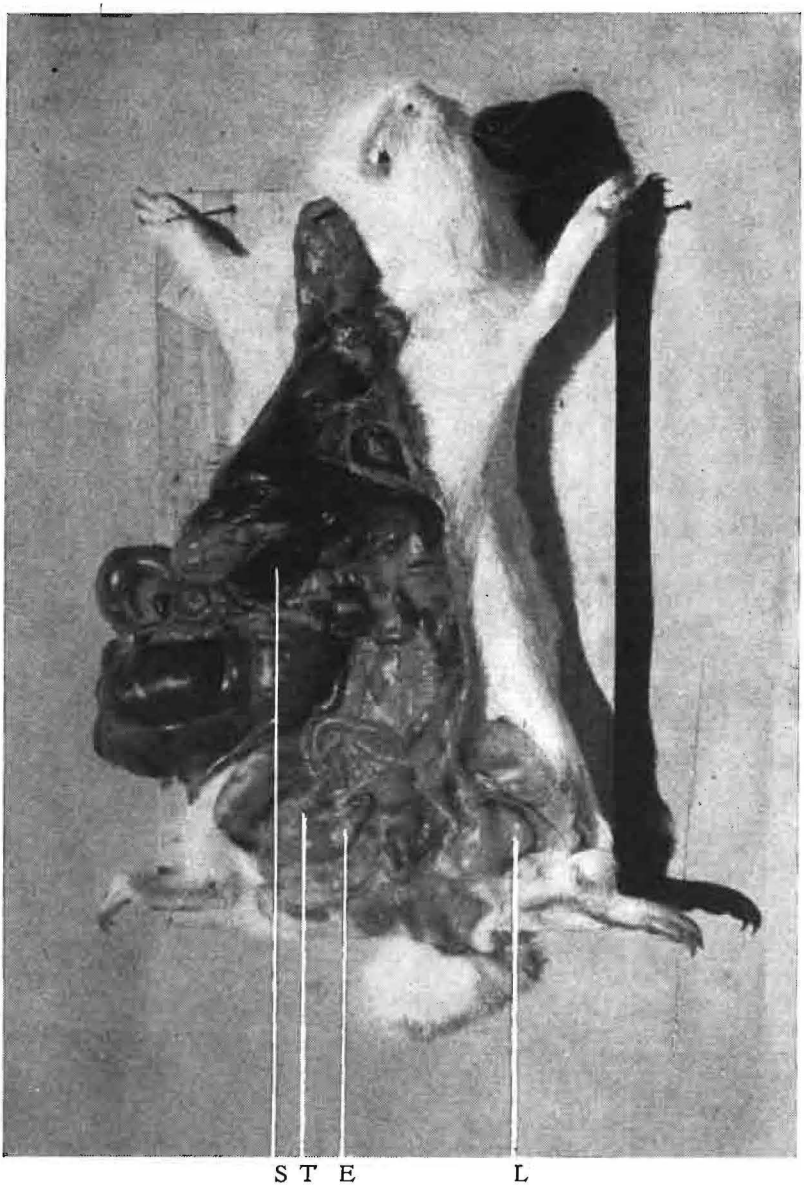

Figure b.

P.M. appearance of spleen (S), lymph glands (L), testicles (T) and epididymides (E), of a vaccinated guinea-pig 6 weeks after challenge with 140 × 106 organisms freeze-dried Brucella abortus A4716G; nothing unusual can be found.

The supply of vaccine in the Union has now been augmented by production in aerated cultures. The problem of keeping quality, for transporting over long distances at high climatic temperatures has been solved by freeze-dried vaccine.

Figure c.
P.M. appearance of spleen (S = markedly enlarged), lymph glands (L = haemorrhagic or hyperaemic and enlarged), testicles (T = partial atrophy) and epididymides (E = atrophy and degeneration with or without abscess formation) of a susceptible guinea-pig 6 weeks after subcutaneous inoculation of 140 × 106 organisms freeze-dried Brucella abortus A4716G; extensive lesions.

TABLE 2.

SAFETY TESTS AND IMMUNIZING VALUE TESTS WITH BRUCELLA VACCINE IN GUINEA-PIGS.

BATCH	VACCINATES				CHALLENGED								Culture used.		REMARKS
					Vaccinates				Controls — Non-Vaccinated						
	No. 1		No. 2		No. 3		No. 4		No. 5		No. 6				
	Titre	P.M.	Titre	P.M.	Titre	P.M.	Titre	P.M.	Titre	P.M.	Titre	P.M.			
158	40	—	5120	—	2560	—	5120	+	2560	++	5120	++++	A4716G	22/10/48	Good test.
169	160	—	5	—	40	—	320	+	5120	++	10240	+++	A4716G	30/12/48	,, ,,
190	320	—	640	+	10240	++	40000	+++	Died	++	5120	++++	A4716G	30/12/48	Fair test.
222	640	—	80	—	5120	—	20	—	5120	+		+	A4716G	11/3/49	,, ,,
249	1280	—	80	—	5120	—	5120	N.T.	5120	++++	N.T.	+	A4716G	19/5/49	Good test.
271	5	—	1280	—	5120	—	5120	—	5120	+	5120	+	A4716G	22/8/49	Fair test.
282	640	—	640	N.T.	1280	+	1280	+	5120	+	2560	++++	A4716G	22/8/49	Good test.
350	1280	—	320	—	5120	—	5120	—	2560	+	2560	++++	A4716G	8/11/49	,, ,,
370	2560	—	2560	—	1280	—	640	—	2560	++++	640	++++	A4716G	8/11/49	,, ,,
382	320	—	2560	—	640	—	40	—	N.T.	+	N.T.	+	A4716G	14/12/49	Poor test.
391	80	—	320	N.T.	2560	—	N.T.	N.T.	2560	—	1280	++++	A4716G	26/1/50	Fair test.
400	640	—	1280	—	320	—	1280	+	1280	—		—	A4716G	26/1/50	Poor test.
410	640	—	5120	—	640	—	5120	—	1280	—	640	—	A4716G	26/1/50	,, ,,
423	160	—	N.T.	—	5120	—	1280	—	2560	—	2560	—	A4716G	26/1/50	,, ,,
431	1280	—	1280	—	640	—	640	—	320	++++	320	++	A4716G	8/3/50	Good test.
440	640	—	320	—	2560	—	2560	—	1280	++	1280	++	A4716G	8/3/50	,, ,,
458	160	—	1280	—	5120	—	2560	—	1280	+	1280	+	A4716G	26/4/50	Fair test.
461	5120	—	640	—	640	—	1280	—	640	+	2560	+++	A4716G II	26/4/50	,, ,,
463	5	—	N.T.	N.T.	640	—	1280	—	640	++++	2560	+	A4716G	26/4/50	Good test.
468	5	—	N.T.	N.T.	320	—	640	+	320	—	640	+	A4716G	26/4/50	Poor test.
471	1280	—	320	—	10	—	1280	—	640	+	2560	++++	A4716G	19/5/50	Good test.
477	20	—	320	—	N.T.	—	640	—	640	+	1280	++	A4716G	19/6/50	,, ,,
491	320	—	640	—	320	—	640	—	320	+	640	++++	A4716G	19/6/50	,, ,,
503	80	—	N.T.	—	320	+	80	—	5120	++++	1280	++	A4716G	21/10/50	,, ,,
506	20	—	80	—	2560	—	640	—	1280	—	2560	—	A4716G	21/10/50	Poor test.
528	N.T.	N.T.	20	—	1280	—	160	—	640	++++	320	++++	A4716G	21/10/50	,, ,,
531	N.T.	—	40	N.T.	640	—	80	—	2560	++++	1280	+	A4716G	21/10/50	,, ,,
538	160	—	N.T.	N.T.	640	—	640	—	640	—	640	++	A4716G	21/10/50	Fair test.
546	5	N.T.	80	—	2560	—	160	—	320	++++	640	++	A4716G	21/10/50	Good test.
583	320	—	160	—	640	+	40	—	320	—	640	+	A4716G	21/10/50	Poor test.
606	80	—	640	—	1280	—	5120	—	160	—	160	++	A4716G	21/10/50	Fair test.
611	40	—	320	—	1280	++	320	—	N.T.	N.T.	320	+	A4716G	21/10/50	Poor test.
619	320	—	N.T.	—	2560	—	10	—	2560	+++	2560	+++	A4716G	21/10/50	Good test.
629	160	—	N.T.	—	320	—	160	—	640	+++	640	+++	A4716G	21/10/50	,, ,,

LEGEND TO TABLE 2.

N.T.	=	Not tested.
10, 40, 5120, etc.	=	dilution of serum agglutinating a Brucella abortus antigen standardized to agglutinate with No. 1 standard serum of the O.I.E. to a titre of 1 : 480.
+	=	Slight splenic enlargement at P.M.
++	=	Marked splenic enlargement at P.M.
+++	=	Very marked splenic enlargement at P.M.
++++	=	Very marked splenic enlargement at P.M. and lesions in epididymides, testicles, lymph glands or liver, etc.

ANALYSIS OF RESULTS IN TABLE 2.

34 Tests on different batches vaccine.		
59 Guinea-pigs vaccinal titre average	=	761.
60 Guinea-pigs vaccinated showing macroscopic P.M. lesions — Nil	=	Nil.
66 Guinea-pigs vaccinated and challenged titre average	=	2557.
66 Guinea-pigs vaccinated and challenged showing macroscopic P.M. lesions	=	Nil = 55 G-pigs. + = eight G-pigs. ++ = two G-pigs. +++ = one G-pig.
% Vaccinated and challenged Guinea-pigs showing marked lesions	=	4.5%.
61 Guinea-pigs infected as controls titre average	=	1988.
67 Guinea-pigs infected as controls showing macroscopic P.M. lesions	=	Nil = 13 G-pigs. + = 20 G-pigs. ++ = 10 G-pigs. +++ = 7 G-pigs. ++++ = 17 G-pigs.
% of infected control Guinea-pigs showing marked lesions	=	51%.

Whereas Brucellosis is a world-wide disease the problems of Contagious Abortion have different practical and local aspects in different countries and in different herds. It is futile to attempt to find a policy that will satisfy all requirements everywhere.

The development of Artificial Insemination in England, Holland and Denmark, strongly encourages the early elimination of aborters from all causes and protagonists of eradication policies are thus favoured by circumstance. They also gain support from the fact that occasionally *Brucella* organisms from cases of abortion in vaccinated herds show characteristics of *Brucella melitensis* against which it has been shown that S19 vaccine does not protect.

Against the policy of vaccinating is the fact that a number of wild and domestic animals other than cattle, occasionally show serological evidence of Brucella infection and it is feared that such sources may serve to maintain infection indefinitely in some countries (McDiarmid, 1951).

Of imperative urgency are all observations which give good information on the nature of the South African disease for instance:—

(i) The percentage of exposed, vaccinated cattle protected during an outbreak.

(ii) The type of organism responsible for abortion in vaccinated cattle.

(iii) The incidence of subclinical infections or non-specific reactors and their behaviour in the event of exposure. (van Drimmelen 1953).

(iv) The incidence and distribution of *Brucella melitensis* and variant types of *Brucella abortus*. (van Drimmelen 1953).

(v) The non-reacting and reacting carriers of infection.

(vi) The influence of simultaneous occurrence of *Brucella* and other bovine genital infections such as *V. foetus, Trichomonas foetus,* Tuberculosis, Listeriasis, Infectious Sterility (Epivaginitis), Rift Valley Fever, non-specific bacterial and filtrable agents responsible for abortion in cattle.

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HYPERTROPHIC PULMONARY OSTEO-ARTHROPATHY IN DOGS

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SUMMARY

A description of this disease, together with a review of some of the literature available on the subject, is given in this article followed by a description of two canine cases encountered in practice in Johannesburg. The characteristic bony changes seen in the cases are fully described. They are illustrated by two sets of X-ray photographs and a photograph of some of the affected bones. Some of the current views regarding the cause of this condition are also given.

Hypertrophic pulmonary osteoarthropathy (Marie's disease or acropachia) is a condition encountered from time to time in man and animals in various parts of the world. It was first described in man by Bamberger—(1899) and again by Marie (1890). Since then it has been recorded in horses, oxen, llamas, lions, dogs, cats, rabbits, sheep and birds and it is often referred to as Marie's disease. Parkin (1951) first described it in South Africa in a dog. Although the disease is generally thought to be uncommon in animals, it probably does occur more frequently than is believed. According to Schnelle (1945) it is not uncommon in man.

The disease is characterised by an extensive sub-periosteal proliferation, with the deposition of bone between the raised periosteum and the cortical portions of the bones involved. This periosteal proliferation occurs along all the long bones, and most of the small accessory bones. These periosteal lesions are almost always bilateral. The joint surfaces are seldom, if ever, involved. According to Holmes and Robbins (1947) the disease in man often commences with an enlargement of the soft tissues of the ends of the fingers, the so called "club-fingers". The soft tissues round these terminal phalanges become expanded and proliferation of the periosteum appears along the metacarpals and phalanges, affecting particularly the fifth fingers and toes, and then frequently extends along the distal ends of the long bones. As a result the bones have a thickened cortex, and in the later stages are increased in width. The commencement in dogs appears to be somewhat similar, as in many of the cases described in the literature, and in the two clinical cases which will be described later in this article, the periosteal proliferations were most marked in the phalanges and metacarpals or metatarsals. These changes then appear to extend gradually up the limb, and in two of the cases encountered, even the scapulae were involved.

There is, associated with the periosteal proliferations, a swelling of the subcutaneous tissues and thickening of the joint capsules.

Hydrarthrosis, is sometimes present, according to Schnelle (1945). These changes all lead to marked thickening of the limbs, which is usually symmetrical and non-painful. On palpation, the thickening is found to be firm and hard, and it can easily be appreciated that the swelling involves the bones. The skin is never adherent to the subcutaneous tissues. The gait is stilted and stiff, and flexion of the joints is restricted by the nature of the lesions. Parkin (1951) noted no effusion into the joints of the case he described. The long bones are not bowed or distorted in any way, other than by the marked thickening in width.

The X-ray photographs of the affected bones are very characteristic, as will be seen from the plates shown. Parkin's (1951) X-ray photos revealed the periosteal proliferations as "a delicate lacework pattern equal in thickness over the metacarpals to the bones themselves. The lacework effect gives an impression of unevenness and serration due probably to this early case having variations in the degree of calcification. The new tissue is sharply differentiated from the original shafts, but this differentiation would probably be lost, were the case of longer standing". He noted too, that in this case the joints were not affected. According to Schnelle (1945) "radiographs show extensive periosteal proliferation along all the long bones, and most of the accessory bones. The periosteal changes constitute lamellated elevations of the periosteum and spicule formations, ending in whorls, which resemble considerably the changes seen in osteogenic sarcoma. The multiplicity of lesions should differentiate pulmonary osteo-arthropathy from sarcomatous lesions. There is no evidence of erosion of the bone cortex, a fact which should be held to eliminate bone malignancy, although when the shaft of the bone is viewed through the thickened periosteum, the former often appears to be involved."

The method used in taking these X-ray photographs appears to be very important. Parkin (1951) found that the periosteal proliferations were completely penetrated in his first series of pictures, taken with double intensifying screens, and penetration set at 50 K.V. He subsequently took satisfactory softer pictures, made without screens on nonscreen films, with penetration increased to 65 K.V. He had to double his exposure time to get the contrast definition, and detail. This method was employed in the two cases which will be described, and was found to be quite satisfactory.

Only one reference has been noted in the literature available, to involvement of the joints, and this was by Holmes and Robbins (1947), dealing with the condition in humans. They state that the joints are also involved in the later stages of the disease, and show erosions of the joint cartilage, spur formation and even ankylosis. All the authors, whose descriptions of the disease in animals have been reviewed, state emphatically that the joints are not involved. It is possible that these cases were seen before such time as joint lesions would be evident. Cases have been described in veterinary literature, in which all the bones of the skeleton were involved.

The general symptoms, other than the bony changes just described, manifested by animals suffering from this condition depend mainly on and are characteristic of the primary cause. These are mainly symptoms of pulmonary or thoracic disease, but as will be seen, symptom pictures produced by lesions, other than thoracic or pulmonary lesions, can be encountered.

The cause of this condition is not very clear, but many theories have been advanced to explain its pathogenesis. The periosteal lesions are usually secondary to some primary disease, usually a pulmonary one. In man this disease is closely associated with chronic pulmonary diseases, and especially pulmonary tuberculosis. It was formerly believed by many authors that most of the cases seen in animals had tuberculosis as their primary cause. Recent work seems to prove beyond doubt that many cases in man and animals can be caused by lesions other than tuberculosis, and cases have also been encountered where the primary lesion was in the abdominal cavity. A study of available literature revealed a wide diversity of primary lesions. The case described by Parkin (1951) was apparently secondary to a sarcoma-like tumour of the thoracic cavity. He quotes the following cases in his article: A case described by Ball and Lombard (1926) in a lioness, where the disease was associated with chronic pulmonary tuberculosis; a case described by Collet and Jolly (1938) independent of tuberculosis; a case described by Poley and Taylor (1942) which was apparently secondary to a giant cell tumour of the lung; a case described by Rumney and Schofield (1949) associated with a bronchogenic carcinoma; and an outbreak in young sheep associated with tuberculosis. Schlotthauer and Millar (1951) describe the following two cases: (a) A German Shepherd dog, in which the primary lesions were multiple primary alveolar adenocarcinomata of the lungs, a few papillomata in the gallbladder and a leiomyoma in the uterine wall; (b) a male hound in which the primary lesion was an osteofibrosarcoma involving one lung. They also quote a case observed by White (1942) in which the disease was associated with an adenocarcinoma of the liver which had metastasised to the hepatic lymph nodes. The lungs in this case were normal except for a few areas of collapse. According to Schnelle (1945) the German literature describes the condition in dogs accompanying pulmonary neoplasms. He also quotes a further case recorded by Poley and Taylor (1942) in which the condition was secondary to a primary tumour of the prostate gland which had metastasised to the lungs, liver and bones.

Many theories have been advanced to try and explain the pathogenesis of the condition. Marie (1890) and Bamberger (1889) both believed that the bony changes were toxic in origin. Others like Holmes and Robbins (1947) associated it with chronic heart disease, in which there is a prolonged venous congestion. This does not explain most of the cases, as no heart lesions were found in them. Schnelle (1945) states that the bony lesions are

apparently due to interference with the pulmonary circulation, but he does not explain the statement. Others believe that the primary factor is oedema associated with chronic low-grade anoxaemia, in tissues where the circulation is slower, while some attribute the condition to tissue destruction resulting from the primary condition. None of these theories seems satisfactory when one considers the wide diversity of primary lesions which have been encountered in these cases. The theory that the bony changes are toxic in origin is about the most feasible in most cases.

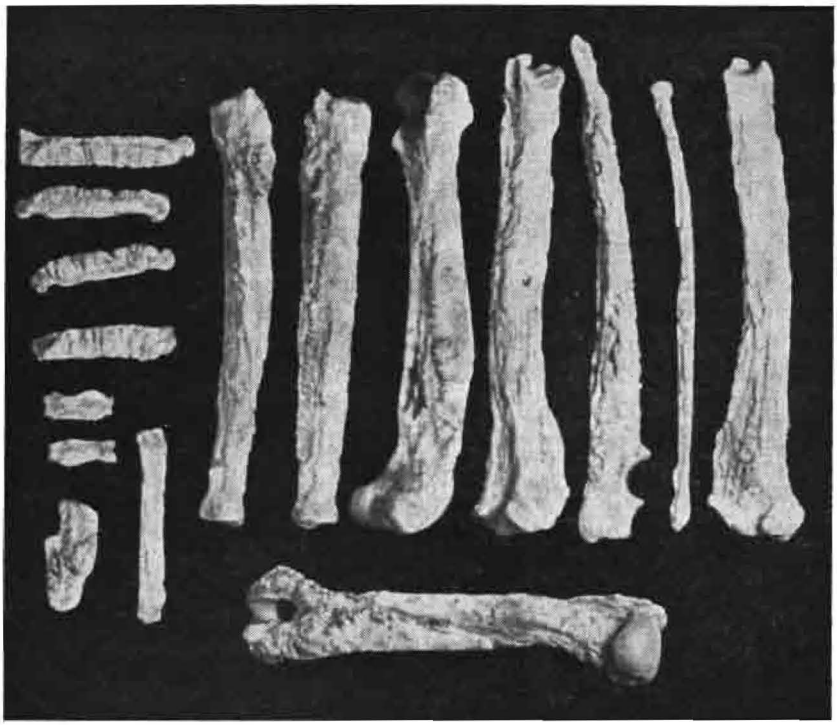
The following two cases were encountered in Johannesburg during the past two years :—

Case 1. This was an eight-year-old Pointer bitch.

History: It received treatment with antibiotics for metritis a few weeks prior to admittance to hospital. It was then treated just before admittance to hospital for "polyarthritis." The joints appeared to be stiff and sore and the owner stated that the condition had made its appearance within the previous few days. It was admitted to hospital on April 4, 1952.

Case 1
Photograph of patient.

Symptoms: Clinical examination revealed marked thickening of all four limbs, extending over almost the entire limb, and especially prominent over the joints and digits. The thickenings were firm and non-painful, but nevertheless the dog was reluctant to walk. The condition of the dog was good and the appetite and bowel motions were in no way abnormal. Apart from a slight conjunctivitis and a discharge from the vulva nothing further abnormal could be determined. The dog showed no dyspnoea but its habitus was dull. On April 7, 8 and 9 X-ray plates were taken of the fore-limbs, and these revealed a marked hypertrophic periostitis extending from the digits to the proximal extremity of the radius. Unfortunately no plates were taken of the humerus and scapulae. These plates, some of which are shown here, were taken with penetration set at 65 Kv., twenty nine inch distance, 15 mA and 1 sec. exposure. They proved very satisfactory and



Case 1
Photograph of bones. Miscellaneous bones from the fore and hind limbs.

illustrate the characteristic lesions beautifully. On April 7, the dog was subjected to the tuberculin test. One intradermal injection of 0.2 ml. concentrated tuberculin (P.P.D.) being made into the inner surface of the right ear flap, and a further injection of 0.2 ml. being made intramucosally in the vulva. The results were read on the morning of April 8 and again the next day, but except for slight pain over the vulval site of injection the test yielded negative results.

During the seven days which the dog was under observation in hospital the temperature varied from 100.6 to 102.8 with an average of 101.4.

The dog was destroyed on April 10 by means of intravenous pentothal followed by 40 ml. of concentrated magnesium sulphate solution. The post-mortem examination was performed at once.

Post-mortem Lesions. There was a bilateral conjunctivitis and cyanosis of the buccal mucous membrane. A purulent discharge from the vagina was noticed. There was a large, round, very firm mass of tissue three inches in diameter present in the anterior portion of the thoracic cavity involving the first three ribs on the left side. The apical lobe of the left lung was adherent to this mass.

In the lungs there were a few small, firm, greyish nodules

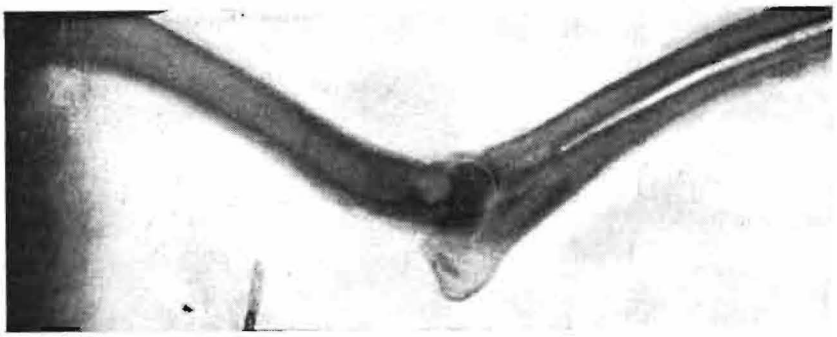
about 1 to 2 mm. in diameter scattered throughout the substance. No acid fast bacteria could be found in them.

The heart showed a chronic valvular endocarditis of the right auriculo-ventricular valve.

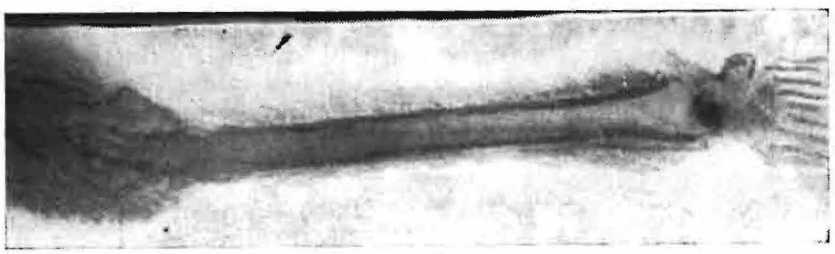
There was a congestion of the liver and the kidneys showed a chronic interstitial nephritis. The uterus contained a large amount of a brownish-red, foulsmelling, fluid pus and the mucosa was thickened. No other pathological changes were noted, apart from the skeletal system.

The thoracic swelling appears to have eroded the bony tissue of the ribs away. It was very firm in consistence, and on section the appearance of the cut surface varied from areas of tissue containing bony spicules to cartilaginous and greyish white tissue.

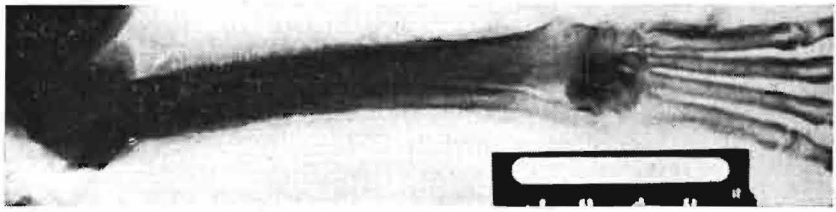
The skeletal system. The bones of all four limbs were cleaned and boiled for examination. All showed a marked periosteal proliferation. There was no involvement of any of the articular surfaces. All the long bones appeared to be slightly deformed and were twice the normal thickness. The scapulae of both the forelimbs were markedly affected. The bone lesions are well illustrated in the accompanying photograph (Case 1). Unfortunately only the long bones were retained for examination.



Case 1 (a)
Humerus, radius ulna lateral view.

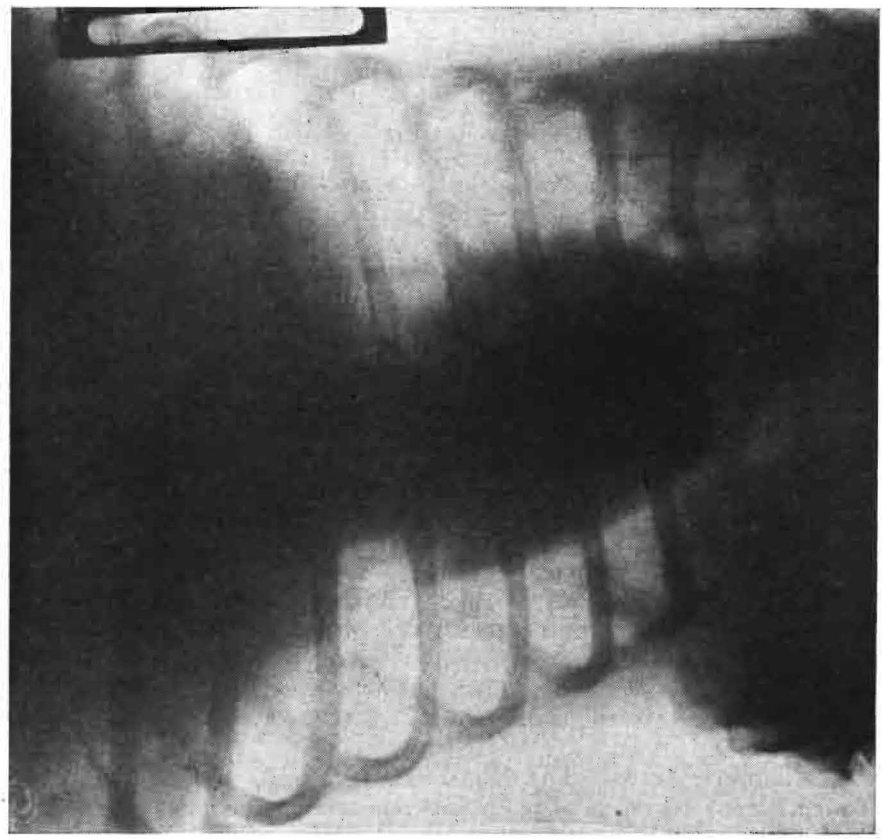


Case 1 (b)
Radius, metacarpus anterior view.



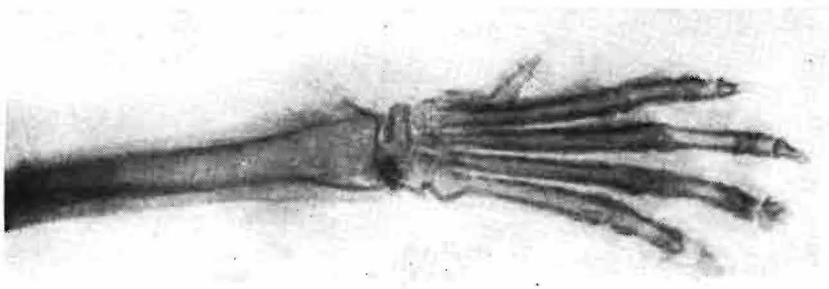
Case 1 (c)
Radius, ulna anterior view.

Case 2. This was a cross-bred terrier type of dog about six years old and owned by a native from Alexandra Native township. Very little in the way of case history could be obtained from the native, but it was evident that the thickening of all four limbs had been noticed for some time, and the animal had started showing a disinclination to walk. It was admitted to hospital for examination. There was a history of intermittent vomiting.



Case 2
(c) Thorax, dorso vent view.

Symptoms. The dog appeared quite bright and alert, and was in very good condition. It was kept under observation for four days, and during this period its appetite and bowel motions were good, and the temperature remained normal. It was observed to vomit a few times. Clinical examination revealed a very marked symmetrical thickening of all four limbs extending up their entire length, but most prominent in the extremities. The thickened areas were firm and hard and not painful. The gait was stiff and stilted and the dog showed a marked disinclination to walk. The limbs were almost double their normal size. Apart from these changes no clinical abnormalities were detected.



Case 2 (a)
Radius, ulna digits anterior view.

X-ray plates were taken of all four limbs, chest and skull in the same manner as described for the previous case. Examination of these plates showed that there was no doubt that this was a case of Marie's diseases. The periosteal proliferations were most marked in the digits and long bones, and the scapulae were also involved. The skull, however, showed no periosteal changes. The X-ray of the chest (dorso-ventral view taken only) revealed a dense mass situated more or less in the centre of the chest cavity over the heart (Case 2). This appeared to be about five inches long and about one and a half inches thick. Many of the ribs showed slight periosteal thickenings.

The dog was destroyed and a post-mortem examination performed immediately.

Post-mortem changes. There was cyanosis of the visible mucous membranes and marked congestion of the liver. The kidneys showed a chronic interstitial nephritis. The spleen showed a number of dark blue small raised areas on the capsule which on section was firm and reddish black in colour.

The lesions were mainly confined to the thoracic region and the skeletal system.

Thoracic cavity. The dense mass seen in X-ray plates proved to be a large dilatation of the oesophagus about five inches long and one and a half inches wide, just over the heart region. On palpation a hard mass could be felt in this diverticulum. On opening this dilated area of the oesophagus, a large piece of foul smelling decay-

Case 2 (b)
Tibia, tarsus lateral view.

ing bone was found, firmly adherent to one side of the dilatation. On careful dissection it was observed that the sharp end of this piece of bone had penetrated the mucosa and muscular coats of the oesophagus in this area and the bone was firmly attached with fibrous tissue to the oesophageal wall. Indeed the sharp end of the bone appeared to be buried in it. Fibrous adhesions were then seen on the serosa in this area. This piece of bone had apparently been lodged in the site described for a considerable period.
marked periosteal proliferations. The articular surfaces of all the joints were free from any changes. The long bones were almost double their normal thickness, and the periosteal proliferations were

The skeletal system. A fore and hind limb were boiled and cleaned for examination. All the bones of these limbs showed very marked in the phalanges, metacarpals and metatarsals. The scapulae were also markedly involved. No other bones were retained for examination.

Pathological anatomical diagnosis. Cyanosis, generalized venous stasis, mild parenchymatous degeneration of the liver, chronic nephritis, multiple small splenic haematomata, dilatation of the oesophagus containing a foreign body. Generalized chronic hypertrophic periostitis.

Remarks. This case is most remarkable in that no sign of tuberculosis of neoplastic conditions could be detected anywhere in the body after thorough examination. The primary lesion therefore seemed to be the oesophageal dilatation with the bone lodged in it. This lesion seemed to have been in existence for a considerable period of time, but the history obtained from the native owner was too unsatisfactory to give any confirmation of this view. The dog must have at one time shown very severe symptoms and subsequently more than the intermittent vomiting mentioned. The imbedded piece of bone apparently did not totally occlude the lumen of the oesophagus as was shown by the amount of food present in the stomach. During the period of observation in the hospital it received a semisolid diet, and careful inquiry revealed

that it did occasionally vomit the larger more solid parts of its food.

The pathogenesis in this particular case is very difficult to explain. It may have been due to toxins produced by the decomposition of this foreign body or the oesophagitis which it produced, or one could accept the view quoted by Schnelle (1945) and assume that the condition was secondary to interference with the pulmonary circulation. The position of the dilatation would justify this assumption but the explanation of the exact cause of the condition in this dog is extremely difficult to find. This case is apparently the first one to be recorded in which the periosteal proliferations were not due to any of the classical primary factors like tuberculosis, chronic respiratory infections, chronic heart disease, or neoplastic conditions.

ILLUSTRATIONS

Case 1. X-ray plates: (a) Humerus, radius, ulna lateral view
(b) Radius, metacarpus anterior view.
(c) Radius, ulna ant. view.
Photograph of bones: miscellaneous bones from the fore and hind limbs.

Case 2. Photograph of the patient.
X-ray plates. (a) Radius, ulna, digits ant. view.
(b) Tibia, tarsus lat. view.
(c) Thorax dorso-vent. view.

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TREATMENT OF HEARTWATER WITH TERRAMYCIN

HAIG, D. A., ALEXANDER, R. A. AND WEISS, K. E.
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In an earlier publication (Weiss, Haig and Alexander, 1952) it was stated that Aureomycin was considerably more effective than the sulphonamides in the treatment of heartwater. Subsequently it was found that Terramycin was no less effective than Aureomycin (Haig and Alexander, 1952).

These antibiotics were used in a form specially prepared for intravenous administration, and the results obtained from their use in the field have been gratifying. However, it was found that the cost of treatment was high and in some instances prohibitive. A further disadvantage was that frequently treatment had to be carried out by farmers who experience difficulty in administering remedies by the intravenous route.

Later, preparations of both Aureomycin and Terramycin were made available in the form of soluble tablets. While the makers recommend the use of these preparations by the oral route only, they have been used intravenously on a large scale by both private practitioners and farmers, not only with no adverse effects but with excellent results.

Recently a mixture of Terramycin and procaine hydrochloride was prepared: it was claimed that this preparation was suitable for intramuscular use and that, while the cost was high, it was effective in considerably smaller doses than when this antibiotic was administered intravenously.

METHODS AND MATERIALS

The Mara strain of heartwater was used for these experiments; the origin and behaviour of this strain have been described previously. (Neitz, 1939 and Weiss, Haig and Alexander, 1952).

Blood was drawn into citrate from infected sheep at the height of their febrile reaction and was used to infect cattle and sheep. The dose given was 10.0 ml. intravenously.

Mature Merino sheep and Friesland bovines more than two years old were used. They were obtained from known heartwater-free areas. When drafted into experiments, they were kept in stables on a maintenance ration. Rectal temperature readings were made twice daily.

Previous experience indicated that the value of a substance for the treatment of heartwater could most easily be determined when treatment was commenced early in the course of the reaction. In these experiments treatment was initiated on the second day

of the febrile reaction before other clinical symptoms of the disease were evident.

For intravenous administration Terramycin hydrochloride "Soluble Tablets" of 50 mg. each were employed. The lot number was WN537205. They were dissolved in sterile distilled water at the rate of 10 mg. per ml. The mixture was injected within five minutes of preparation since precipitation occurred when mixtures were allowed to stand.

For intramuscular use Terramycin hydrochloride "Intramuscular" in 1.0 gm. amounts with 900 mg. sodium glycinate and 300 mg. procaine hydrochloride was used. The lot number was WKX528278. Saline was added to give a concentration of 50 mg. Terramycin per ml. Intramuscular injections were made within 30 minutes of mixing.

EXPERIMENTAL

A. Administration of Terramycin by the intravenous route :—

Eight sheep were infected with heartwater. On the second day of the febrile reaction two received 0.5 mg., two 1.0 mg. and two 2.5 mg. Terramycin per pound body weight, intravenously.

Both untreated controls showed characteristic reactions of heartwater and died. One sheep that received 0.5 mg. per pound and one that received 1.0 mg. per pound died. The temperature of the remaining four sheep gradually returned to normal 24 to 48 hours later; they showed mild temperature elevations again after a further three to five days. Recovery was otherwise uneventful.

Conclusion: While the number of sheep used in this experiment was small the results were in agreement with those obtained previously when preparations of Terramycin specially made for intravenous injection were used. It was concluded that the minimum effective dose of Terramycin administered intravenously was in the region of 2.5 mg. per pound body weight.

All the recovered sheep were found to be solidly immune on subsequent challenge.

B. Administration by the intramuscular route :—

1. **In Sheep.**

In a series of experiments on the efficacy of intramuscular injection of Terramycin in the treatment of sheep, 28 infected sheep were treated with doses varying from one to five mg. per pound body weight. Some received treatment on three consecutive days, while others received a single injection only. None died, whereas seven of eight untreated controls died of heartwater.

In all treated animals the temperature remained elevated for about 48 hours after the first injection. The

temperature then returned to normal, but in a few there was a mild relapse about four or five days later.

Under the conditions of these experiments it seemed that a single intramuscular injection of one mg. Terramycin per pound body weight was as effective as repeated doses of five mg. and as effective as 2.5 mgms. per pound given intravenously.

2. In cattle.

Owing to the difficulty in obtaining susceptible cattle, it was not possible to use more than ten animals for this experiment. Three received a single injection of one mg. per pound, four received two daily injections of one mg. per pound, while the remaining three received a single injection of two mg. per pound. All but one showed a rapid beneficial response: this animal was sick for a few days but recovered when a concurrent rumen atony was diagnosed and treated.

Unfortunately all ten cattle were urgently required for other experimental work for which they were in fact being immunized against heartwater. Consequently a suitable number of untreated controls could not be left to serve as an index of the virulence of the strain of virus. However, previous experience has shown that a mortality rate of not less than 80 per cent could be anticipated. Four sheep which were infected with the same pool of infective blood showed typical reactions of heartwater and died.

SUMMARY AND CONCLUSIONS

Terramycin soluble tablets have been found to be effective in the treatment of sheep infected with heartwater. The minimum effective dose administered as a single intravenous injection was found to be approximately 2.5 mg. per pound body weight. This amount is approximately the same effective dose as that of Aureomycin when administered by the same route.

Terramycin with procaine administered intramuscularly was effective in considerably smaller doses. It was found that under the conditions of these experiments a single injection of 1.0 mg. per pound was as satisfactory in the treatment of both cattle and sheep as repeated doses of larger amounts. It is assumed that delayed absorption is responible for the increased effectiveness.

In all treated sheep it was noticed that there was a delay of from 24 to 48 hours after treatment before the temperature of infected animals returned to normal. The habitus of the animal is of prime importance when deciding whether it is necessary to repeat treatment during the later transient febrile reaction.

As none of the animals treated intramuscularly died, local muscular reaction to injections of Terramycin could not be examined.

A further point has been brought out during these studies on the chemotherapy of heartwater. Particularly in those cases where, from force of circumstances, treatment by the parenteral administration of antibiotics is delayed and it is necessary to repeat treatment, the further development of the disease may be arrested but the animal does not return to a state of good health. In such cases the incidence of acute or chronic atony of the fore-stomachs must be borne in mind and further treatment with readily available carbohydrate together with acidification of the ruminal contents instituted.

A generous supply of Terramycin was made available for these experiments by Messrs. Petersen Ltd. of Cape Town to whom we wish to express our indebtedness.

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CLINICAL TRIALS WITH METHENAMINE MANDELATE — "MANDELAMINE" — IN CANINE PRACTICE

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The treatment and management of urinary tract infections in small animals have always presented some considerable difficulty since the range of useful urinary antiseptics has been limited. The advent of the sulphonamides gave promise that a new weapon was at hand but these hopes have been only partially realised as many of the older sulphonamides were prone to produce renal damage unless alkalinization of the urine was undertaken, together with a copious fluid intake to produce diuresis.

The newer antibiotics mark a big step forward in treating urinary infections but their use frequently calls for supporting treatment. Moreover, not every case of infection or inflammation requires antibiotic treatment and many cases which show no gross systemic disturbance will respond to simpler treatment without recourse to antibiotics.

Inflammation of the bladder is comparatively common in small animals and both males and females may be affected. Bacterial infection, the presence of calculi or gravel and trauma are frequent causes of cystitis either in an acute or chronic form. It is possible that many spayed bitches are affected in later life when loss of sphincter control produces a urinary incontinence and consequent chronic cystitis.

In the male dog prostatic hypertrophy and inflammation are often encountered especially in ageing animals but inflammatory changes occur even in young animals. Enlargement of the gland is a frequent concomitant of chronic, senile changes in the kidney and, in many cases, the prostate gland, bladder and kidneys may be involved simultaneously.

Infection involving the kidney tissue proper is extremely difficult to treat but the answer probably lies in the use of the antibiotics. For infections of the renal pelvis, ureters, bladder, urethra and prostate gland the ordinary diuretics and urinary antiseptics have been used for many years and preparations such as hexamine and mandelic acid are well known. Their use, however, has not been consistently successful; some animals are notoriously difficult to treat orally and the palatability or otherwise of the drugs employed has played a not inconsiderable part in medication.

Some eighteen months ago, a new preparation combining hexamine and mandelic acid — methenamine mandelate — was made available for clinical trials. The drug has now been extensively used in small animal practice and it is possible to assess its therapeutic value in over 100 cases of urinary tract infections.

These comprised 51 cases which were diagnosed as subacute nephritis of which the greater proportion showed involvement of the renal pelvis, 31 cases of prostatitis with or without hypertrophy, 20 cases of cystitis and 13 cases of uraemic intoxication arising from kidney failure.

Tolerance. In the main, animals appear to tolerate "Mandelamine" well and even cats have shown no idiosyncrasy. Vomiting occurred in a few instances especially in those cases showing uraemic symptoms. This, however, was probably due to auto-intoxication rather than the action of the drug. Prolonged administration of "Mandelamine" in doses of 0.5 gm. daily for three months has had no adverse effects. Two cases of icterus were encountered in patients receiving the drug but this was later proved to have been due to hepatic degeneration.

Dosage. Simultaneous antibiotic therapy did not affect the dosage of "Mandelamine" which was instituted from the time of diagnosis and continued for three or four days after the last injection of antibiotic. For animal treatment the dose of the drug was based on the average human recommendation and a figure of approximately 0.25 gm. per 10 lbs. body per day divided into three doses was decided upon. In practice this figure proved to be a suitable one on which to calculate daily requirements. Small animals received relatively higher doses viz. 0.125 gm. four times a day. For a medium sized animal weighing 30-45 lbs., one tablet (0.25 gm.) was given three or four times daily while the heavier breeds weighing 65 lbs. and upwards were given 0.5 gm. three times a day.

RESULTS

Nephritis. Thirty nine cases received combined antibiotic and "Mandelamine" therapy and, of these, 23 recovered. The remaining 12 cases which were not considered sufficiently ill to warrant antibiotic injections received "Mandelamine" alone. All but three recovered; the cases which failed to respond later improved on antibiotic treatment.

Cystitis. Results with the drug either alone or in combination with antibiotic injections have been consistently good and, in the 20 cases mentioned, some 80 per cent recovered completely. The drug would appear to be particularly beneficial both pre and post operatively in cases of cystotomy for the removal of calculi or where there has been trauma of the bladder mucosa following injury. Even long standing chronic infections, especially in spayed bitches, showed marked improvement.

Prostatitis. Thirty-one cases of prostatic involvement were treated with "Mandelamine" and 16 of these received injections of antibiotic in addition. Five cases failed to respond and eventually died. Fifteen cases showing only prostatic irritation and hypertrophy without inflammatory changes were put on to "Mandelamine" alone in an effort to relieve the discomfort and all but three

cases showed considerable improvement. There appeared to be no incompatibility when the drug was given in combination with female sex hormones.

Uraemic conditions. In this type of condition, invariably involving aged patients with senile changes in the kidney structure together with enlargement of the prostate gland, "Mandelamine" has not produced any improvement and, in 13 cases, the mortality rate was approximately 90 per cent. The drug, however, would not appear to be contraindicated even where gross kidney changes have taken place.

Summary. Methenamine mandelate in specially coated tablets has been given an extended clinical trial in canine practice. The drug is well tolerated and does not cause nausea or vomiting and is reasonably easy to administer. In a series of 115 cases of pyelitis, cystitis and prostatitis it has been used either alone or in combination with antibiotics. A considerable measure of success has been obtained especially in infections involving the bladder and prostate gland.

Acknowledgement and thanks are due to Messrs. M. & J. Pharmaceuticals, Port Elizabeth, for the supplies of "Mandelamine" for the clinical trials.

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THE INCIDENCE AND DIAGNOSIS OF SPIROCERCOSIS IN DOGS IN THE TRANSVAAL

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Onderstepoort.

ABSTRACT.

Since it has appeared from the literature that Spirocerca lupi *infestation is usually diagnosed only after the death of dogs, a method of flotation using zinc sulphate solution and glycerine (S.G. 1.32) has been devised and is here described. This has given good results where the oesophageal wall is involved and the eggs can escape into the lumen. Skin sensitivity and precipitin tests appeared to be of no value. In a survey of* 100 *dogs, mostly from the vicinity of Onderstepoort,* 20 *were found to be infested with* Spirocerca. *Most of these showed no symptoms attributable to this infestation, but the diagnosis is of importance in the differential diagnosis of vomition.*

INTRODUCTION.

In South Africa it has long been evident that the incidence of hookworm infestation (ankylostomiasis) is so high as to constitute an important canine health problem. Conditions generally also favour the near-ubiquity of tapeworms (mainly *Dipylidium*). Ascariasis occurs fairly extensively in breeding kennels and under conditions of concentration of dogs on a limited area of ground. Infestation with *Spirocerca lupi,* on the other hand, has in the past been encountered only on comparatively rare occasions in post-mortem examinations of dogs at Onderstepoort. The condition has in recent years however been found to occur with increasing frequency in the oesophageal wall at autopsies, and in several instances was found to be the cause of intractable vomiting followed by dehydration and death.

It was considered unsatisfactory that diagnoses had only been made after the deaths of the hosts and for this reason the present study was undertaken. The ordinary routine 50% glycerine flotation method of examination, (Mönnig, 1950), used for many years at Onderstepoort, was found to be completely ineffective for demonstration of *S. lupi* eggs. The specific gravity was too low and the eggs therefore did not float to the top. Moreover, it seemed worth while to attempt serological tests.

The occurrence of *S. lupi* in dogs and other canines appears to be confined mainly to tropical and subtropical countries, though (Svenkerud, 1947) described a case in Norway. Frequent mention

is made of this condition in veterinary literature from Asiatic countries, (McGaughey, 1950), (Menon, 1953), (Paramanand, 1953). The incidence of this nematode in South Africa has up to now not been the subject of any particular study, but it has been generally accepted that spirocercosis is rare. Since routine post-mortems had suggested an increasing incidence it was decided to embark on a small scale survey in conjunction with the quest for a satisfactory method of diagnosis. The subjects for this survey were dogs admitted to the small animal clinic at Onderstepoort for a variety of conditions. In the Far East, similar surveys had in China Hsu (1948) shown 25% of dogs to be infested and in Indonesia (Kraneveld and Djaenoedin, 1952) up to 40-50% of dogs from some parts of the country. The condition appears to have been diagnosed chiefly in the abattoirs. Where faeces examinations are referred to in the literature, no details are given of the method used.

MATERIALS AND METHODS.

1. *Origin of dog patients.* The dogs originated mostly from an area within a five mile radius of Onderstepoort, but approximately 10% came from the city of Pretoria and another 10% from the Reef towns and the Northern Transvaal.

2. *Methods of collection and preparation of faeces specimens.* Fresh faeces (about ½ oz.) from a dog were placed in a wide-mouthed bottle. They were then suspended with about 3-4 times their own volume of water. The suspension was strained through organdie (or gauze) held in position in a glass funnel with paper clips. The filtrate was then poured into a 15 ml. capacity centrifuge tube (1.5 × 10.0 cm.) and centrifuged at 1000 r.p.m. for 10 minutes. The clear supernate was poured off. Usually about 0.5 cm. of deposit remained in the tube. If it was considered excessive or unsatisfactory it was again washed with water and treated as above. The flotation fluid was then added to the deposit so that the tube was filled. The deposit was well mixed and the material centrifuged as before. After this treatment the surface of the fluid was touched with a glass rod or platinum loop and the material so removed placed on a glass slide. It was examined under a coverslip with the 8 and 40 objectives. *Spirocerca lupi* eggs were easily identifiable (see plate I).

3. *Skin Sensitivity and Precipitin Test Antigens.* The material used in these was as follows:—thirty *S. lupi* adults which had been removed from a subject at post-mortem examination were crushed and ground in a pestle and mortar. The material was freeze-dried in 1 ml. amounts for safe storage. It was reconstituted with distilled water or alcohol for the above tests.

DIAGNOSTIC PROCEDURES

Diagnosis in subclinical cases was based on faeces examination and in some cases the findings were confirmed by post-mortem examination. Skin sensitization and precipitin tests were also tried.

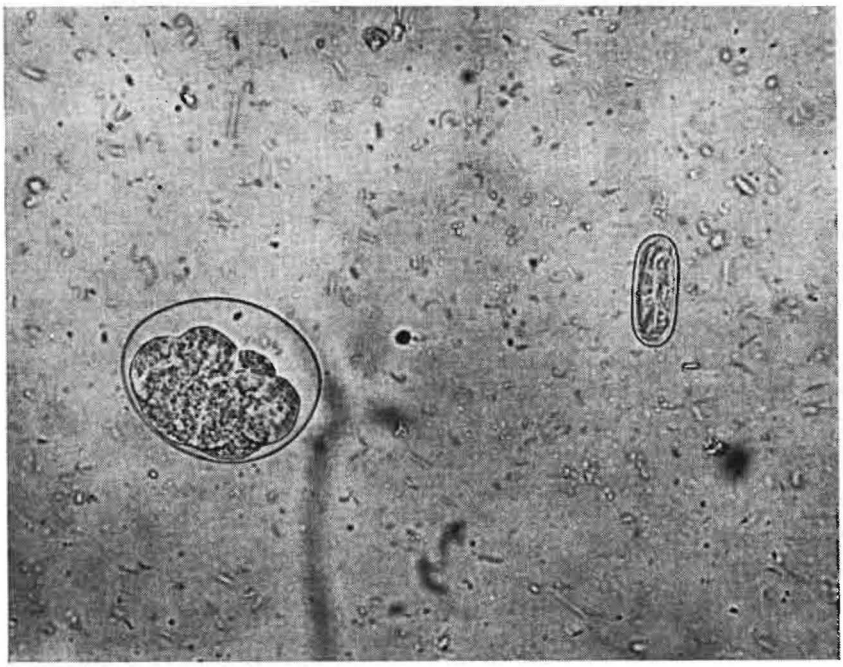

PLATE I.—Photomicrograph showing one *Ankylostoma* (large) egg and one *Spirocerca* (small) egg. Note the relative sizes and also the large numbers of faecal micro-organisms to be seen in the preparation.

1. *Faeces examination*

As already mentioned, the 50% faeces suspension: glycerine flotation method of Mönnig was not effective in floating *S. lupi* eggs. This mixture had a specific gravity of 1.14-1.17, which was apparently too low for floating eggs of this worm, but in specimens from infected dogs the *Spirocerca* eggs could be seen microscopically either in the deposit or in direct faeces smears.

It was obvious that mixtures with a higher specific gravity were needed to float the eggs. The Faust (1938) flotation concentration method for protozoa and helminths using zinc sulphate was tried instead. In this method the first stage of concentrating the filtered faeces suspension was by centrifugation. 33.3% zinc sulphate solution was then added to the deposit and a S.G. of 1.18-1.22 obtained with such mixtures. This was immediately successful as the worm eggs were effectively floated. The method was employed for 70% of the survey. Later it was found that the zinc sulphate solution was inclined to dry out rapidly after the coverslip was put on. The addition of glycerine was tried to remove this disadvantage. The percentage of zinc sulphate (33.3%) was retained

but the amount of water was reduced in favour of varying amounts of glycerine. The following mixtures were tried:—

Mixture	Crystalline zinc sulphate	Glycerine	Water	S.G.
1	33.3	33.3	33.3	1.32
2	33.3	50	17	1.38
3	33.3	47	20	1.34
4	33.3	—	66.6	1.22

The numbers of eggs floated up from a known infected faeces specimen were compared using the above four mixtures. It was found that the most satisfactory results were obtained with mixture No. 1. This method was thereupon used for the remainder (30%) of the survey instead of the No. 4 mixture.

These mixtures readily floated up hookworm eggs (*Ankylostoma canium, A. braziliense*), those of ascarids (*Toxascaris leonina, T. canis*), coccidial oöcysts, demodectic mange mites (*Demodex canis*) and large numbers of bacteria from faeces suspensions. They had the disadvantage, however, of causing some of the hookworm eggs to collapse, presumably because of the high osmotic pressure of the flotation fluid. Nevertheless there was no difficulty in identifying them. *Spirocerca* and other worm eggs were apparently unaffected. This method was quite unsuitable for the demonstration of tapeworm eggs.

The results of the survey are given in the table below:—

The incidence of various internal parasites as determined by faeces examination of a series of 100 dogs in the Transvaal.

No. of dogs examined	100
No. of positive for hookworms	71
No. positive for *Spirocerca*	20
No. positive for *Ascaris*	10
No. positive for coccidiosis	3

The above data show that *Spirocerca lupi* was the second most prevalent nematode of dogs in the series examined. Of the 20 dogs which were found positive by faeces examination 7 were autopsied and these findings confirmed.

2. *Skin sensitization and precipitin tests*

In human medicine the value of skin sensitization tests for hydatid disease (Casoni tests) in particular, but also for trichinosis and schistosomiasis, is well known. Precipitin testing has also proved of value in these diseases, particularly in trichinosis. While these tests are not highly specific they are of distinct value to the clinician especially as negative findings can be relied upon.

Since *Spirocerca* worms may be lodged in the wall of the aorta or elsewhere, or the worms may not be laying eggs, it is obvious that not all cases can be detected by faeces examination. The value

of skin sensitization and precipitin tests was therefore investigated. Five dogs were tested. Three were known positives and two negative for spirocercosis but positive for both ankylostomiasis and ascariasis.

a. *Skin sensitization tests.* Watery and alcoholic extracts were prepared and tenfold dilutions (1/10 to 1/10,000) made in saline. After comparing the suitability of the lips and ears of dogs as the site of injection, the inner side of the ear was preferred as it appeared more sensitive, and, moreover, reddening of the skin could be observed in these cases irrespective of the skin colour of the dog. One drop of the watery extract in the various dilutions was injected into the skin of the inner side of the right ear. This ear thus received four injections. The same procedure was carried out with alcoholic extracts on the left ear. At the same time the dogs were bled for the precipitin tests. All the dogs were positive with both the watery and alcoholic extracts in the 1/10 and 1/100 dilutions but not with the high dilutions. The wheal-like reaction developed about 5-10 minutes after injection. At first a marked reddening occurred in a circumscribed zone around the site of injection. Then after about 30 minutes a circular slightly elevated but well demarcated zone 1-2 cm. in diameter developed. Thereafter the lesion became more diffuse and less well demarcated. The skin remained slightly thickened for another 24-48 hours. Both the spirocerca positive and negative dogs reacted to the same extent. The reaction was therefore non-specific, possibly as a result of ascaris and hookworm infestations.

b. *Precipitin tests.* These were performed on the sera. Tenfold serial saline dilutions of the watery extract of the worms were made and these were mixed with undiluted serum in the tests. All the tests were negative.

TREATMENT.

The treatment of spirocercosis has not received any attention at Onderstepoort. In Ceylon, (McGaughey, 1950) and India, (Paramanand, 1953), "Hetrazan" (Lederle) has been claimed to be effective in causing clinical symptoms to disappear and it is also claimed that the worms ceased to lay eggs. It is not known whether the worms were killed. Our experience of treatment of a case is confined to a Bull Mastiff dog, which was admitted for attempts at treatment of *Filaroides osleri* (lungworm) infestation. This dog in addition had spirocercosis which was diagnosed only at post-mortem examination. The treatments it had were thus not intended for spirocercosis. The dog was confined to a kennel on November 23, 1951. It was unlikely that he could have contracted spirocercosis after that date. He received a course of "Fouadin" (Bayer):

1.5 ml. i.m. daily for 12 days. Two months later he received "Fouadin" again, in a dosage of 3.5 ml. i.m. daily on five alternate days followed by one 3.0 ml. dose of "Anthiomaline" (Maybaker) intravenously. After another five months he received a course of "Anthiomaline": 2.0 ml. daily (intravenously) for seven days, and in addition 10 mg. per kilo of "Hetrazan" t.i.d. per os over the same period. Tetrachlorethylene was on two occasions given in 3.0 ml. peroral doses.

Five months after the last treatment the dog was destroyed. At the autopsy an oesophageal *Spirocerca* lesion containing a number of live worms was found. Unfortunately the faeces of this dog had not been examined for eggs, but the dog had not shown clinical symptoms.

The dog had thus received four drugs which one might have expected to be possibly effective for spirocercosis, all with negative results. It therefore seems that none of these drugs would be of value in treating the condition. Menon (1953) has proposed the treatment of spirocercosis by surgical means, but this involves major surgical procedures, which do not appear at present to be feasible.

DISCUSSION AND CONCLUSIONS.

From the above data there are indications that spirocercosis is a widespread condition in dogs in the Transvaal, although usually in an inapparent or subclinical form. A method of faeces examination has been described which has proved highly efficient in demonstrating the eggs of *S. lupi*, if present in the faeces. It is also effective for demonstrating other nematode eggs. One hundred dogs were examined of which 71 were positive for hookworm infestation and 20 were positive for spirocercosis. This gave an indication of the relative prevelance.

The skin sensitization and precipitin tests were not found to be of any value.

The significance of *S. lupi* has not been fully established but its importance in the differential diagnosis of vomiting has been well substantiated. It is of interest to note that in Indonesia (Kraneveld and Djaenoedin, 1952) where dogs are slaughtered for human consumption, the animals found at inspection to be infected were in good condition. It therefore seems that it is only under certain circumstances that symptoms are produced. In two fatal cases seen at Onderstepoort the oesophagus was paralysed and grossly dilated but there was no obstruction whatever in the lumen as the greater part of the lesions were situated on the tunica adventitia and protruded into the thoracic cavity. It seems that the paralysis was due to a neurotoxin, though there is the possibility of mechanical pressure on nerves supplying the oesophagus.

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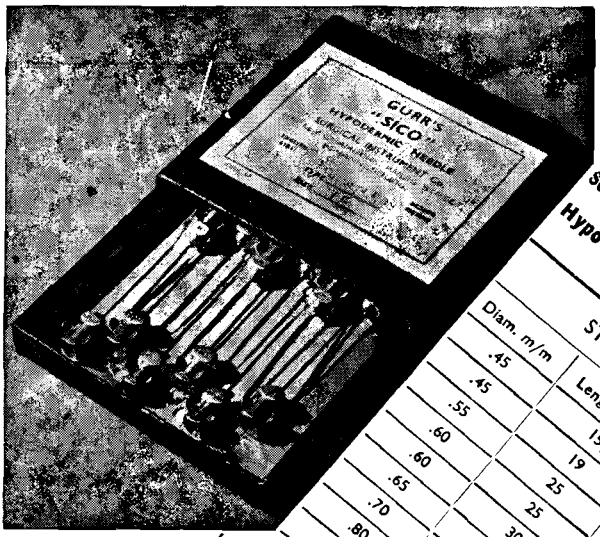

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.60	30	" 14 "
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.70	33	" 2 "
.80	38	" 1 "
.65	50½	" VI Serum
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IMMUNIZATION AGAINST PARATYPHOID

M. W. HENNING

Onderstepoort.

Paratyphoid is still spreading among calves and it has become one of our major problems in maintaining the health of our calves during the first eight or ten weeks after birth. Calfhood vaccination is not entirely satisfactory, and it is often necessary to prepare a special vaccine from a local strain of *Salmonella dublin* in order to combat a very severe local infection. Even this vaccine sometimes fails to prevent losses.

Experiments carried out at Onderstepoort have shown that very young calves do not produce antibodies against *S. dublin* as readily as older cattle. Further experiments, carried out on pregnant cows, have demonstrated that newly-born calves of immunized cows obtain a fair amount of immunity from the colostrum, provided the immune colostrum is the first feed after birth.

In some cases the concentration of immune bodies in the calf's blood, after a colostral feed, may be considerably higher than in the maternal blood. This colostral immunity lasts for about two or three months and is generally sufficient to protect the calf against infection during the most vulnerable period of its life, viz. the first three months after birth.

Before the colostral feed the newly-born calf is completely defenceless. In order to obtain the immunity, it must drink the immune colostrum before it takes in anything else. If it should drink ordinary milk or even colostrum from a non-immune cow, it readily loses its power to absorb immune bodies from the colostrum.

For these reasons it was decided to introduce a method of immunizing pregnant cows, so that an immunity could be conferred on the calves through the medium of the colostrum.

Preliminary tests on badly infected farms have yielded encouraging results. On many farms where calfhood vaccination failed to control the disease, the immunization of pregnant cows appeared to have had the desired effect. The incidence of paratyphoid has markedly decreased on all the farms where maternal immunization was introduced during the pregnant state.

The best results were obtained when at least two inoculations were performed and when the interval between the two inoculations was at least thirty days. The second inoculation causes a boosting of the immunity obtained from the first, provided it is administered not less than thirty days after the first and not less than two weeks before parturition. But the first inoculation can be performed at

any time during the pregnant state. A period of as much as six months between the two injections is not too long.

The vaccine for pregnant cows is approximately seven times the concentration of the one prepared for calves, and the best results are obtained when it is administered intramuscularly.

Calves that have obtained a colostral immunity from immune cows have temporarily lost the power of producing antibodies and should, therefore, not be inoculated with a paratyphoid vaccine during the first two or three months after birth. The colostral immunity completely blocks out the antigenic effects of the vaccine. Only calves, whose dams have not been vaccinated, should, therefore, be inoculated.

It is anticipated that the concentrated *S. dublin* vaccine for the immunization of pregnant cows, now prepared at Onderstepoort, will in due course largely replace the vaccine used for calves.

REFERENCE.

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THE TREATMENT OF STERILITY IN CATTLE WITH VETERINARY AUREOMYCIN OINTMENT "LEDERLE"

H. SEELE
Bellville.

For many years in Germany, the administration of Iodine in various combinations was the only treatment of sterility on a bacteriological basis. Lately one has turned more and more to the use of Aureomycin.

A tube of 6% Veterinary Aureomycin Ointment For Udder Infusion "Lederle" is diluted with 20 ml. Liquid Paraffin. Of this solution 10 ml. are required for a single treatment. Any "Record" —or glassyringe with attached uterine catheter is suitable for the uterine infusion.

The special advantage of the Aureomycin treatment, apart from its value as a broadspectrum antibiotic, lies in the fact that it can still be applied 36-48 hours *after* service or artificial insemination, without harming the fertilised ovum.

SOME SURGICAL TECHNIQUES

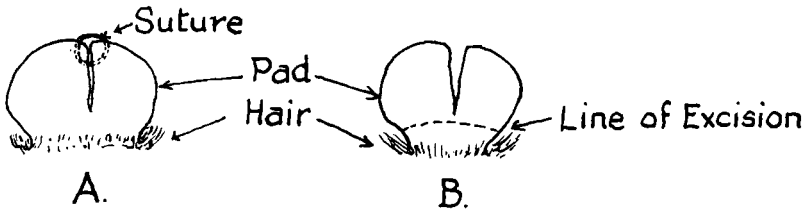
D. H. IRWIN
Somerset West.

Summary.

Certain surgical techniques are described for expediting

1. Treatment of cut pads in dogs.
2. Tooth root and stump removal.
3. Watertight tracheal intubation.
4. Maintenance of intravenous access.

1. Cut pads are a common accident and are often presented in this practice. Suturing the cut surfaces together has given uniformly disappointing results even when the wounds were fresh and "clean" and antibiotics and sulfa drugs were employed. The method of treatment found most satisfactory is excision of the wound, and dressing with a pad and bandage. The two methods are shown schematically, (A) suturing of pad; (B) excision of wound.



On one occasion a deeply cut accessory (proximal volar) pad on the fore limb of a dog was excised, together with a $\frac{1}{8}$" rim of hair-bearing skin. Following a dressing of sulphanilimide puly. c O1. Morrhuae, a beautifully formed pad was regrown in about three weeks.

2. Removing roots of broken teeth in the dog becomes a big interference if it is decided to adopt the procedure of removing the lateral wall of the alveolus. This is difficult in adults of the large breeds and in the lower jaw of the small varieties may lead to fracture. It leaves a considerable area of contused tissue and consequent increased possibility of infection, not to mention the subsequent pain. A method of stump and root removal which to some may seem to be a crude procedure but which has nevertheless rendered good service in the writer's hands is simply to drill the stump or root out with a brace and a steel (jobber's) bit. This bit makes a very neat job and sharp and jaggered sequestra are not formed, nor is the jaw contused.

3. During oral and pharyngeal surgery it is necessary to ensure that blood and foreign bodies do not enter the larynx. This may be done by placing a Magill or other suitable rubber tube in the trachea

and packing around the tube and in posterior pharynx a length of moistened gauze bandage. This obviates the necessity of using a cuffed Magill tube. Human patients often complain of a sore throat following the use of a cuffed tube. As a lubricant for the tube eucerin is used.

4. Having introduced a needle into a vein one can of course maintain this entry to the blood stream by adjusting a drip. The limiting factors governing this are obvious and do not warrant mentioning. Another method of maintaining entry into the blood stream when a drip is not available or expedient is by inserting a stilette into the needle. The stilette is withdrawn when further intravenous therapy is required and a syringe attached in the usual manner. This is suitable for short duration requirements and so far no thrombi nor emboli have been recognised to follow as a consequence. For more protracted intravenous work, one may use the plastic tubing now available for the purpose, which is threaded through the needle once this is safely in the vein. The lumen of the tubing is again kept free from blood by means of a stilette. The plastic is less likely to set up a phlebitis or initiate thrombi. The length of the stilette must be adjusted to the needle or tubing before use. This method is of value when it is difficult to introduce a needle intravenously on account of low blood pressure or collapsed veins and when the skin shows pathological changes. The needle may be secured in place by means of adhesive plaster. Perhaps the most frequent application is in keeping animals under thiopentone anaesthesia for the minimal period as in aural and other examinations which may be of short or longer duration, and in castration of the boar.

AUREOMYCIN IN THE TREATMENT OF PIROPLASMOSIS IN THE CAT

J. F. BROWNLIE

Cape Town.

During 1951-52 I had several outbreaks of piroplasmosis in the cat which were most resistant to treatment. Drugs tried serially included Babesan, Phenamidine, Intravenous Trypan Blue, and Arsenicals and there was little response to any.

Intravenous Gonacrine was then tried in doses of ½ cc. and in most cases the response was immediate. The only peculiarity encountered in this treatment was the prompt emesis following injection.

In a private communication from Dr. Neitz of Onderstepoort Laboratory, who very kindly rallied to my appeal for help when I found the usual drugs having little effect, it was suggested that I try Aureomycin intravenously in doses of 10 mgm. per kilo, and then possibly to increase the dose and repeat in 24 hours. I tried this in four cases with little response clinically or haematologically and reverted to using Gonacrine.

In late 1952 even Gonacrine and the cycle of other piroplasmicidal drugs in many cases produced no effect other than a suspended state of chronicity. I again recalled Dr. Neitz's suggestion and this time tried Auremycin per os and in much larger doses.

My findings were that 100 mgms. in an adult cat given every 8 hours for three days produced clinical control and fairly rapid improvement. The colour of the mucous membranes improved as did the blood picture and parasites became very infrequent.

Since then I have adopted this as my sole treatment for feline piroplasmosis, supplemented where necessary by liver injections and cardiac sustenants. I also advise a subsequent course of Vitamin B complex to counter the effect of Aureomycin in producing a deficiency in vitamin B.

It may be necessary to repeat the course of Aureomycin once or twice, but so far to the best of my knowledge no cat has died of piroplasmosis since this form of treatment was instituted, indeed many cats abandoned as incurable chronics by other practitioners have responded to it and of these, two have recently been spayed and another has had a successful Caesarean section.

Credit must be given to Dr. Neitz for his valuable suggestion, and I can only hope that an Aureomycin-resistant strain of Piroplasm will not be produced.

OBITUARY

EMMANUEL LECLAINCHE (1861-1953)

With the passing of Professor Leclainche in his 93rd year the veterinary profession in France and the profession as a whole has lost one of its best known members. To the present generation his name will not be very familiar but he was one of the most prominent veterinary research workers in the generation which was contemporary with Pasteur in his later years and that which succeeded him. For twenty years he was Professor of Infectious Diseases at the Veterinary School at Toulouse. He collaborated with Nocard in the production of a textbook on infectious diseases of animals and founded the Revue Generale de Medicine Veterinaire. He did a great deal of valuable research work and will probably be remembered best for his work on gas-gangrene in animals in collaboration with Professor Vallee. In 1911 he became Director of Veterinary Services in the Ministry of Agriculture where he did very valuable work in combating infectious disease outbreaks. He took the initiative in founding the International Office for Epizootics which he directed for a quarter of a century. In 1936 he published his "History of Veterinary Medicine", a monumental study. All his life he was a fighter for his profession and the veterinarians of South Africa will join with their colleagues in France in honouring the memory of a great veterinarian.

RECENT MOVEMENTS OF OFFICERS IN THE VETERINARY SERVICES

Dr. L. T. Edwards from Pietersburg to Pietermaritzburg.

Dr. A. van Heerden from Johannesburg to Piet Retief.

Dr. J. P. van der Merwe from Piet Retief to Pietersburg.

Dr. J. H. B. Viljoen from Estcourt to Vryburg.

Dr. T. A. T. Louw from Port Shepstone to Estcourt.

Dr. L. R. Hurter from Ladysmith to Dundee.

Dr. M. C. Lambrechts from Vryheid to Pretoria.

Four of the recent graduates, 1953, have joined the service and have been posted as follows, provisionally :—

Dr. J. M. Erasmus to Umtata.

Dr. H. F. Strijdom to Barberton.

Dr. P. D. de Wet to Louis Trichardt.

Dr. A. J. Snyders to Onderstepoort laboratory.

POULTRY ASSOCIATION OF GREAT BRITAIN INTERNATIONAL AWARD MADE

It is announced that the Award Committee in the United Kingdom has decided that the 1953 Award shall be made to Dr. Henry van Roekel of the Department of Veterinary Science, University of Massachusetts, Amherst, Mass., U.S.A. It is given for what in the opinion of the Award Committee is the most important contribution to poultry husbandry research published in the previous year.

The work in which Dr. van Roekel was concerned embraced :—

A report on pullorum disease eradication in Massachusetts.

A survey of the incidence of antigenic forms of S. pullorum in the U.S.A.

Chronic respiratory disease of chickens.

An egg-propagated immunizing agent for the control of infectious bronchitis of chickens.

Cultural attributes of the chronic respiratory agent.

REPORT OF PERMANENT COMMITTEE OF THE INTERNATIONAL VETERINARY ASSOCIATION

Report of the second meeting of the Permanent Committee for the International Veterinary Congresses enlarged with the President and the General Secretary of the Congress and the Presidents of the Sections, on August 14th, 1953, at 4 p.m. in the Concert Hall in Stockholm, continued on August 15th, at 9 a.m.

Previous to this meeting, a conference was held at 2 o'clock in the Concert Hall by the Resolution-Committee of the Permanent Committee, consisting of Messrs. SIR DANIEL A. E. CABOT (U.K.), Prof. Dr. de BLIECK (the Netherlands), Prof. G. RAMON (France), Prof. K. ERIKSSON (Sweden), Prof. Dr. G. FLÜCKIGER (Switzerland), Dr. W. R. WOOLDRIDGE (U.K.), Dr. W. A. HAGAN (U.S.A.).

In total 16 resolutions had been received from the various sections and the individual members of the Congress.

AGENDA

1. The resolutions to be discussed at the closing meeting of the Congress.
2. Honorary Members.
3. Election of a Committee to study the project drafted by Prof. Hjärre and Dr. Alegren re-establishing international organisations of specialists, in connection with the development of the work of the I.V.C.
4. Extension of the Committee for the Compilation of a List of Animal Diseases.
5. Uniform international emblem for veterinary surgeons.
6. Resignation of the President of the Permanent Committee.
7. Prof. Hermsdorff's proposal to have an international periodical published by the Permanent Committee.
8. Place of the next Congress in 1957.
9. Miscellaneous.

Present:

from the Bureau of the Permanent Committee: Mesrrs. Sir DANIEL A. E. CABOT (U.K.)—President, Dr. C. SANZ EGANA (Spain)—Vice-President, Dr. F. WOLDIKE NIELSEN (Denmark)—a.i. in the vacancy of Dr. GERHARD PETERSEN, Prof. Dr. L. de BLIECK (the Netherlands) — General-Secretary and Treasurer.

Members:

Messrs. Prof. Dr. F. ROSENBUSCH (Argentine), Prof. W. I. B. BEVERIDGE (Australia), Prof. Dr. G. E. HERMSDORFF (Brazil), Dr. Ch. A. MITCHELL (Canada), Prof. HAKON W. WESTERMARCK (Finland), Prof. G. RAMON (France), Prof. Dr. KURT WAGENER (Germany), Prof. P. E. MULLANEY (Ireland), Prof. IGINO ALTARA (Italy), C. V. DAYUS (New Zealand), Prof. H. F. WIRSTAD (Norway), Dr. JUAN FIGUEROA INFANTE (Peru), Dr. A. ALEGREN (Sweden), Prof. Dr. G. FLÜCKIGER (Switzerland), Prof.

Dr. S. N. YALKI (Turkey), Dr. W. R. WOOLDRIDGE (U.K.), Dr. G. P. LOCKHART (Uruguay), Dr. W. A. HAGAN (U.S.A.).
Substitute members:
Dr. RUDOLF SCHMIDT (Austria), Dr. R. WILLEMS (Belgium).
Prof. K. ERIKSSON (Sweden) President and Dr. A. ISAKSSON (Sweden) General-Secretary of the Congress.
from the sections:
Dr. THOMAS W. M. CAMERON (Canada) (Section II), Prof. G. M. VAN DER PLANK (the Netherlands) (Section VI).
Guests:
JOSÉ MARIA QUEVEDO (Argentine), Prof. Dr. ANT. KLOBOUK and FR. NIZNANSKY (Czechoslovakia), Prof. J. VERGE (France), Dr. K. OHLY (Germany), E. QUESADA BRAVO (Mexico), Dr. A. CLARENBURG (the Netherlands), Sir THOMAS DALLING (U.K.), W. A. POOL (U.K.), Prof. N. J. LEONOV (U.S.S.R.), PIERO GALLO (Venezuela).

1. *Discussion of the Resolutions.*

RESOLUTION I

After some alterations this Resolution is divided into two resolutions and accepted as follows:

Fight against epizootics on an international level.

"The XVth International Veterinary Congress recognizes the necessity for an energetic campaign against epizootics and supports all efforts to establish an international co-ordination of this fight.

The increasing overlapping of international activities during the past few years constitutes for member-states not only a severe financial burden, but also tends to impair the efficiency of all measures taken in this field.

Hence. the XVth International Veterinary Congress is of the opinion that the tasks resulting from the international fight against epizootics should be organized in the main through the O.I.E. and the F.A.O. within the framework of their mutual agreements.

The Permanent Committee for the International Veterinary Congresses is instructed to co-operate with the international organisations concerned."

RESOLUTION II

Revision of the Statutes of the Permanent Committee for the International Veterinary Congresses and of the Bye-Laws of the International Veterinary Congresses.

"The XVth International Veterinary Congress instructs the Permanent Committee to prepare for the XVIth International Veterinary Congress in 1957 a draft revision of the statutes of the Permanent Committee and of the Bye-Laws of the International Veterinary Congresses.

The Permanent Committee should consider whether a World Federation of Veterinarians in the form of an International Union is desirable."

RESOLUTION III

Two resolutions were received, which—after a prolonged discussion and an explanation by Sir Thomas Dalling, are combined as follows :—

International standardization of biological products.

"Recognizing the need of urgent action to establish international standards for biological products for veterinary use, the XVth International Veterinary Congress welcomes the extension of the work of the Committee on Biological Standardization of the World Health Organisation to include such products. It suggests that this committee be encouraged to extend as soon as possible its work towards the provision of international standards for other suitable veterinary substances, those meriting immediate attention being the *Cl. welchii* (Cl. perfringens) antigens, beta and epsilon, and swine erysipelas antiserum. The XVth International Veterinary Congress also welcomes the work of the O.I.E. on the study of biological products for use in the control of animal diseases and suggests that the Office be encouraged to continue its activities on this subject."

This resolution is accepted unanimously.

RESOLUTION V

After some alteration the following resolution is accepted unanimously :

Establishing suitable post-graduate scholarships in the field of veterinary parasitology.

"In view of the heavy losses arising from parasitic infestations of livestock and the dearth of trained parasitologists throughout the world, the XVth International Veterinary Congress urges the Permanent Committee to seek the co-

operation of O.I.E. and F.A.O., and national and international veterinary bodies to establish suitable post-graduate scholarships in this field."

RESOLUTION IV

Information on preventive and curative treatment of parasitic diseases and the practical control of these diseases.

"On the proposition of the Committee on the Control of Parasitic Diseases, the XVth International Veterinary Congress recommends co-operation to the fullest possible extent with O.I.E., F.A.O. and other agencies in determining the distribution of the important parasitic diseases of livestock throughout the world, in making available to the veterinary profession the latest and most authentic information on preventive and curative treatment of these diseases and in encouraging the practical control of parasitic diseases throughout the world."

This resolution is accepted unanimously.

RESOLUTION VI

This is a very difficult problem, according to Prof. ERIKSSON, Dr. ISAKSSON points out that only one third of the reports had come to hand by the 1st of January, 1953, and the last had been received as late as in July. This combined with printing difficulties had made it impossible to have the Congress papers in the hands of delegates one month before opening of Congress. There should be a limit of 8 months. Dr. ISAKSSON urges reporters for the next Congress to submit papers in time.

Distribution of the reports of the Congress.

"The XVth International Veterinary Congress urges the Organizing Committee of the next Congress to make every effort to see that the reports of the papers to be presented at that Congress are in the hands of all delegates at least one month before the opening date of the Congress."

This resolution is accepted unanimously.

RESOLUTION VII

After some discussion the following resolution is selected from a series of six and approved:

Veterinary education regarding physiology and pathology of reproduction and lactation.

"As the prevention and treatment of disturbances in reproduction and lactation and artificial insemination of domestic animals have developed into especially important branches of veterinary science and practice, the XVth International Veterinary Congress recommends that veterinary schools should ensure that students receive adequate instruction in this branch of veterinary work."

With a view to the fact that the text of the resolutions is not in the hands of all members, Dr. WOOLDRIDGE proposes to refer further resolutions to the Resolution Committee of the P.C.

The CHAIRMAN explains that this is not in conformity with the statutes.

The GENERAL-SECRETARY explains that it was impossible to have the resolutions multiplied in time, as resolutions were still coming at 2 o'clock, there being section-meetings till the last moment.

Dr. WOOLDRIDGE thereupon proposes to proceed with the next item on the agenda.

The CHAIRMAN points out that the further items of the agenda are only of interest for members of the P.C.; everybody can remain, but only members of the P.C. will vote.

The CHAIRMAN puts to the vote who is in favour to pass on to the next item and to revert to the resolutions the following morning, when the General-Secretary will take care that everybody is in possession of the text of the resolutions. The meeting unanimously agrees to this.

Prof. LEONOV points out that he has been unable to take knowledge of the resolutions, as these are very difficult to understand. He, therefore, reserves the right to comment to the P.C. later on these resolutions.

2. *Honorary Members.*

As there are no proposals, the CHAIRMAN passes on to the next item.

3. Election of a committee to study the project drafted by Prof. Hjärre and Dr. Alegren re-establishing international organisations of specialists, *in connection with the development of the work of the I.V.C.*

As agreed in the meeting on the 9th of August, Prof. Eriksson submits a proposition reading as follows :—

"I agree upon the proposal made by Professor Hjärre and Dr. Alegren that the Permanent Committee of the International Veterinary Congresses should

support the setting up of special international veterinary organisations and that these organisations should be represented in the Permanent Committee, and I am inclined to go even further and recommend the setting up of an international veterinary *union* comprising the special international veterinary organisations and the national veterinary organisations in those countries that will join the union.

The union should be conducted by a *union council* with a *permanent union bureau* for executive powers. *Commissions* could be formed for special tasks. Union *conferences* should be held by the union and *congresses* by the special veterinary organisations. A union conference could be held for instance every fourth year at the same time as one or more special congresses. I consider it self-evident that the present permanent committee should be reorganized into a union council and a permanent union bureau. This question is, however, to such an extent important and comprehensive that it ought to be investigated by a special committee. I should like to suggest that the Permanent Committee elect a special committee consisting of from 5-7 persons to investigate the question. I would believe that it wold be sufficient to have one representative from Sweden, U.K., U.S.A., France, Germany and the Netherlands. Perhaps the national organisations in these countries ought to propose representatives.

If possible, the special committee should also take into consideration the possibility of setting up special international veterinary periodicals."

Prof. FLUCKIGER presumes that it is not Prof. Eriksson's intention that this should be a resolution to the Congress, but that a small committee should examine whether it is desirable to form a universal union of the veterinary profession. After having studied the question this committee will report to the P.C. Prof. FLÜCKIGER thinks that it is not fitting to outline technical details, this is the task of the committee, also it is not customary to mention certain countries.

Dr. WILLEMS thinks that everybody agrees that a re-organisation is necessary. In Paris a small committee was formed already. This question is being complicated by the proposition to establish a world union and also by the proposal to form international societies of veterinary specialists. All aspects of this question should be carefully studied and propositions and suggestions should be sent to all National Committees. No decision should be taken until all national committees have had an opportunity to give their opinion.

The CHAIRMAN infers that a small committee will study this question and report to the P.C. This is just what Prof. Eriksson wants. Prof. Eriksson has only indicated some desiderata.

Dr. LOCKHART says it is impossible to give the least details in the present stage and he proposes formally to authorise the P.C. to execute this plan to the best of its ability, to which the meeting agrees.

The General-Secretary point out that the committee for the revision of the Bye-Laws of the Congresses and the Statutes of the P.C. will also study Prof. Eriksson's and Prof. Hjärre's proposition for establishing a World Union and forming international societies of veterinary specialists. This committee consists of: Sir Daniel A. E. Cabot, President; Dr. Alegren, Prof. Altara, Sir Thomas Dalling, Prof. Ramon, Dr. Sanz Egana and Prof. Wagener.

4. *Extension of the Committee for the Compilation of a List of Animal Diseases.*

The GENERAL-SECRETARY reports that on the 13th of August a meeting was held of the above Committee attended by 35 persons. This meeting accepted the following resolution:

1. The Committee for the Compilation of a List of Animal Diseases should be enlarged by the appointment of a member of each National Committee;
2. each National Committee should be asked to nominate a member to serve on the Committee for the Compilation of a List of Animal Diseases;
3. the Report should be referred back to the National Committees, they should be informed of the discussion that has taken place at that meeting and they should be asked—
   (a) to make their recommendations on the manner in which the nomenclature should be produced;
   (b) to give the names used in their own languages for the diseases included in the Report;
   (c) to give the names of diseases that should be added to the Report;
   (d) to suggest any modifications required.

Hereupon a resolution was read accepted by a number of veterinarians from Latin America at a meeting held on the 13th of August attended by representatives of Argentine, Chile, Mexico, Brazil, Peru, Uruguay, Venezuela

and Spain, in which they apply to the representative committees to include Spanish in the nomenclature of the animal diseases.

5. *Uniform international emblem for veterinary surgeons.*

Dr. SANZ EGANA explains that no further headway has been made. He will try to get further designs. Dr. SANZ EGANA proposes that the same committee remains in being and will study the matter further, to which the meeting agrees.

6. *Resignation of the President.*

The CHAIRMAN asks whether there are any proposals.

Dr. WILLEMS says that all those who have attended the first meeting of the P.C. have learnt with regret the resignation of our General-Secretary. It would be a severe blow to the P.C. if we would also lose our President. Dr. WILLEMS, therefore, suggests to urgently ask Sir Daniel to keep his seat, because if he were also to go, it would mean decapitating the P.C. Prof. FLÜCKIGER had understood that the President would remain in office and that also Prof. de Blieck would stay, whereas Prof. Jansen would take over part of the work. Now that Dr. Sanz Egana is already on the Bureau as representative of the Spanish-speaking countries, he would propose to nominate a representative of Germany in the Bureau as 2nd Vice-President.

The CHAIRMAN points out that the election of the Bureau will take place on Saturday after the closing session of the Congress. He thought the situation was quite clear, if anybody is in doubt he should say so.

Dr. WILLEMS proposes to the meeting to ask Sir Daniel to remain in office and recommends to make it possible for him to attend international gatherings.

General applause.

The CHAIRMAN asks whether there is any opposition to this proposition. This not being the case, the CHAIRMAN thanks for this decision.

7. *Prof Hermsdorff's proposal to have an international periodical published by the Permanent Committee.*

This proposal which was circulated to members during this Congress reads as follows :—

INTERNATIONAL REVIEW OF VETERINARY MEDICINE

to be published under the auspices of the

INTERNATIONAL VETERINARY CONGRESSES

Art. 1. The Secretariat of the Permanent Committee for the International Veterinary Congresses, with offices in Bilthoven (Holland), shall publish a (monthly?) magazine entitled "INTERNATIONAL VETERINARY REVIEW", which shall be the official organ of the International Veterinary Congresses (I.V.C.).

Par. 1. Each issue of this magazine (I.V.R.) shall be published separately in each of the official languages of the I.V.C. French, English and German.

Par. 2. The I.V.R. may also be published in any other language, so long as there are enough subscribers to cover the expenses of translation and printing.

Par. 3. The yearly subscription to I.V.R. be £2 or $5, separate numbers to be sold for 3 shillings or $0.50 each.

Par. 4. These prices shall be subject to alteration by resolution of the Permanent Committee for the International Veterinary Congresses (P.C.) meeting at one of the I.V.C.

Art. 2. The I.V.R. shall publish :

(a) the resolutions of the I.V.C.
(b) all the business of general interest conducted by the P.C.;
(c) original articles having a direct or indirect bearing on veterinary medicine;
(d) articles of outstanding merit which have been published elsewhere;
(e) statistics relating to domestic animals and their products (livestock farm produce);
(f) trade, market and price information in connection with livestock and and farm produce);
(g) livestock sanitarian regulations and methods adopted in the various countries;
(h) information concerning the spread or control of communicable and parasitic diseases of animals in the various countries;

(i) new surgical and therapeutical methods employed in veterinary medicine;
(j) international legislation dealing with the trade and industry of livestock and farm products;
(k) international legislation dealing with hunting and fishing;
(l) summaries of articles or news of interest to veterinarians, published in newspapers or magazines, and news and summaries of books on veterinary medicine, feeding and intensive and extensive breeding and stockraising.

Art. 3. Each member of the P.C. shall be the qualified representative of the I.V.R. in his country.

Art. 4. Each member of the P.C. will be expected—
(a) to contribute to the I.V.R., to the extent of at least one original article every year;
(b) to publish the I.V.R. in his country;
(c) to take steps to have competent technicians contribute to the I.V.R. and to send in annual reports of the activities of the official services and laboratories of his country and any other publications of interest to veterinarians.

Art. 5. The I.V.R. may accept donations or carry publicity to be charged for at such rates as may be approved by the secretariate of the P.C.

Art. 6. Until the I.V.R. can support itself financially, current expenses shall be paid out of I.V.C. funds.

Art. 7. The regulations herein governing the I.V.R. may be modified by decision of two-thirds of the members of the P.C., on acting on the proposal of one of the members.

The CHAIRMAN says that Prof. Eriksson has made a similar recommendation. The P.C. will also study Prof. Hermsdorff's proposition and report about it as soon as possible.

The GENERAL-SECRETARY makes mention of a letter received from Prof. Dr. NEVZAT TÜZDIL (Turkey), who says that the published reports of the present Congress have — on technical grounds — been condensed, which in many cases is not beneficial to the scientific work. He would suggest that various authors are given an opportunity to publish their original work fully in the projected international veterinary periodical. Further Prof. TÜZDIL wishes to emphasize that the new periodical should not appear every month, as this must be considered as an impossibility. He also gives a few suggestions for the name of the periodical, say "Zeitschrift" or "Archiv".

8. *Place of the next Congress.*

The CHAIRMAN asks whether there are any suggestions.

Dr. SCHMIDT reports that the National Committee of Austria has directed him to verbally invite the next Congress to be held in Vienna. Unfortunately it was not possible to submit a written invitation.

Prof. ROSENBUSCH says that prior to this meeting the representatives of the South-American countries as well as of Spain held a meeting, where the possibility to have the next Congress in a Latin-American country was discussed. Contact was made with the Argentine Government and a telegram was received by the Legation of Argentine in Stockholm according to which the Argentine Government agrees to organize the next Congress.

Dr. SCHMIDT points out that his Committee had taken the trouble, as at the last meeting there was no invitation. Under the circumstances Dr. SCHMIDT withdraws his invitation in favour of Argentine.

The CHAIRMAN expresses the meeting's gratitude to Dr. Schmidt and his National Committee for the action taken at the time the P.C. was worried, also for the fact that when some embarrassment threatened to arise, he so graciously withdrew his proposition.

Applause.

The CHAIRMAN wants to make it quite clear that the invitation is intended for 1957.

Prof. ROSENBUSCH says Argentine is fully aware of the periodicity and will do everything in its power to organise the Congress in that year, unless there were to be some unforeseen circumstances. In that case the Argentine Government will do everything to notify the P.C. in advance.

The CHAIRMAN addresses the meeting saying: The proposal before you is that the next Congress in 1957 will be held in Argentine.

General applause. Carried unanimously.

Prof. ROSENBUSCH thanks the Austrian delegate for withdrawing his invitation in favour of Argentine. He further addresses the meeting asking to help with the scientific work, also with the discussions, because after the discussions comes the true life of a Congress.

Dr. SANZ EGANA expresses his satisfaction that the Spanish language has been accepted as official Congress language and that the next Congress will take place in Argentine.

Prof. WAGENER requests the P.C. to examine whether in 1963 an International Veterinary Congress can be held in Hamburg (centenary of the Congresses), and to place this on the agenda of the next meeting.

The GENERAL-SECRETARY refers to the fact that the Netherlands would like to celebrate the centenary, as this coincides with the centenary of the veterinary medical association in that country.

9. *Miscellaneous.*

Dr. WOOLDRIDGE proposes to place on the agenda of the next meeting: Discussion of the time-table for the business meetings of the next Congress.

Dr. WILLEMS reports that the Belgian National Committee has submitted the following proposition re the organisation of future Congresses to be studied by the P.C. It is agreed that also this will be referred to the next meeting in Paris.

"The unceasingly growing number of reports does not permit any more to devote the necessary time to the discussions. Meanwhile this exchange of views forms the most fruitful element of the Congress.

Also, in order to realize a saving of time to the benefit of a better organisation, the Belgian delegation proposes that for future Congresses —

1° the reports will be distributed at least one month before opening of the Congress, so that everyone can take notice of the reports which are of interest to him and prepare an eventual intervention in the discussions;

2° the exposition of the reports or their summary will be dropped and the author will solely be invited to make known the results obtained after drawing up his report;

3° the discussions will be immediately started."

With regard to 1°, a Resolution to this effect (VI) has been approved by the P.C. and will be submitted to Congress.

Hereupon the meeting is adjourned till the next morning at 9 a.m.

On Saturday the 15th of August, 1953, at 9 a.m., the discussions are resumed.

At the proposal of Dr. A. Alegren, President of the Organizing Committee, Sir Daniel A. E. Cabot and Prof. Dr. L. de Blieck are unanimously elected Honorary Members. This proposal is received by the meeting with enthusiasm. Both gentlemen accept the honour with satisfaction.

RESOLUTION VIII

Prof. FLÜCKIGER is against this resolution, as this is connected with Prof. HJÄRRE'S proposition re the international organisation of veterinary specialists and this will be given consideration when revising Bye-Laws of the Congresses and statutes of the P.C.

Dr. SCHMIDT and Prof. VAN DER PLANK deem it, however, imperative that an organisation as proposed in this Resolution will be set up, with a view to the part which the veterinarian has to play in this connection.

Thereupon this Resolution is accepted.

International Animal Production Organisation.

1. "In view of the vital contribution which the veterinary profession can make to the important field of animal production, the XVth International Veterinary Congress recommends the formation of a special Animal Production Organisation to deal with Animal Breeding, Animal Nutrition and Animal Husbandry in relation to animal health and animal productivity.
2. This Animal Production Organisation should be affiliated to the International Veterinary Congress Organisation and should have representation on the Permanent Committee."

RESOLUTION IX

International exchange of veterinarians.

"The XVth International Veterinary Congress proposes that the veterinary organisations of the different countries should organise an exchange of veterinarians in different fields of activity for the purpose of study, gaining practical experience and establishing personal contacts."

This resolution is accepted unanimously.

RESOLUTION X

After some discussion this resolution is accepted:

The use of vaccines in the fight against infectious diseases and epizootics.

"The XVth International Veterinary Congress recommends that, when choosing a process of immunization with a view to combating an infectious disease, preference is given to vaccines composed of germs or viruses killed or made inactive, so that they are totally inoffensive. Living germs or viruses, attenuated or not, should not be used unless no other immunizing method of sufficient value exists.

In that case, so-called "living" vaccines shall not be used generally unless a profound experimental study has proved the stable character of the viruses of which the vaccines are composed, and has precisely determined the risks which their use involves. The possession and the use of these vaccines should be reserved exclusively to veterinarians."

RESOLUTION XI

After some slight alteration this resolution is accepted.

Food hygiene and public health.

1. "The XVth International Veterinary Congress—in view of the importance of veterinary work for public health and public economy—recommends an increased participation of veterinarians in public health and agricultural administrations, especially for combating zoonoses, for the supervision of victuals and for the study of other questions of current interest for human and animal health.
2. As the value and effect of the supervision of victuals depends on the technical training of the supervising veterinarians as well as on their participation in the framework of the administration, it is desirable that in all countries a special training of professional veterinarians takes place in the field of the manufacture and supervision of victuals of animal origin.
3. As an important part of food poisoning is caused by human permanent excreters of salmonella-bacteria, suitable measures for the removal of germ-carriers from the food trade should be aimed at in all countries.
4. W.H.O., F.A.O., O.I.E. and other international organisations should support individual countries by technical consultation and through the development of international standardized methods of research in the field of zoonoses and food hygiene and in this way facilitate the training of veterinarians for the public health service."

RESOLUTION XII

Prof. FLÜCKIGER proposes to refer this resolution to the P.C.—Dr. HAGAN says there is no objection against accepting. Prof. FLÜCKIGER cannot accept it if W.H.O. is not deleted. Sir THOMAS DALLING gives a detailed exposition of the important work done by the W.H.O. in the field of combating rabies which is underlined by Dr. HAGAN. Dr. WOOLDRIDGE thereupon proposes the following definite text:

Control of rabies.

"The XVth International Veterinary Congress recommends that international organisations such as W.H.O., F.A.O. and O.I.E. should provide all possible technical and material assistance to countries where rabies is enzootic, in an intensified effort to control and eradicate this disease by the application of well proven sanitary measures combined with mass immunization of dogs with a vaccine of proved potency, reinforced, where necessary, by wild-life reduction programmes."

which is accepted.

NON-ACCEPTED RESOLUTIONS

The resolutions that have not been accepted by the P.C. relate to the following subjects:—

1. Inviting the U.N.O. to establish international measures to protect the frontiers in order to prevent the introduction of epizootics. The Permanent Committee is of the opinion that it is not up to the U.N.O. to deal with these technical veterinary matters. Moreover, this question is dealt with in Resolution I.
2. The constitution of a permanent sub-committee of the P.C. for the purpose of advising on the programme of the section on parasitic diseases of subsequent congresses, and of arranging for suitable subjects for discussion and reviews of recent advances of knowledge in veterinary parasitology.
3. The organisation of an international society of veterinary parasitologists to provide a permanent organisation which will encourage research and exchange of information and which will meet at least during the course of each I.V.C.

   The Permanent Committee has these matters in hand in a more general sense and so both resolutions are referred to the P.C.

4. That tribute should be paid to the work of the International Women's Auxiliary to the Veterinary Profession and its branch institutions and that the establishing of similar local organisations should be encouraged, and assistance should be given to further development of their objects.

As the Permanent Committee is of the opinion that the aims of this organisation are outside the scientific scope of the Congresses, this resolution was not accepted.

The discussions being concluded, the CHAIRMAN thanks those present and closes the meeting.

LETTERS TO THE EDITOR

THE DETECTION OF WIRE IN CATTLE WITH METAL-DETECTOR

14 Baxter Street,
Durbanville.

The Editor,
Journal of the S.A.V.M.A.,
Onderstepoort.

Dear Sir,

After reading the very encouraging article of Drs. Boswell and Hempstead, in the Journal of the S.A.V.M.A., I went to great pains to try and purchase a Metal-Detector. I practice in an area where losses due to wire are one of the most common complaints. One dairy with about 300 cows reports a loss of about 20 a year. On another farm six animals were kept for examination. All of them were cases of wire, four with advanced pericarditis, the diagnosis being subsequently confirmed on post-mortem. On another farm four rumenotomies were performed on one day. Rumenotomies are performed almost weekly.

My experience is that the symptoms are very indefinite. Some cases are typical, while in others the only symptom is that the animal is off its feed. I have kept cases about which I have been uncertain under observation for a bit too long, thus losing animals that could have been saved. In my experience the chances of an animal running a temperature are not very good. In an animal showing heart symptoms, the prognosis is hopeless.

It was with great expectations that I tried my new metal-detector. Case one was negative, case two was positive and case three was negative.

Case one was a doubtful one, case two an obvious advanced case which was slaughtered, and case three a fairly obvious clinical case. I then adjusted the instrument to the most sensitive position. Both case one and three were now positive. I operated on both of them. Case one had a harmless piece of nail and the animal was already on its way to recovery at the time of operation. Case two had a piece of bailing wire of about three inches in length that was definitely penetrating.

Subsequently I have always used the instrument in the most sensitive position and have never found a negative case yet. I have opened up two cases, where no wire or metal could be found. In one case only two pieces of lead could be found. In the cases mentioned, no reticulitis or adhesions were present. Animals that were operated on were still positive after the operation, but recovered completely. Doubtful cases that were positive were kept under observation and recovered.

I have come to the conclusion, that if the instrument is slightly less sensitive it will miss cases where an operation is necessary. If it is in the most sensitive position it will give you a positive diagnosis in all cases. It just tells me that most animals have metal of some sort in them, the nature of the metal and whether it is responsible for the disease is just as uncertain as before. I have therefore discarded the instrument as useless.

Yours sincerely,
J. P. KRIEL.

Cecil Road,
Plumstead,
Cape Town,
Sept. 3, 1953.

LEPTOSPIROSIS OF SMALL ANIMALS IN CAPE TOWN

Dear Sir,

This is a description of the observations made in connection with the relatively frequent occurrence of cases exhibiting a nephritic syndrome suggestive of Leptospirosis. Such cases have been occurring in Cape Town for at least four years.

The first case investigated was clinically of the L. canicola type. Guinea-pigs were inoculated with material from it but the results were negative. The dog recovered under treatment.

Early this year two serum samples from suspected cases were sent to the University of Glasgow Veterinary School and positive reactions were obtained to L. icterohaemorrhagiae antigen. About this time two cases of Weil's disease in humans were recorded for the first time in Cape Town. This further stimulated investigations on canine leptospirosis and enabled tests with L. Icterohaemorrhagiae antigen to be carried out at the Pathology laboratory of Groote Schuur Hospital.

The following cases have been dealt with and will only be very briefly described from the clinical aspect. Where sera were submitted for the serological test, only L. icterohaemorrhagiae antigen was available, so where a low titre was obtained the case was considered as L. canicola infection.

Case 1 Alsatian: It showed anaemia and had mild fits. It was destroyed in extremis. It was considered to be clinically of the L. canicola type as the serum reacted at 1-30.

Case 2. Alsatian: Clinically an L. icterrhaemorrhagiae type, showing symptoms of jaundice with collapse. A reaction was obtained at 1-300 with the serological test.

Case 3. Cat: Clinically symptoms of icterus but the serological reaction was negative. Leptospirosis could not be excluded as the reaction may be negative in the early stages and no other explanation of the icterus could be given.

Case 4. Crossbred Dobermann: An L. icterohaemorrhagiae case clinically and giving a serological reaction at 1-300. The dog recovered under treatment.

Case 5. Greyhound: Clinically an L. canicola type. The serological reaction was 1-10. Recovery occurred with treatment.

Case 6. Collie: Clinically this was again an L. canicola type. The serum reacted at 1-30.

Symptoms

In acute and subacute cases of L. canicola infection, the syndrome is that of a nephritis, with changes in the mouth which appear almost typical. The tongue presents a brownish, smoked appearance with, in some cases, necrosis of the tip. In bad cases almost half the tongue may be involved. Ulcers of the buccal mucous membrane may be present in the region of the Carnassial teeth and the odour from the mouth is unmistakable.

In acute L. icterohaemorrhagiae cases the symptoms are those of acute jaundice. As the types approach the chronic they are difficult to distinguish, but depression, thirst, tucked up abdomen, occasional vomiting and mouth lestion would suggest leptospirosis.

Diagnosis

This can be made from the symptoms, serological tests and examination for leptospira infection. Neutrophilia appears to be constant and monocytosis frequent. The urine should be examined for leptospira infection, preferably with dark ground illumination.

Animal inoculation should be carried out using guinea-pigs but the most satisfactory animal for work with L. canicola appears to be the hamster.

Differential Diagnosis

The disease may be confused with acute nephritis due to other causes. Other conditions which may cause difficulty in differentiation are piroplasmosis and certain virus diseases of dogs. Icterus may have many causes. Alimentary obstruction, mild enteritis and even chronic indigestion may cause difficulty

Treatment

Aureomycin is the drug of choice, but Streptomycin and Penicillin produce cures in L. canicola infection and in early L. ictero if accompanied with antiserum.

Two workers have reported that Penicillin treatment predisposes to the carrier state, inasmuch as although clinically the dog or experimental animal is cured, Leptospira can still be demonstrated in the convoluted tubules of the kidney.

Public Health

In view of the fact that human infections can occur from both L. canicola and L. ictero., due warning should be given to owners nursing sick animals, and in any cases of concurrent illness the doctor should be advised.

Summary

Six dogs have shown clinical Leptosprosis and these have been confirmed serologically.

Many cases have been seen which could not be confirmed previously due to lack of diagnostic facilities.

The disease is therefore an entity which merits serious consideration in Small Animal Practice.

Finally I would like to express my grateful thanks to Dr. de Kock and Dr. Stephan for their valuable and enthusiastic help, and to Dr. Mulligan of Groote Schuur Hospital for his willing assistance in carrying out serological tests.

Yours, etc.,

JAS. F. BROWNLIE.

OBITUARY

VINCENT COOPER (1897-1954)

The news of the sudden death of Vincent Cooper, Sub-Director of Veterinary Services, Cape West, with headquarters at Cape Town, on the night of March 30th, came as a great shock not only to his family, but also to his many friends and his colleagues. "Cook" as he was known affectionately to his contemporary colleagues was born on 24th February, 1897. The writer, whose sad privilege it is to write this obituary, first made his acquaintance as a small boy when we attended the Preparatory School of Jeppe High School. We were class mates until we matriculated together from that same school in 1915. Little did we know at that time that we would qualify together as veterinary surgeons in 1925.

In addition to a fine scholastic and academic career during which he at all times enjoyed the profound respect of students and staff alike, he was an outstanding sportsman in the true sense of the word. A medium fast bowler who bowled with his head, a tennis player well above the average and at soccer a sound goal keeper, a training which led to many a sterling display as a rugger full back. In later years he was no mean bowler.

After he left school he saw active service in East Africa. On demobilization at the end of that campaign he did not enjoy the best of health so that it was not until 1920 that he was able to register as a veterinary student, and took up residence at Buxton Hostel, Transvaal University College. On 4th February, 1926, he joined the Division of Veterinary Services as Government Veterinary Officer, Nongoma, Natal. Thereafter, he held posts at Eshowe, Estcourt, Johannesburg and Pretoria until on 27th November, 1944, he was promoted to the post of Senior Veterinary Officer and assumed duty in Cape Town in charge of the Cape Western area. He held this office with distinction to the time of his death.

There are many who mourn the loss of a staunch friend. The Service has lost a respected leader of ability. The veterinary profession can ill afford the untimely loss of a gentleman and a colleague of his calibre. One and all hasten to express their sympathy to his wife, son, married daughter and infant grandchild and to his aged father and brothers.

R.A.A.

SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

MINUTES OF COUNCIL MEETING held on 23 November, 1953, at 2.15 p.m. at the Residency Hotel, Schoeman Street, Pretoria.

Present: Drs. A. M. Diesel (President), G. D. Sutton (Hon. Treas.), R. A. Alexander, S. W. J. van Rensburg, E. M. Robinson (Editor), A. D. Thomas (Vice-President), P. S. Snyman, M. H. V. Brown, R. Clark, M. de Lange and K. E. Weiss (Hon. Secretary), G. Pfaff, A. C. Kirkpatrick (Hon. Life Vice-Pres.).

Apologies: Dr. M. C. Robinson.

1. Minutes of Council meeting held on 13/8/53 adopted.
2. Matters arising from these minutes :—

(a) *Purchase of Brewers Yeast*:

This matter was held over from the last Council meeting in order that Dr. Thomas could be present at the discussion.

The President read regulations 17 (1) under section 123 (3) of the Liquor Act 1928 governing the acquisition of Brewers Yeast. Dr. Thomas pointed out that it was unfair that the Veterinary Profession should be discriminated against, as far as the acquisition of Brewers Yeast is concerned. He felt that if the profession was interested, they should take the matter further.

After discussion Council decided to shelve the matter. Dr. Thomas thanked Council for the information obtained on this behalf.

(b) *Resolution Natal Branch—S.A. Jockey Club*:

Letters from Drs. Goodall, Kirkpatrick, Boswell, Brown, Hempstead and D. J. Louw giving their views on the above-mentioned matter were read.

The President asked Dr. Pfaff for his opinion. Dr. Pfaff pointed out that Dr. Louw's letter adequately covers the matter, which actually arose from trouble in Natal. The idea of licensing is to prevent unsuitable persons from doing this sort of work. A licensed official is debarred from betting. In licensing, not only knowledge of horse practice, but also various other factors are taken into consideration.

Dr. Kirkpatrick pointed out that in England, only full-time veterinarians employed by the Jockey Club are licensed and felt that it is even more necessary that part-time veterinarians be licensed.

On the suggestion of Dr. van Rensburg it was decided to reply to the Natal Branch as follows: "The Council of the S.A.V.M. has fully investigated the matter and feels that it is in the interests of the profession that Veterinary Surgeons be licensed, and is in full agreement with the action taken by the Jockey Club of South Africa."

(c) *Deposit Accounts for Vaccines ex Onderstepoort*:

The Secretary reported that letters were received from the Witwatersrand and Natal Branches of the S.A.V.M.A. indicating their concern about the limitations of the rebate on the purchase of vaccines ex Onderstepoort to £12. 10s. per quarter. The reply of the Director of Veterinary Services to these letters was read.

In the discussion Dr. Alexander pointed out that he is in full sympathy with the views expressed by the branches, but that it would take considerable time and sound arguments to persuade Treasury to reconsider the matter, because the limitation was specifically introduced as a result of abuse by certain individual veterinarians. At present there was no rebate limit to co-operative societies buying vaccines in bulk but due to the great cost of redistribution this was a non-paying proposition to them. Dr. Alexander felt that the rebate should be 33⅓% provided the veterinarian uses the vaccine himself. Referring to the price of Distemper vaccine raised by the Witwatersrand Branch he pointed out that the prices of vaccines are determined by the Costing Accountant of the department,

taking a whole lot of factors in consideration. This matter could only be investigated at the next costing.

The general consensus of opinion as expressed by various Council members: Drs. Brown, Pfaff, Thomas and van Rensburg felt that the rebate limit is far too low and constitutes a definite restriction. Dr. Pfaff suggested that each vaccine should have its own rebate limit, whereas Dr. Thomas suggested that there should be no limit at all. In the end it was decided to write to the Branches and inform them that the matter is receiving the attention of the Director of Veterinary Services who is in full sympathy with their views and with those of Council.

(d) *Enlargement of Council: Dr. Sutton.*

Dr. Sutton introduced the question of enlargement of Council. He suggested a formula to be worked out to increase the size of Council according to the increasing membership of the Association. He felt that more private practitioners should be represented.

After lengthy discussion and mature consideration it was decided that Council should not be enlarged.

4. *Election of Member for Veterinary Board:*

Council was informed that Dr. A. M. Diesel has been re-elected as member of the Veterinary Board.

6. *Application for Membership:*

The following colleagues, duly proposed and seconded, had applied for membership:—

(a) Dr. J. S. Dovey, 24 Havelock Street, Port Elizabeth.
(b) Dr. M. Gibson, P.O. Box 1, Sandown, Johannesburg.
(c) Dr. H. Wallace, P.O. Box 1, Sandown, Johannesburg.

Council decided to recommend acceptances to the next Annual Congress.

Dr. Alexander asked that these new members be notified that registration is essential in this country.

7. *Natal Veterinary Co-op.*

The letter from Dr. Tarr re abovementioned matter was read.

Dr. Thomas took exception to the allegations by Dr. Tarr that Council has failed to do its duty and reminded Council that a liaison committee consisting of Drs. Diesel, Thomas and Tarr (the latter appointed by the Natal Branch of the S.A.V.M.A.) was formed but that this committee never functioned due to the non-co-operation of the Natal member.

Dr. Pfaff also pointed out that he was delegated by Council to investigate the matter in Natal but being a member of the Veterinary Board, the legal advisors were against such action. The matter was therefore not pursued further.

On the proposal of Dr. van Rensburg, Council instructed the Secretary, in collaboration with Dr. de Lange, to write to Dr. Tarr and to inform him of the steps taken by Council on their behalf since his original communication of 14th November, 1953. Also to inform Dr. Tarr that Council is not competent to deal with such matters or to investigate the position in Natal, but that if he has further evidence to support the original statement he should lodge an official complaint to the Veterinary Board, which will probably be in a position to deal with the matter now that Dr. Thomas is back from overseas with more information. Complaints should be lodged against a veterinarian employed by the Co-op and not against the Co-op itself.

In conclusion Dr. van Rensburg suggested that the whole question of Co-ops should be investigated by Council and in order to give a lead to the profession members should be informed of the implications. As time did not allow a discussion it was decided to place this matter on the Agenda for the next Council Meeting.

9. *Presidential Chain of Office*:

On Dr. Alexander's proposal Council instructed General Purposes Committee to go into the matter and collect information and to report back to the next Council Meeting.

10. *Golden Jubilee Celebrations*:

Proposed by Dr. Clark that the Jubilee celebrations of the Association be held during 1955 to coincide with the centenary celebrations of the City of Pretoria. Adopted.

11. *Correspondence*:

(a) *Letter from Dr. Thomas re his trip Overseas and Attendance at International Veterinary Congress*: read. Dr. Thomas added that there was an appeal by the organising Committee that every member Country should honour its obligations by paying its contributions regularly. These funds are used to publish an international list of animal diseases nomenclature and also to establish a film bureau and to pay the travelling expenses and subsistence of certain distinguished speakers. Council informed that next International Veterinary Congress will take place at Beunos Aires.

The President invited Dr. Thomas to write an article for the Journal on his impressions overseas. Dr. E. M. Robinson suggested that Dr. Thomas gives a demonstration of new instruments at the next Annual General Congress.

Speaking on certain remarks by Dr. Thomas in his letter, Dr. Brown enquired whether there was any method whereby the Association could assist young practitioners to go overseas to gain experience. Dr. Thomas felt the Association could be of assistance by collecting a panel of practitions who could act as *locum tenens's* for colleagues on leave.

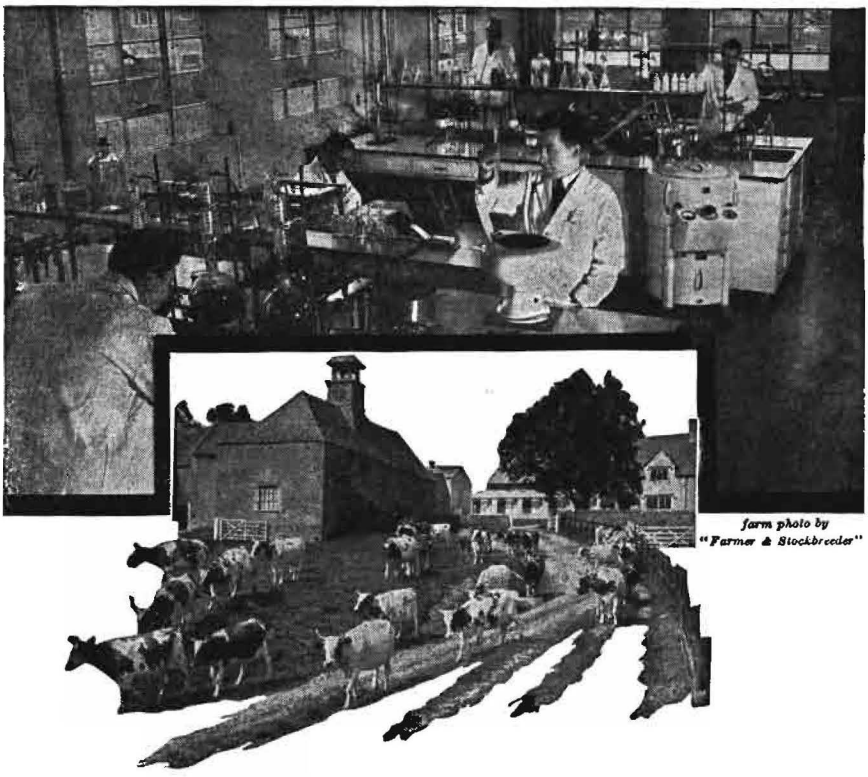
Dr. Alexander informed Council that there were certain comments he made on the correspondence relating to the International Veterinary Congress which should be discussed by Council. Resolved to place same on Agenda for next Council Meeting.

12. *General*:

Dr. Diesel thanked Council for re-electing him as a member of the Veterinary Board.

Meeting closed at 5.30 p.m.

Honorary Secretary.



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Jl. S.A.V.M.A. 25(2), 1954.

THE MODERN APPROACH TO POULTRY BREEDING.

P. H. C. DU PLESSIS,
Division of Animal Husbandry, Pretoria.

According to numerous biologists, most birds, including the domesticated fowl, have only one functional ovary and oviduct, which is on the left side. They all agree that it is logical to assume that from the standpoint of evolution, the loss of the right ovary and oviduct may be attributed to the need for reducing weight as an adaptation for flight, and to lack of space in the abdomen for two oviducts. For reproduction one ovary can supply all the eggs needed. It has also been pointed out, however, that in the hawks and falcons a fairly large proportion — about 60 per cent — have a right ovary which may vary in size, as well as the normal one on the left. Paired ovaries and oviducts, both systems apparently functional, have been reported in a duck.

With hens having double sets of functional reproductive organs, the possibility undoubtedly exists that these supposedly superior birds would be able to surpass those of the present day in egg production. With paired reproductive organs the possibility even exists of developing a race of hens producing no less than two eggs a day. From a biological point of view such a development seems quite feasible and achieving this purpose constitutes a challenge to our present day geneticists.

Fowls laying a sequence of 213 eggs have been bred successfully. This record is held by a Canadian White Leghorn hen. A Rhode Island Red hen from the United States with a production of 358 eggs laid 184 in a sequence. The longest cycle of our own famous hen No. 215, which laid 355 eggs, was only 167 eggs. Hence, why should it not be possible to breed hens having a much more extended sequence? Why accept the idea that we have already reached, the "physiological ceiling" of egg production, and not strive to develop an egg-a-day breed of fowl. Personally I am convinced that we may look forward confidently to 300 egg averages, without sacrificing egg size altogether, provided the feeding and management are such, that these genetically superior hens might be able to find expression for their production potential. Three hundred egg, hen-housed averages have already been achieved by some duck breeders. The so-called "physiological ceiling" is based on the fact that certain strains are not improving even under continued selection. However, there are several possible genetic explanations of this situation and it need not necessarily be attributed to biological limitations. In America the 300-egg bird is now an exceedingly common article. More than 10 per cent of birds entered in American laying tests in the last few years

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have been recorded as having produced over 300 eggs in 51 weeks of the first laying year.

INHERITANCE OF ECONOMIC TRAITS.

It should be realized that the new approach to applied animal breeding problems via the most fundamental of genetic constants — the degree of heritability — is a very recent development. This new method calls for a somewhat different outlook than we have been used to in the past, and it must be pointed out that, for the understanding of some of the statements that have to be used in the course of this discussion, a fair amount of statistical and biological training may be required.

As practically none of the genetic factors responsible for changes in such economic characters as egg production, etc., can be individually identified, recourse must be had for explanation to the science of population genetics. This involves an abstract thinking and reasoning which many people have difficulty in acquiring, but once the concept of heritability is grasped the whole matter becomes clear. In the application of genetics to animal breeding the heritability of the trait, which is the object of improvement, enters the picture and it is one of the most fundamental concepts connected with the inheritance of such a character as egg production.

It is generally accepted that the phenotypic or observed expression (visible characters or measurable performance) of all characters of economic importance such as egg production, bodyweight and egg weight is influenced by both environment and heredity. The degree of heritability indicates the relative importance of genetic factors and non-heritable factors in the contribution they make to the total variation in a flock. In a broad sense heritability may be defined as the fraction or proportion of the total variation which can be ascribed to genetic factors. Hence, the degree of heritability of a character determines whether the record of an individual can be wisely used in estimating its breeding value. In a very limited sense the heritability refers only to the average influence of the genetic factors, and it is used to express that fraction of the phenotypic or observed variation between parents which may be expected to be recovered in their offspring. Thus, if the heritability of any given character is *low*, then only a very small fraction of the phenotypic or observed variation between parents is recovered in their offspring. In other words practically all of the variation between the parents is due to environmental sources. On the other hand should the heritability of a character be 100 per cent then all of the observed variation between the parents is recovered in their offspring. Hence, the breeding potentialities coincide with the observed performance.

Suppose that the difference between the average egg production of a flock as a whole and that of the birds selected as breeders is 50 eggs, and that the heritability of egg production is 10 per

cent, then the egg production of the resultant progeny would be expected to improve by 10% of 50, or 5 eggs per generation. The disheartening results usually obtained by the majority of our breeders, who adopt the old system of breeding viz. of trapnesting the best looking pullets each year, and then selecting for breeding the following year those individuals which have given the highest records, may be ascribed on this basis to the low heritability of egg production.

Therefore, on the magnitude of the heritability depends the choice of the most efficient breeding programme. If the heritability is high, individual selection will be efficient as performance will be a good indicator of breeding potentialities. Take the case cited above and suppose that the heritability of egg production is not 10 per cent but 80 per cent, in which case the egg production of the offspring would be expected to improve by 80 per cent of 50, or 40 eggs per generation. These widely differing results, viz. an improvement of 5 eggs against that of 40 eggs per generation amply illustrate that with low heritability there is little relationship between the breeding potentialities and the observed performance of the individual. Therefore, it is necessary to use measures other than the individual's record to estimate its breeding value. In this case, the record of the family as a whole becomes more important than the record of the individual in determining which birds to use as breeders. The most accurate estimate of an animal's breeding value is an evaluation of its progeny when it is mated to several different mates. Progeny testing rejects the notion that fine feathers make fine birds, and adopts instead the proverb "Handsome is as handsome does" as Prof. Hutt of the University of Cornell puts it. This particularly applies to a character such as egg production with a low heritability and the fact that it can only be measured in one sex. Such a progeny test should include if possible *all* the daughters from a particular mating or at least a fair random sample. Any attempt to pick the best for testing purposes will only lead to delusion. It is not suggested that a breeder should undertake progeny testing on his own because it is obvious that progeny testing along these lines is very expensive both in time and equipment, and farmers can therefore usually only test the daughters of a few sires annually. Even then the expense is great and the reward uncertain. Progeny testing is probably a function of the State, and I visualize a progeny testing scheme in which the necessary facilities are provided by the State, probably free of charge.

Progeny testing, however, is very exacting in its requirements and the entire aim of the existing progeny test at Glen, where 10 selected daughters of a sire are tested, is probably lost because environmental factors common to members of the same family are not excluded and the breeders, on top of this, are also permitted to send a selected group of daughters to be tested. Therefore, the fact that a sire might show a figure well above the average of a

particular year's test is no guarantee whatsoever that this superiority is genuine and heritable and not due to environmental causes and partly out of the control of the breeder.

The estimation of the heritability of characteristics is a major subject of research today and it must unfortunately be admitted that, particularly in this country, information about the heritability of the different economic characters is sadly lacking. It cannot be overstressed that these particulars are absolutely essential when we are trying to apply modern theories to practical animal breeding.

In general, with some degree of reservation, the heritability values for the different characteristics of economic importance can simply be classified as high, medium and low. As already stated characters with high heritability respond readily to individual selection or mass selection as it is generally called. It seems that family selection for these characters is no more efficient than individual selection. Economic traits, with high heritability for instance, are bodyweight, egg weight, rate of growth, rate of feathering and egg characters. Consequently none of these traits offers any problems because they readily respond to selection.

However, selection for characters such as egg production, viability, sexual maturity, etc., with low heritability, show no permanent response to mass selection and it is literally impossible even to make the slightest permanent progress unless the family selection method is used exclusively. In other words genuine genetic improvement is unlikely with mass selection.

We do not know enough yet about the heritability of other productive traits, such as fertility, persistency, broodiness and winter pause. to make any definite recommendation, but it seems as if the heritability of these traits is not high enough to make mass selection effectual. At present breeders should proceed on the assumption that a combination of both family and individual selection provides the best opportunity for improving these traits.

INTERRELATIONS BETWEEN ECONOMIC TRAITS.

Recently investigation has been started in connection with a second problem in breeding viz. the likelihood of the existence of genetic correlations between traits for which selection is done simultaneously. The practical consequence of such a situation is probably not fully realized and is of such vital importance in animal breeding that it definitely deserves to be incorporated in this discussion.

When we talk of a genetic correlation it means that selection for a specific trait will either improve another trait present or it will be antagonistic to it and so cause it to be poorer. Some examples of such a situation are known and undoubtedly more will be found as the animal geneticists are at present concentrating on this problem.

When breeding for improved meat qualities in chickens, increased bodyweight is the first consideration. Some breeders, however, also consider a shorter shank desirable. Consequently simultaneous selection for both characters in the same individual is the aim. Should the correlation between high bodyweight and short shanks be positive, which means that an increase in bodyweight is associated with a corresponding decrease in shank length, (not in terms of actual measurements, but in terms of the scale of desirability) then the selection will be successful, and ultimately fowls with increased bodyweight and shorter shanks will be obtained. However, Prof. Lerner from the University of California, tried out this selection procedure in a population of New Hampshire fowls. Contrary to expectations he found this correlation to be negative in terms of the scale of desirability, which means that an increase in bodyweight is associated with a corresponding increase in length of shank. Consequently equal amounts of selection pressure applied to both bodyweight and to shank length simultaneously will cancel each other out and therefore the selection will be self-defeating. The breeder, in selecting for both characters, will therefore, in spite of his good intentions, not practise selection at all.

In contrast to correlations of the antagonistic type, favourable genetic correlations among desirable traits may simplify our selection. Contrary to common belief, it seems to be a well-established fact today that the correlation between high egg records and viability is positive. A similar relationship exists between bodyweight and egg weight. Goodale, for instance, succeeded in increasing the size of the eggs of white Leghorn pullets from 48.7 grams to 58.2 grams in five generations of selection. The bodyweight automatically rose at the same time from 3.5 lb. to 4.3 lb. Contrary to the favourable relationship between egg weight and bodyweight, evidence is accumulating that possibly a negative relationship exists between egg numbers and egg weight. While attending the University of Edinburgh I had the opportunity of analyzing the records of a Brown Leghorn flock maintained at the Poultry Research Centre, Edinburgh, for experimental purposes. According to the results of this analysis it was possible to conclude that the heavier birds within a breed are likely to be among the poorer producers when the number of eggs laid and not the weight of the individual eggs is the consideration. This is also confirmed by the Glen Egg Laying Test results which have been analyzed recently. This means that when we are selecting for breeding purposes the two traits, viz., high egg number and high egg weight, cannot continuously be improved simultaneously as these two characters are antagonistic to each other. In fact, at the outset of a selection programme for these two traits there apparently exists a favourable relationship between them, but as simultaneous selection for these two traits continues a negative relation arises. When this stage is reached and a still higher egg

production is desired, the only alternative will be to sacrifice egg size for increased numbers. Whether this antagonistic tendency is reached when the annual egg production is 200 or when it is 300 two-ounce eggs. is hard to say. With some reservation, however, I estimate this figure to be roundabout 200 A-eggs, because judging by the average production of A-eggs attained at the Central Egg Laying Test at Glen from 1928 to 1953 we find that it fluctuates between 175 to 180 A-eggs. There is no evidence, whatsoever, that this figure will ever be exceeded, if we continue on the lines which have been followed hitherto. Another very important factor to keep in mind is that the incidence of abnormalities of the egg producing organs resulting in higher mortality usually is associated with the production of large eggs. The strain occasioned by laying large eggs is evidently too much for these organs.

The Americans to-day do not attach the same importance to individual egg weight that we do. The ultimate result is, that to-day much higher egg laying records are achieved by them than we can ever dream of in this country. Families with an average production of 300 eggs annually are no exception.

As already stated, negative genetic correlation between the desirable expressions of economic traits may result in selection which is selfdefeating. There are also other examples of unfavourable genetic correlations. It has been found that birds exhibiting broodiness are superior for viability, and in this case selection for non-broodiness will decrease viability. Thus, selection in the desirable direction for one trait will interfere with the improvement of another. To give satisfactory guidance to breeders, who simultaneously have to select for several desirable characters, it is most essential that all the possible cases of genetic correlation should be worked out.

PRACTICAL CONSIDERATIONS.

In practice it is found that breeders must usually select for more that one trait. A breeder, concentrating on birds for egg production, must not only consider egg numbers but also viability, egg size, fertility, hatchability and several breed characters. Obviously the greater the number of characters selected for the lower will be the intensity of selection for each trait. Suppose the breeder decides to select the top 10 per cent. of his flock for greater egg production. He might find the average production of these potential breeders to be 250 eggs. However, if adequate egg size also forms one of his breeding objectives, he might find that the top birds for egg number are not necessarily the top ones for egg size. If the breeder wanted to combine selection for both traits he might find that the average egg production of his breeders has now fallen from 250 to say 220 eggs. Every time another objective is added to the selection programme it may mean a further reduction in average production. Consequently a breeder should think twice before including characters in his breeding pro-

gramme which have no reference to economic importance. Should we not judge the merit of breeding stock on the basis of economic traits, as these characters are after all the ones that determine whether the enterprise will show a profit or loss? Breeders should keep in mind that the smaller the number of characters concerned in a selection programme, the greater the expected gains in each.

Are the complaints lodged by commercial egg producers against the disqualification of highly productive hens for minor breed faults, such as small amount of enamel white in the earlobes of Rhode Island Reds or slight indications of white tipping in the primary flight feathers of the wing of adult Australorps of both sexes, not perhaps fully justified?

It is not an essential requirement to be a trained geneticist if one wishes to gain success as a breeder. But whatever production policy or method of selection for further improvement is adopted it should be realized that one is working not only with birds, but with genetic factors or genes. It is the duty of every breeder to acquire at least some knowledge of the science built up around these genes, viz., the science of genetics.

THE CHEMOTHERAPY OF FILAROIDES OSLERI (COBBOLD, 1879) INFESTATION IN DOGS: A PROGRESS REPORT.

W. D. MALHERBE,
Onderstepoort.

ABSTRACT.

Since it was evident from the available literature that there was no satisfactory treatment known for the tracheo-bronchitis caused by Filaroides osleri *lungworm in dogs, a method of treatment was devised and over two dozen bull mastiffs were successfully treated. Weekly intravenous injections of either Anthiomaline or Fouadin for nine to twelve weeks gave satisfactory results with no danger of toxicity. For more rapid effect Hetrazan per os (10 mg. per kg. t.i.d.) combined with either of the above drugs (1.5 - 2.0 ml. intravenously) was given daily for seven days, but there was some risk of toxic manifestations. Hetrazan alone was not effective.*

INTRODUCTION.

For all practical purposes infestation with *Filaroides osleri* lungworm has been found to be limited to a single breed, the bull mastiff, in South Africa. Within this breed the incidence has been becoming a serious matter since to many breeders the financial implications were causing considerable concern. Their breeding stock represented a substantial investment, and when pups were sold, usually at good prices, there was no means of making sure that they would not, after six months or a year, start showing symptoms of stenosing tracheobronchitis caused by the lesions of the *Filaroides* lungworm.

A standard text, that of Mönnig (1950), indicates that symptomatic treatment only can be recommended. Intratracheal injections of 1 ml. of 5% phenol, it is stated, causes symptoms to disappear. Pillers (1935) advocated resting the patient for 4 - 5 months in a clean, insect-free loose-box, during which time the worms might die off and the nodules or "tumours" disappear. Introduction into the trachea of phenothiazine was reported by Steyn (1945) to be of no use.

The present study was undertaken as it was evident that there was no specific treatment known and that hygienic measures, though of some use, did not prevent poor growth of young bull mastiffs and chronic ill-health in most of the affected dogs.

MATERIALS AND METHODS.

Suitable infested animals for trial of various drugs were readily available from breeders and owners. The diagnosis was made by

the method described by Malherbe (1951) and the degree of progress of healing assessed by the same means.

Some of the dogs were admitted to hospital while others were treated as out-patients.

The drugs selected for trial were Hetrazan brand of diethylcarbamazine acid citrate (B. Vet. C. and B.P.C.) on account of its successful use in the treatment of filarial worms in humans and animals, the Fouadin brand of stibophen (B.P.) and the Anthiomaline brand of lithium antimony thiomalate, on account of their use as parenteral anthelminthics against filarias and schistosomes.

The patients were periodically examined bronchoscopically and by means of the bronchial swab. In a few cases where the dogs had been donated for the purpose of the experiments the final examination was carried out at autopsy.

RESULTS.

The results may be summarized as follows:-

1. Hetrazan, though normally used against filarias of humans at a dosage rate of 2 mg. per kg. t.i.d. per os, was given at this and steadily increasing rates over four and six weeks to two dogs. For the final week or two in both cases the daily dose of pills, 22.5 and 50 mg. per kg. respectively, was dissolved in distilled water and injected intravenously once daily, producing only transitory systemic reactions in the form of deep sighing respirations.

In both cases, which were severe ones, the clinical condition and habitus seemed to improve. The shortness of breath, resembling asthma, was not so evident. Swabs taken several times after the termination of the experiment however showed no diminution in the number of eggs.

It was concluded that Hetrazan alone, even in heroic doses, did not cure *Filaroides osleri* infestation.

2. Five dogs, the property of one breeder, were given single injections of 5 ml. of stibophen (as Fouadin) or of Anthiomaline intravenously at weekly intervals for periods ranging from seven to twelve weeks. The intravenous route, incidentally, was chosen in preference to the more usual intramuscular one, since it was found that the latter had caused severe myositis with carrying leg lameness and even oedema. The drugs received as nearly as possible equal use, each dog always receiving the same one for the whole course of his treatment.

Three dogs receiving twelve injections of Fouadin or Anthiomaline were clear of infection at the end of the treatments. One receiving nine injections of 5 ml. of Fouadin was cleared. In one case treatment had to be suspended after seven injections of Anthiomaline on account of pregnancy and the animal was three months later found to be still infested.

There was thus considerable evidence that under conditions of good feeding and normal exercise out-patient treatment at weekly

intervals with these two antimonial drugs gave very satisfactory results.

3. Combinations of Anthiomaline or Fouadin and Hetrazan were also tried. After the pups of the bitch described above who had had seven weekly injections of Anthiomaline had been weaned, approximately three months after parturition, the animal was admitted to hospital and given a short course of 10 mg. of Hetrazan per kg. t.i.d. per os and 2 ml. of Anthiomaline daily into the cephalic vein for one week. Her high grade infestation before the course of treatment was found to have cleared up entirely when she was tested again two weeks after its termination. This animal had been a very obvious clinical case and looked very well at her discharge. Her weight was 39 kg.

One animal weighing 31 kg. which had before the present study been given three intravenous injections of Antimosan at weekly intervals at a rate of 25 mg. per kg., causing critical liver damage, was found five months later still to be infested. A twelve day course of 10 mg. of Hetrazan t.i.d. per os, combined with 1.5 ml. intravenously daily of Anthiomaline, was given. A negative swab two weeks later was confirmed by consistently negative results during the subsequent six months.

Another bitch, weighing 36 kg. was given a week's treatment of Hetrazan per os (10 mg. per kg. t.i.d.) and intravenous daily injections of alternately 2ml. and 1.5 ml. of Fouadin. After only one week without treatment examination still revealed the presence of *Filaroides* eggs. Another course was then given consisting of seven injection of 3.5 ml. of Fouadin intravenously on alternate days and 10 mg. of Hetrazan per kg. t.i.d. per os for seven days. Examinations and observation extending over a further three months failed to reveal evidence of infestation.

4. Intensive courses of treatment with Anthiomaline or Fouadin, using 6 - 12 doses of about 3 ml. each on alternate days did produce cures but it was found that toxicity in the form of nausea and liver damage occurred in several cases. On the available evidence it was not possible to favour the one drug above the other from the point of view of efficacy on the one hand or toxicity on the other.

DISCUSSION.

Over two dozen cases of *Filaroides osleri* infestation have now been treated successfully. The numbers have however not been sufficient to enable the author to state positively what the minimum amounts of the drugs are that would cure the condition. The response varies in different dogs and in some cases it was noticed that the final clearing up of lesions after treatment was delayed for some weeks. The impression was gained that any treatment was potentiated by a previous treatment or course of treatments, using these drugs. Further experience will no doubt clarify various points.

At the present time then it seems that two feasible methods of treatment emerge from the available experience, viz.:

a. Nine to twelve weekly intravenous injections of about 5 ml. of Anthiomaline or Fouadin for average sized adolescent or adult bull mastiffs between 30 and 45 kilograms in weight.

b. Intensive courses of a combination of Hetrazan per os (10 mg. per kg. t.i.d.) with daily intravenous injections of Anthiomaline. or Fouadin in a dosage of not more than 1.5 to 2.0 ml. daily, for a week, repeated if necessary after a rest period of 2 - 3 weeks.

The former method at the moment seems to have the advantages of comparative cheapness and the lack of any danger of intoxication, but may stretch over several months. In the latter method on the other hand the quicker results thus far obtained are accompanied by greater danger of toxicity.

Further experience will no doubt show more fully what the comparative value of these methods will be in practice.

ACKNOWLEDGEMENTS.

The generous complimentary supplies of Anthiomaline from Messrs. Maybaker (S.A.) (Pty.) Ltd., and of Hetrazan from the Lederle Laboratories Division of the American Cyanamid Co., New York, are gratefully acknowledged.

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IS THE BEST USE BEING MADE OF AVAILABLE VETERINARY MAN-POWER IN SOUTH AFRICA?

A. D. THOMAS
Pretoria.

The shortage of Veterinarians.

A shortage of veterinarians prevails in many parts of the world, but nowhere does it seem to be so acute as in South Africa. A recent article in this journal bears eloquent testimony to this fact. It refers particularly to the State Veterinary Service where the normal establishment in the Veterinary Division shows some 21 posts unfilled.(1)

A glance at the strength of the total veterinary force in a few European countries relative to human and cattle population also seems to bear out that South Africa lags far behind in providing what is considered a necessary complement of veterinarians.

Country	Human Pop. in millions.	Cattle Pop. in millions.	Veterinarians.	Ratio vet : cattle.
Denmark	4.0	3.0	1,400	1 : 2,100
Holland	10.0	2.5	900	1 : 2,700
Switzerland	4.0	1.6	800	1 : 2,000
Sweden	7.0	2.5	700	1 : 3,500
Great Britain	48.5	10.0	3,700	1 : 2,700
South Africa	11.5	12.5	300	1 : 41,000

Bearing in mind that we have in South Africa most of the stock problems found in Europe, plus a good many more of our own, in the form of protozoan and virus diseases, nutritional deficiencies and plant poisoning, it is indeed surprising that more has not been done to improve the position, particularly in making the best use of such veterinarians as are available. It has been said of course that the stock being in general of inferior quality, low in value, and the distances the veterinarian has to cover so great, that it is economically unsound to give the same amount of attention to animals here as is done overseas. This argument, however, is fast losing its significance and this paper is intended to stimulate thought or better still action towards better planning in the utilisation of veterinary man power in South Africa.

How New Zealand solved her shortage.

It is interesting to note, in passing, how an essentially pastoral country, New Zealand, faced with a similar shortage of veterinarians, devised a plan which so far seems to have served its purpose satisfactorily. New Zealand has no Veterinary School of its own, so it was necessary to attract qualified veterinarians from overseas, while also boosting the training of New Zealanders at Australian and other Schools by means of bursaries, grants in aid, etc.

The need was not so much for state veterinary police as for private practising veterinarians. In order to facilitate and regu-

(1) Jl. S.A.V.M.A 24 (1) p. 1. 1953.

larise the recruiting and distribution of the necessary veterinary man-power, a Veterinary Service Council was formed and endowed with funds by the government and interested boards. The functions of this Council are:

(a) To organise farmers into Veterinary Clubs and to co-ordinate the activities of these clubs.

(b) To lay down uniform and attractive conditions of pay and of service.

(c) To subsidize weaker clubs. To determine where additional veterinarians are required and allocate them to stronger clubs.

(d) To aid and encourage training of more qualified veterinarians and to organise refresher courses for older hands.

(e) Generally to supervise the smooth working of the Veterinary Service as a whole.

Considering the many disabilities attendant upon and inevitably associated with the running of private practice on a fixed salary basis, New Zealand deserves praise for being the only country so far to have made a success of this form of Veterinary Organisation.

It is significant, also, that in its 5th Yearly Report (1952) the Veterinary Service Council makes the recommendation that Club Veterinarians may in future be required to do some State veterinary work at fees to be laid down.

Clearly then, New Zealand has realised the necessity for some centralised co-ordinating body to regulate private practice. There are signs that the movement is in a state of evolution and may tend to link up with the state organisation.

Veterinary Services in some European Countries.

Taking for example the countries mentioned in the table above, one finds certain features common to them.

All have a Central State Veterinary Organisation which takes care of Veterinary Policing and to varying extents controls all other aspects of Veterinary Services.

All have a highly developed and extensive system of private practice backed by more or less efficient diagnostic laboratories and research institutes.

All have succeeded apparently in combining and co-ordinating the two so that there is a minimum of overlapping and wasted effort. In other words *all* aspects of Veterinary Service, State Veterinary Police, meat and milk inspection, artificial insemination, vaccine production and private practice are integrated into one overall service to the country.

There are of course differences in the ways and in the degree to which this has been carried out.

In Great Britain for instance there are no less than 1,630 part time salaried veterinarians. In Denmark, Holland and Switzerland

the backbone of Veterinary Services is still the private practitioner who does everything in the rural areas, including meat inspection, artificial insemination and state work at prefixed fees. It seems an accepted fact that whether part time salaried veterinarians are employed, or piece work is farmed out at prefixed fees to private practitioners — close supervision is essential to ensure uniformity and efficiency of action, and is the secret of success in any such scheme. This supervision needs to be local, immediate and practical not vague, remote and riddled with red tape. In other words the Supervisor must be on the spot or within easy reach, he must have the particular circumstances of that locality at his finger tips and enjoy the confidence, respect and collaboration of all colleagues under him in his district. Such an arrangement is not merely imaginary and utopian. It actually exists and operates satisfactorily in many countries.

In the thickly populated area specialisation is advantageous and necessary. There have to be full time meat inspectors, large and small animal practitioners, artificial inseminators, etc. and as one gets to the smaller and marginal communities so has the veterinarian to assume and combine two or more of the different aspects of the work. Supervision in the former case is more in the nature of co-ordination of the various spheres especially in emergencies.

The system undoubtedly has much to commend it. Private enterprise is not stifled. Hard work and efficiency earn their just reward, within the framework of the scheme. There is no picking and choosing by the private practitioner, he has his duties and obligations towards the public, the profession and the State, and the District or Divisional Supervising Veterinarian is there to watch, guide and correlate the work of all veterinarians in his area.

The young veterinary graduate starts at the bottom. He may do artificial insemination or an assistantship for a year or two. Then he may set out on his own, but usually he is directed by an "appointments committee" to one or other of several localities (to a new opening, or a partnership) where an additional man is required.

His advancements now is in his own hands. As his experience increases so may he be given part time appointments in municipalities, etc., or he may transfer to more important centres as and when vacancies occur.

In due course and according to his personality, ability and integrity he may come into consideration for filling administrative vacancies in the permanent Central State Service — first as District or Divisional Supervisor, then Provincial Chief and so to the key posts at the top.

This means that by the time a man has passed his prime, so do his duties become less arduous and strenuous. His income is stabilised and assured while his vast experience is now placed at the disposal of the public, the State and his colleagues in an advisory and supervisory capacity.

In those countries where co-operative movements among farmers are common and efficiently operated, it is noteworthy that in no single instance are the services of practising veterinarians hired on a fixed salary basis. This of course does not apply to routine jobs, done within fixed hours and with known leisure periods, e.g., artificial insemination, meat and other food inspection services which usually carry fixed salaries.

The reasons for this almost universal attitude are well known, but may be recapitulated here for the sake of clarity.

A. In curative veterinary medicine and surgery there is an element of urgency, with few exceptions, not encountered in other spheres of veterinary work. This means not only calls at all hours of the day and night, so that rest and leisure are often disturbed or non existent. It means also that the practitioner at times has to decide to give priority to certain cases more urgent than others. In so doing it is only right that the man enjoying that priority should adequately make recompense for the extra trouble taken on his behalf.

   Then again some of the work is fairly specialised and requires a high degree of skill and painstaking effort to obtain the best results — e.g., Surgery, Gynaecology, Diagnostics. A fixed salary however generous could hardly act as sufficient inducement to perform work under such conditions.

B. Within limits, the public must have freedom of choice of the man they have confidence in. This in itself is a great safeguard against professional indifference and carelessness.

C. Where fixed salaries are paid it is only human to try to evade inconvenient calls, or to postpone unpleasant tasks, or to spin out the work so that very often two men ultimately are required to do what one could. There is also a serious temptation to accept favours and even bribes in return for special attention given.

   At all events it is quite clear from the accumulated experience in these countries that:-

   (i) Curative veterinary medicine and surgery is best left to private practice.

   (ii) Preventive medicine, research and other routine veterinary services are more satisfactorily performed on a salaried basis.

   (iii) These two methods of remuneration are not irreconcilable, in fact they can and are combined wherever and whenever it seems advantageous.

Veterinary Services in South Africa.

The development of Veterinary Services in South Africa and the present state of these services has been ably described in this journal by Dr. A. M. Diesel.(2)

It is greatly to the credit of the State Veterinary Service of the day that in the early years of the present century, it concentrated the efforts of its small staff in the direction in which it could do most good, namely in preventive measures and in research against the formidable epizootics then prevailing in South Africa. (Rinderpest, Lungsickness, Glanders, Anthrax, Lymphangitis, Horsesickness, East Coast Fever, Redwater, Gallsickness, Heartwater, Scab, etc.).

(2) Jl. S.A.V.M.A. 23 (4) 1953.

That these efforts to a large extent have been successful, is borne out by the fact that some of these diseases have been eradicated while the rest are now under reasonable control.

In those days private practice was unthought of and impossible anyhow, owing to long distances, slow communications, bad roads and particularly to the low value of animals.

As the danger of these epizootics receded the stock increased, not only in numbers, but in quality and in value.

The second world war has also contributed materially in sending up the value of domestic stock.

It was therefore understandable and unavoidable that the demand for curative treatment for all those ills of stock not scheduled as epizootics, and therefore not dealt with by the State Service, should have risen in proportion.

The State Veterinary Service was not equipped to meet this new development, or did not appreciate fully its implication.

It was left to private enterprise to cater for this demand in part at least i.e. in larger centres where a fair living was to be made. The figures given by Diesel illustrate this development very clearly.

In 1920 there were 60 state veterinarians and 18 private practitioners.
In 1952 there were 79 state veterinarians and 165 private practitioners.

In a country where farmers have long been used to doctoring their own animals, it speaks well for the services they have been receiving, that the demand for this kind of service has gone on increasing and will go on doing so as long as more and more valuable stock is being bred and reared.

In order to extend these services to less populated or marginal areas where private enterprise alone finds it uneconomic or too risky to venture, some other plan will have to be evolved. Either the State itself, or organised agriculture through its various boards, or co-operatives, or clubs as in New Zealand, will have to step in and subsidise private practitioners.

The position today is that there is virtually a dual Veterinary Service in the country. On the one hand there is a depleted (as compared with pre-war standards) State Service watching for and dealing with epizootics. (Perhaps on closer examination its present strength may be proved quite adequate). Formidable epizootics fortunately are not prevalent all the time, and it should be feasible to mobilise additional men in case of emergency as is done in other countries.

On the other hand we have a body of private practitioners doing what they can where they can to alleviate sporadic disease, in a purely individualistic and often haphazard way.

The trouble is not that there are two sets of veterinarians working in the country, for it has been shown that they each perform a most necessary function. The trouble is that they do not and can not under present conditions satisfactorily apportion the work

among themselves. There is at present no responsible and authoritative body like the New Zealand Veterinary Service which could undertake this correlation.

It is only too well known that no serious plan of action can be initiated or carried out in the control of diseases like tuberculosis, sterility and mastitis with the present set up. It is also well known that an appreciable proportion of the population cannot obtain veterinary help at all, whether from the one group or the other. One suspects also that a few lucky centres can boast of having a state veterinarian as well as a private practitioner, while the total work available could probably be done by one man quite comfortably.

The belief has been expressed that if the training of veterinarians is stepped up, most of the difficulties will disappear. At any rate it is held, the Department will be able to fill its vacant posts.

Assuming that this could be done, and that the Department was disposed to employ the number of veterinarians necessary to tackle major problems like tuberculosis, etc., would the existing relationship between the two groups be changed? How would that help to bring curative treatment within reach of the rural or marginal areas?

On the professional plane it is fortunate so far that the dealings of the Department with the private practitioner have on the whole been quite cordial. It would be wrong, however, without any sort of investigation, to say that there never has been any clash of interests or friction between the two.

Private practitioners have resented the implied slur of having to be "approved" before being entrusted with tuberculinization and other fairly simple tasks.

The attitude of certain state officials who have held consistently and emphatically that Veterinary Services can be performed only by state veterinarians, may not be intended as a slight to the rest of the profession, but it does create the impression that state veterinarians are a class apart who alone are competent to deal with epizootics. In other countries this differential feeling does not exist. Every veterinarian, after all, gets the same basic training and for that reason can, theoretically, tackle any branch of Veterinary Science. Legitimate specialisation from long experience or special study is of course another matter. When it comes to the all important question of diagnosis, whether it be an epizootic or sporadic disease, the state veterinarian, just as much as the private practitioner, must rely upon and be able to obtain the assistance of an efficient and well equipped diagnostic laboratory.

The remedy.

From whatever angle one looks at it, the present arrangement shows much room for improvement. The dual system as has been shown can give adequate and overall service to the rural and marginal communities, only by joining and combining forces, which would permit a redistribution of available veterinary man-power.

Other countries no doubt have experienced similar difficulties and it would certainly be advantageous to study their various organisations and adopt some of their most successful schemes to our own particular needs. Suggestions from our own ranks will not be lacking if requested.

The need for decentralised diagnostic laboratories with a greatly increased efficiency index to serve all those requiring this important aid, is long overdue. Although this is one of the services which has been grouped among the routine types of veterinary work, it is one undoubtedly in which **urgency** also plays a major role !

There may be other ways of helping the isolated farmer, and if we are to move with the times, these should be explored thoroughly, otherwise the initiative will pass completely from our hands into those of more enterprising "stock remedy" and "feed" firms.

It has been said before that the South African farmer has from sheer necessity been forced to do his own doctoring. If some of this doctoring has had dire results in the past, due to ignorance, one must concede that with modern drugs and antibiotics a lot of good can be done by the discriminating farmer in the way of treatment.

Whether we like it or not we must recognise and accept the fact that the Department of Agriculture has placed at the disposal of the farmer a mass of book knowledge concerning the diagnosis and treatment of disease. Farmers who do not posses a syringe and do not know how to make the usual hypodermic injection, and even an intravenous one — are considered in some districts as rather backward. One could almost say that there is not much left for the veterinarian to do excepting accurate diagnosis of the unusual disease and major surgery.

Acting on this assumption it might be possible to enlist the good will and co-operation of the progressive "longdistance" farmer by placing more responsibility on him in the treatment of simple cases and in the after-treatment of more complicated ones.

By fostering a close personal collaboration between the farmer and his veterinarian — including telephonic advice — the value of the more impersonal advice already freely available to him from Onderstepoort and other sources would be greatly enhanced.

It is more than likely that many veterinarians already act in this way at their own discretion. The point is whether the matter could be gone into and taken a step further and become more widely applicable to the mutual benefit of the farmer and the veterinarians concerned.

The public has repeatedly asked for more veterinary services, and farmers even now are groping in the dark trying to find ways and means (Veterinary co-operatives, farmers' veterinary syndicates, etc.) of attracting those services.

All the government can do is to increase output of qualified veterinarians thereby hoping to solve all difficulties, including those of inadequate salaries within its own Division.

Commissions have been appointed by the Government to investigate all aspects of veterinary work. They have taken and sifted much evidence and produced voluminous reports, but very little change in veterinary policy or outlook has emerged. Perhaps an investigation by the profession itself might be more fruitful, provided it was backed by suitable action.

Isn't it time in any case that the veterinary profession in South Africa took a good and impartial look at itself and showed that it is alive to the changing times and their needs? If it appears that a change is advisable and the proposals put forward are sound, they must eventually appeal to the public and their adoption step by step will be only a matter of time.

The question is: are we as a profession big enough to face up to our responsibility and give effect to its dictates?

Finally let us remember that the shortage of veterinarian will not endure for ever. Instead of looking for strength in this precarious, unsatisfactory and temporary phase, we must look for strength rather in increased numbers to the point where we can effectively cope with all the work there is.

It is an exceedingly unhealthy state of affairs for one or other likely employer of veterinarians to have to wait and pray for a depression or the so-called "saturation point in private practice" (in other words a glut of veterinarians) in order to be able to fill its vacancies. As a profession we must take our "knocks" in any economic recession with the rest of the population, but should plan now to prevent anyone from exploiting such circumstances to our detriment.

It is firmly believed that such a plan should include combining and reallocating of veterinary work to offer a better all round service to the public. Harmful rivalries and odious comparisons within the profession will then disappear to a large extent.

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AUSTRALIAN ITCH. A NOTE ON ITS OCCURRENCE IN SOUTH AFRICA.

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An ever increasing number of enquiries have been received over the last few years from farmers in many parts of the Union regarding an abnormal fleece condition amongst Merino sheep which is generally referred to as "Australian Itch". It is mainly during the warmer months of the year that the animals appear to suffer from a persistent mild irritation of the skin. This manifests itself by biting and scratching at the more accessible regions of the body, such as the flanks and quarters, and affected animals rub themselves against trees, posts, fences and other objects to which tufts of wool may be found adhering. The fleece soon acquires a ragged appearance somewhat similar to that characteristic of lice or ked infestation. The wool tips become dry and stringy with locks of wool hanging from the sides and flanks and small easily removed tufts of partially detached fibres protrude from the fleece. The wool cannot be parted easily at this stage due to the presence of an abnormal number of cross fibres and this adversely influences its combing properties and hence its sale value.

Sheep suspected of suffering from this condition were submitted to Onderstepoort for investigation during March 1954. Histological examination of skin biopsies showed the presence of a distinct dermatitis with hyperkeratosis, the proliferation not being very marked, however. A close investigation of the wool fibres revealed malformations along their length consisting of uneven thickenings, constrictions and indentations indicative of their being affected during growth and these seriously detracted from their tensile strength.

Skin scrapings from various parts of the body were taken on numerous occasions. For the purpose the wool was clipped by means of curved scissors as close to skin level as possible over an area of three to four inches square. A few drops of white oil were applied and lightly rubbed in, the area was then vigorously scraped with scalpel and the material so collected transferred to a glass slide for microscopical examination. Only after a period of almost four months during which improvements in technique were gradually effected was it possible to demonstrate the presence of minute acari of the genus **Psorergates** Tyrrell.

These mites from sheep constitute a new record for South Africa and are very closely related to the species **Psorergates ovis** Womersley described from sheep in Australia where they are stated to be responsible for a skin condition very similar to that now described amongst Merino sheep in South Africa (Carter 1941).

The mites are extremely small, slightly less than half the size of **Sarcoptes acabiei** and about one third that of **Psoroptes ovis.** The adults are subspherical with four pairs of equally well developed legs armed with a pair of strong claws. The head is nearly circular with a pair of palps each bearing a short terminal spine. The sexes may be differentiated by the presence of two long posterior bristles in the male and two pairs in the female, arising from distinct tubercles. The larvae and nymphs are almost circular, the six legs of the former and eight of the latter so short as to resemble stumps and the long abdominal bristles are absent.

During a recent investigation in the Karoo the mite was found in several Merino flocks. A number of flocks was encountered, however, amongst which many sheep were seen showing similar symptoms but time did not permit of a thorough examination. It must be assumed that the condition is widespread in the Union in all probability as was found to be the case in Australia.

The mite is difficult to demonstrate on sheep, especially in the case of recently infested animals. The infection appears to spread very slowly through a flock and it may take several years to build up a heavy infestation. Lambs and young animals were found to be apparently free of infection in flocks where many advanced cases were encountered amongst older sheep.

Little difficulty is experienced in detecting and diagnosing chronic cases. Apart from changes in the fleece the skin is thickened and shows numerous cord-like hardened wrinkles. On removing the wool from such areas the skin has a greyish appearance with alternating paler patches largely confined to the ridges which are covered with whitish scales and scurf and may show some proliferation. Occasional small moist areas a few millimetres in diameter may be present but apart from this no pronounced skin lesions are apparent.

Little is known at present of the control aspects of this problem in South Africa but it is reported in the Australian literature on the subject (Graham 1943) that a cure can be effected by the use of lime-sulphur dips.

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PASTEUR AND THE DESTRUCTION OF RABBITS IN AUSTRALIA.*

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The more one reads of Pasteur and his works, the more one is struck by the versatility of the man. He investigated crystal formation, diseases of silkworms, poultry, animals, and man and, in this article, he outlines a method of ridding Australia and New Zealand of their unwanted rabbits. The subject is of topical interest because of the success attending the deliberate introduction of myxomatosis virus among the rabbits of Australia and its accidental introduction among those of Europe.

The French newspaper, "le Temps", of 9th November and 2nd December, 1887 published the following official notice, emanating from the Government of New South Wales (abridged):-

"The sum of £25,000 will be paid to anyone who will, at his own expense, demonstrate a method of ridding the colony of its rabbits on condition that the method, after a year's trial, receives the approval of a Government Commission and that it is inoffensive to domesticated animals".

Pasteur's reply was published in the issue of "le Temps" of 29th November (abridged):-

"Up to the present, mineral poisons, chiefly phosphorus compounds, have been used. But these can kill only at the spot where deposited whereas a search should be made for a method that would set up a disease that would become enzootic in the rabbits.

"The microbe of fowl cholera, which can devastate a fowl run, is of extremely high pathogenicity for the rabbit. If food, soaked in culture, is placed near runs, the rodents will eat it, will become ill and die and will pass the disease to their fellows".

It is somewhat disappointing to note that Pasteur wrote this letter without first having carried out experiments, even in the laboratory. However, he proceeded to do so immediately. In one test, 5 rabbits in one cage were allowed to eat cabbage leaves infected with the microbe of fowl cholera; immediately after they they had consumed the food, 3 further rabbits were introduced. All of the first five were dead within 20 hours; one of the three that had not partaken of the infected food died in 19 hours and the other two survived. In another test, 4 rabbits were allowed to eat infected food and 4 others were then placed with them. In this experiment the bodies of those that died were not removed

* Sur la déstruction des lapins en Australie et dans la Nouvelle-Zélande. L. Pasteur, Ann. Instit. Pasteur (1888), 2, 1-8.

from the cage. All the "fed" animals died within 24 hours and all the "controls" within 6 days.

Pasteur further showed that a wild rabbit was susceptible when fed whereas pigs, dogs, goats, sheep, horses, donkeys, and rats were not.

On 3rd December, Pasteur received a letter from Mme Pommery (of champagne fame) saying she had stocked a wall-surrounded enclosure with rabbits to provide sport for her grandchildren. The ever-increasing colony was now a menace, she wished to destroy it, and placed the location at Pasteur's disposal. He took advantage of the offer and started the campaign of destruction on 23rd December. On 27th December, Mme Pommery wrote to say that all the rabbits were dead.

From further corespondence, it would appear that "perfidious Albion" had criticized the method "but" says Mme Pommery "M. Pasteur poisons the ordinary food of these rabbits and in the days that follow nothing stirs; 'tout est fini, tout est mort' ".

Fenner (1954) gives the reason for the non-acceptaince by the Australians of Pasteur's method. "The Australian quarantine authorities vetoed the proposal, however, because the bacillus is pathogenic to domestic animals and birds".

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VIBRIOSIS AS A CAUSE OF HERD INFERTILITY IN SOUTH AFRICA.

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The Vibrio foetus organism is not a newcomer to this country. It was first reported as a cause of abortion in cattle in the Union by Snyman (1931) who expressed the opinion that "the infection is more widely spread and causes more abortion than is generally accepted". Subsequently Canham (1948) investigated a number of outbreaks of bovine abortion in Natal and identified Vibrio foetus as the cause in every case. He too concluded that vibrionic abortion is very prevalent in Natal and in other parts of South Africa.

Until recently, however, the role played by Vibrio foetus in the causation of bovine infertility has not been recognised.

Plastridge, Williams and Petrie (1947) were the first to point out that a lowered conception rate might be found in infected herds, and when Stegenga and Terpstra (1949) definitely established that besides causing abortion, this organism is also responsible for enzootic sterility in Holland, its part in lowering reproductive efficiency was proved beyond doubt.

The reason for failure to identify this organism — which has been known since it was first described by M'Fadyean and Stockman in 1909 and 1913 — with herd infertility until recently, must be attributed to the fact that, while it can be readily isolated from aborted foetuses and fresh placentas, great difficulty is experienced in recovering it from infected cows and heifers.

Vibrio foetus is not constantly present in the genital secretions of affected females. It dies off rapidly in the presence of contaminants and cannot be sent over a long distance to the laboratory, especially in a warm climate. Great difficulty too is experienced in culturing it and keeping strains established.

In South Africa the problem of diagnosis is further complicated by the presence in the Northern provinces of the Union of contagious epididymitis and vaginitis (epivag) and of trichomoniasis, both of which clinically bear a very close resemblance to vibriosis.

Furthermore there are indications that vibrio foetus appears to be gradually losing its role as an abortifacient and to be assuming an increasingly important part in the production of infertility. It is significant that in several of the herds in which it was found to be responsible for poor breeding results there was no history of abortions having been observed.

DISTRIBUTION.

Van Rensburg (1953) described a form of contagious anterior vagino-cervicitis which was not confined to the epivag areas, but

was present in various districts throughout the Union, and presented a syndrome not unlike that of vibriosis. The possibility of a double infection of both vibrio foetus and an unknown virus being present simultaneously in some herds and of synergism between these two agents, was also suggested. The investigations made during the past year lend support to this theory, and have also shown that vibriosis is so widely prevalent and is causing such serious impairment of breeding in many herds that it must be regarded as being secondary only to epivag as a cause of infertility in cattle in the Union.

By the application of the agglutination test to vaginal mucus, as well as by culturing and microscopic examination vibrio foetus infection has now definitely been established as a cause of infertility in herds in all four the provinces of the Union. Material from many other herds has given suspicious reactions and in view of the many factors which militate against confirmation of the diagnosis by laboratory tests, it can be assumed that most, if not all of these suspected herds are also infected. In addition the history and clinical picture presented by numerous other herds that were examined or on which advice was sought on account of their poor fertility also suggest vibriosis as the probable cause.

The disease if far more widespread than epivag, and at present the Western Cape is the only part of the Union in which it has not yet been diagnosed. The observations have shown that it is more prevalent in certain localities or districts than in others, and in nearly all cases its presence in several herds in the same neighbourhood could be traced to the introduction of breeding animals from a common source.

The dissemination of vibriosis throughout the country is greatly favoured by the pernicious and unwholesome but nevertheless extensive speculation and trafficking in animals, which unfortunately appears to have become an integral part of dairy farming in the Union. A contributory factor is the incomprehensible gullibility of some farmers, which blinds them to the many latent dangers that may be hidden in apparently healthy animals that are offered for sale by public auction.

ECONOMIC ASPECT.

By reason of the many different methods in which vibrio foetus exerts its harmful effects on breeding the sum total of the losses it produces in infected herds may, from the economic view point, render it a more important disease than any other reproductive infection.

In many countries it is considered to constitute a more formidable breeding problem than brucellosis. Thus Jepsen, Rasbech and Szabo (1951) estimate that it costs Danish farmers £1,500,000 per annum. In the Union the present indications are that if allowed to spread unchecked, it may very soon eclipse both brucellosis and epivag.

The comparatively low abortion rate caused by this organism is of small significance when compared with the serious interference with breeding for which it is responsible.

Although cows may rapidly develop an immunity to vibrio foetus and generally do not abort more than once, the breeding efficiency of many never appears to be fully restored. When once it is established in a herd, it seems to persist indefinitely affecting principally heifers of breeding age and clean cows newly introduced into the herd.

One herd (A) has experienced serious breeding trouble continuously for 9 years, and in the past 12 months the owner only got 16 calves from his 60 cows.

In another (B) where it has been present for 6 years, a pregnancy examination of 52 cows that had been served repeatedly and were all presumed to be in calf, revealed that only 19 were pregnant.

In a third herd (C) the owner never experienced any breeding trouble until he bought a new bull in 1950. The herd from which this bull was obtained was also subsequently found to be infected. Cows and heifers served by him showed a vaginal discharge and pain, one to two days after service. Although no abortions were observed, the owner suffered severe loss due to the cows and heifers repeatedly returning to the bull. Within a few months the other two herd bulls were also infected, and when this herd was first examined in 1953 many cows that had calved more than a year ago and had been repeatedly served, were not in calf yet. The owner's records showed that only 14 calves were born out of his 55 cows during the previous year.

TRANSMISSION.

As far as is known Vibrio foetus occurs only in the genital tract of affected animals, and the disease is essentially of a venereal nature, being spread from bull to cow and vice versa during coitus. Infection can also be transmitted to the female by inseminating with semen from infected bulls.

There still appears to be some doubt as to whether infection can be contracted by any other than the genital route. Plastridge and co-workers (1951) found that heifers can become infected before service. Attempts made by them to transmit the disease per os and by instillation into the conjunctival sac failed. Nevertheless they consider ingestion and direct contact as possible methods of infection.

Lawson and Mackinnon (1952) found that the infertile condition caused by Vibrio foetus was not transmitted by ordinary day to day contact in the cow shed, and they did not succeed in producing it by feeding healthy heifers with vibrio cultures or by instilling such cultures into the conjunctival sac.

In our observations several heifer calves of 4 to 12 months of age in infected herds have shown evidence of anterior vaginitis and the muco-purulent discharge of vibriosis. In one of the herds quoted above, artificial insemination was started nine months ago, and notwithstanding the fact that they had never been served or inseminated several heifers were recently found to be infected.

The results obtained by Lawson and Mackinnon cannot be regarded as conclusive. Their experimental animals were tied up in the stable, and there was not the same opportunity for contact transmission as in a herd kept under natural conditions, nor is there the same likelihood of mechanical transmission by insect vectors in Britain as in tropical and subtropical countries. Unless, therefore, strong evidence to the contrary is produced, it must be assumed that there is a probability of transmission by other methods than coitus or insemination, even though the route of infection is confined to the genital tract.

This aspect is of great importance from the point of view of control. One of the methods advocated is to build up a clean herd by breeding young heifers to a bull that has not previously served. The possibility, however, of virgin heifers becoming infected at an early age by methods other than coitus, would nullify all attempts to clean up a herd in this manner.

PATHOGENESIS.

In the female vibriosis may manifest itself in almost every possible method of interference with breeding, and in every phase of reproduction from service to parturition.

The presence of the disease in a herd is characterised by a combination of a number, if not all, of the following syndromes:-

(1) Aberrations in the oestrous cycle.
(2) Pathology of the tubular genitalia.
(3) Early death and resorption of the foetus.
(4) Early undetected expulsion of the foetus.
(5) Late abortions.
(6) Birth of weak or dead calves at full term.
(7) Retention of the placenta.

(1) *Aberrations in the oestrous cycle*:-

The interference with the sexual cycle may be of such a varied and complex nature that the investigator is frequently in the first instance misled into suspecting that he is dealing with a severe type of functional infertility, every form of which may be encountered in a vibrio infected herd. The most frequent types are:-

(a) *Irregularity in the duration of the oestrus cycle*: The observant owner who keeps accurate breeding records will report marked variations in the length of the cycle of some

cows. While it may be abnormally short in a few cases, the most common deviation seen is an increase in the length of the cycle which may be 25 or 26 days and even longer.

(b) *Anoestrus*: The animals go into a period of anoestrus for no apparent reason. This is particularly frequent in the post parturient period, cows and heifers failing to show a return of oestrus for as long as 6 to 8 months after calving. A very common complaint in infected herds too is that unbred heifers that should be ready for service, fail to show heat. Anoestrus and pathology of the genital tract which prevents conception, unduly prolong the inter-calving period. It is, therefore, not uncommon to find a good proportion of cows and heifers in an infected herd to be not pregnant a year or more after the last calving. Similarly heifers of 3 and 4 years old may still be barren despite frequent servicing, and a good proportion of these have ultimately to be eliminated on account of complete sterility.

(c) *Suboestrus* (Silent Heat): Rectal examination of animals reported to be in anoestrus reveals in many the presence of a well developed fresh corpus luteum which is obviously a C.L. periodicum and not a C.L. persistens. This indicates that there must have been recent oestrus and ovulation which was not detected.

(d) *Corpus luteum persistens*: One of the most common findings in pregnancy examination of an infected herd, it that a number of cows served months previously and believed to be in calf, are not pregnant. Their failure to come into heat is mostly due to a persistent corpus luteum. This is either a C.L. periodicum persisting after the last heat period, or a C.L. graviditatis in cases where conception did take place, but ended in expulsion or resorption of the foetus.

(e) *Static ovaries*: This is another frequent cause of anoestrus. It may be seen at any time, but in infected cows it is most common after calving, and in heifers at the time when they should be ready for service.

(f) *Delayed ovulation and anovulatory oestrus* have also been observed in an unusually large percentage of cases in infected herds.

These abnormalities in the sexual cycle cannot be correlated with the nutritional, climatic or environmental factors usually associated with funtional sterility. Their constant presence in vibrio foetus infected herds can, therefore, only be attributed to that organism.

(2) *Pathology of the tubular genitalia*:-

Inspection of the vagina by means of a speculum immediately convinces the investigator that he is not here concerned with functional sterility, but with a venereal infection.

The principal lesion seen in vibriosis is an anterior vaginitis which may or may not be accompanied by inflammation of the pars vaginae of the cervix. In a small minority of cases there may only be a cervicitis in which case the reddened mucosa covering the vaginal portion of the cervix shows a clear line of demarcation from that of the vagina. The vaginitis may extend as far back as the hymeneal ring and in some cases this midportion may be more severely affected than the anterior vagina.

The vagino-cervicitis is generally accompanied by a secretion of muco-pus from the vaginal and cervical walls, and this may be seen oozing from the inflamed mucosa, especially if the speculum is held in position for 10 to 20 seconds.

The anterior vagina thus presents a picture which is almost identical with that seen in epivag. In vibriosis, however, the inflammation never appears to be quite as intense or to show the same tendency to haemorrhage as it does in epivag.

The muco-purulent discharge in vibriosis varies in colour from creamy to light yellowish or grey. It does not show the same density and marked tenacity and cohesion as that of epivag, which causes it in the latter to come away in long strings, but is more often passed in large blobs. Neither is it as copious or liable to cause the same degree of soiling of the buttocks as that of epivag. It is not constantly being discharged and can in the majority of cases only be detected by examination with a speculum.

The inflammation and mucoid-pus may be seen in the anterior vagina within 24 hours after service. It may subside and even appear to clear up completely within a few days, only to reappear again subsequently, especially after service by an infected bull. Absence of vaginitis and secretion should not, therefore, be accepted as evidence of freedom from infection.

Judging from the reports of other workers and the description of the disease in the literature, it does appear as if the vagino-cervicitis produced by vibriosis is far more severe in South Africa than in other countries.

The possibility of its being associated with an unknown virus or with epivag cannot be disregarded.

There is not the same tendency with vibrio foetus to produce the complications like salpingitis, peri-oophoritis and peritonitis which are so frequently seen in epivag. Nor does it produce a degree of metritis which can be detected by clinical examination. There is, however, the possibility of a very mild form of catarrhal endometritis, which may interfere with conception and nidation. This may account for the large number of cases of cows and heifers with a normal oestrous cycle and with no detectable pathology of the genitalia failing to hold to service or insemination with fertile semen.

(3) *Resorption of the foetus*:-

The most common complaint of owners of infected herds is that a large proportion of cows and heifers appear to settle quite

normally after service, but that they subsequently show an unexpected return of oestrus after several months. Normally the fertilised ovum is not firmly embedded until approximately the sixth week of pregnancy. All the available evidence indicates that fertilisation may take place as usual in the Fallopian tube, but that the vibrionic infection creates conditions in the uterus that are unfavourable for firm attachment of the fertilised ovum when it reaches the uterine horn. The result is that it dies and is resorbed within the first two months of pregnancy.

In the course of rectal and vaginal examinations in infected herds, two cases were encountered in which embryonic and placental debris were expressed from the uterus during palpation of the organs.

(4) *Early undetected expulsion of the foetus*:-

Instead of being resorbed, the foetus may be expelled, and it is certain that a large number of early abortions take place without being detected.

The owner's report of cows that were presumed to be several months pregnant showing an unexpected return of heat is frequently accompanied by the information that the animals had been examined and pronounced to be in calf. In other cases again the veterinarian doing the periodic pregnancy examination discovers that a cow which he at the previous examination found to be 2 or 3 months in calf, is now barren, the foetus having been lost in the interval between the two pregnancy tests. This often causes the veterinarian concerned great embarrassment and even loss of prestige, especially where the presence of vibriosis is not suspected, since the natural tendency is for the owner to question the ability of the veterinarian, rather than to suspect a pathological state.

(5) *Late abortions*:-

In view of the above one cannot accept some of the text book accounts to the effect that vibrionic abortion only takes place in late pregnancy. Such reports are probably based mainly on the statements of owners who only observe the late abortions.

There is still an unfortunate tendency with farmers to ascribe all abortions to Brucella abortus, and to disregard the two lesser known causal factors, namely Vibrio foetus and Trichomonas foetus. These two only enter into the picture when the abortions occur in known brucellosis-free herds or when it continues in herds that are being systematically immunised with strain 19 vaccine. In the latter case there is a tendency with many to ascribe the apparent failure of such immunisation to stop the abortions to inefficacy of the vaccine rather than to suspect some other causal factor.

The appearance of vibriosis in a herd is often, though not constantly, heralded by a spate of abortions. In a recent infection cows of all ages may abort, but as immunity is developed the older cows tend to go to full term, and the abortions are noted more amongst heifers and newly introduced susceptible cows.

The incidence of abortion is subject to great variation. Plastridge and co-workers (1951) state that it ranges from 4 to 20 per cent, although in one herd it was as high as 30 per cent. In South Africa the owners of several of the infected herds could supply no history of abortion, and they asked for an investigation only on account of the serious impairment of the breeding efficiency of the herds.

(6) *Birth of weak or dead calves*:-

Apart from abortions during late pregnancy, a fairly common phenomenon in vibriosis is cows calving a week or two before due date. Such premature calves are usually very weak and some are born dead. Apart from this an abnormally high proportion of calvings at full term also yield dead or weak calves, and many of the latter do not survive for long.

(7) *Retained Placenta*:-

The Vibrio foetus organisms show a tendency towards localisation in the pregnant uterus where they produce lesions, chief amongst which is a placentitis. This is responsible for retention of the placenta in an abnormally large percentage of cases, both in cows that have aborted and those that calve at full term.

Plastridge and co-workers (1915) found the incidence of retained placenta in one infected herd to be 7 per cent.

While no accurate data are available for this country, it would appear from the reports of farmers that the incidence of placental retention is appreciably higher in South Africa than the figure given.

This complication also tends to prevent conception at the subsequent breeding, and it is one of the factors responsible for the long intercalving periods which form a characteristic feature of vibrionic infection.

THE BULL.

When once the bull has contracted the disease by serving an infected female he carries and transmits the infection for an indefinite period. There is no other known method of transmission of Vibrio foetus to the bull excepting by coitus and service into an infected artificial vagina.

The organism appears to be localised in the prepuce as well as in the genital tract, and it can be recovered both from preputial washings and from the semen.

No macroscopic clinical lesions in any part of the genitalia of bulls with vibriosis have as yet been described, and it is impossible to establish the infection in the bull merely by a clinical test.

The examination, however, of the semen of infected bulls suggests that there is a more rapid deterioration in the quality of their semen than one would expect in the case of a bull with a completely normal genital tract. For instance, the examination

of the semen of the three sires of herd C quoted previously, yielded the following results:-

	Bull Number		
	1	2	3
Libido	good	good	good
Volume	5.5 c.c.	2.5 c.c.	4.8 c.c.
Appearance	milky	watery	watery and flocculent
pH	7.5	7.0	7.8
Motility	4	3	2
Methylene blue reduction time	18 mins.	22 mins.	40 mins.
Density per cu. mm.	1,440,000	990,000	1,065,000
Proportion live sperm	41%	48%	33%
Proportion abnormal sperm	33%	34%	37%

Collection of these semen samples was made on the same day, and number 3 is the bull suspected as being the one that introduced the infection three years previously.

Although they show no clinical evidence of the disease the fertility of most sires in infected herds drops in the course of time. This is largely due to the excessive drain on the bulls through having to serve infertile cows repeatedly.

Notwithstanding this, the possibility of a mild catarrh of the male genital tract cannot be disregarded. Mere overwork cannot on its own be held responsible for all the changes, such as the flocculent nature of the semen of number 3, which are frequently seen in ejaculates from infected bulls.

DIAGNOSIS.

The laboratory diagnosis for vibriosis is culturing of the organism and the agglutination test applied to vaginal mucus from infected cows. The serum agglutination test has proved very unreliable.

For culturing, samples must be collected in an aseptic manner and delivered at the laboratory without delay. The forwarding of samples by rail or post is therefore not recommended. Culturing of the organism is thus of very limited value under South African conditions.

The agglutination test of vaginal mucus promises to be the most suitable one when once the necessary organisation for doing this as a routine test has been created.

Under present circumstances it is desirable that every endeavour be made to diagnose the disease in the field. The history

and clinical picture are generally sufficient to arouse a very strong suspicion, and when suitable material is available, the diagnosis can be confirmed by microscopic examination of smears made from aborted foetuses, diseased placentas and the genital tract of cows and heifers ol low fertility. Smears made from the stomach contents and abomasal mucosa of a newly aborted foetus show the organisms more readily than any other. In all cases it is essential that the material be quite fresh and that smears be stained immediately.

The organism is gram negative and can be stained by the methods of Hansen or of Köster as described by Van Drimmelen (1953).

The vaginal mucus of some infected cows may show vibrios continuously, but in many they can only be detected at oestrus. This is, therefore, the best time to make smears from the mucus.

Whatever diagnostic method is employed, a negative result can never be accepted as proof of freedom from vibriosis. It is usually necessary to collect and examine a large number of samples before the organism is found.

CONTROL AND TREATMENT.

The absence of a reliable diagnostic test that will yield a conclusive result in individual animals, and of visible characteristic symptoms of the disease renders every clean herd liable to infection by the introduction of breeding stock.

For prevention, stock owners should be advised to obtain their breeding animals only from herds where no breeding trouble is prevalent. New bulls can be tested by allowing them to serve a few clean cows or heifers and to examine these with a speculum for evidence of anterior vaginitis and cervicitis during the first two weeks post service. Cows and heifers that are introduced should in the first instance be examined per vaginam. If apparently clean, they should then be served by a clean bull who in turn must subsequently be tested out on clean females as described above.

Where various types of venereal diseases are as widely prevalent as in South Africa natural service at all times involves a risk, and the only sure prevention against vibriosis and allied infections is by practising artificial insemination with semen from tested bulls. This too is at present the only method which offers any hope of eradicating the disease from an infected herd. At present several owners of infected herds outside areas where organised A.I. services are available are applying this method of breeding on their own and with very good results.

The lesions in the genitalia and the marked aberrations in the sexual cycle which characterise this disease militate against good results soon after the introduction of A.I. in an infected herd and owners must be warned not to expect normal conception rates within the first twelve months.

Regular veterinary examination of the herd is desirable in order to apply the appropriate treatment for the different types of oestrus irregularities that may be encountered.

Three to four months complete sexual rest is recommended for all cows and heifers that have calved or aborted and those that show vaginitis.

Every vibrio infected herd contains a good proportion of cows and heifers with no visible pathology of the genitalia and no irregularity of the oestrous cycle. Yet they fail to hold to repeated inseminations. It is presumed that conception is prevented in such cases by a low grade endometritis, and for this type intra-uterine treatment with antibiotics is recommended.

Since Easterbrooks and Plastridge (1950) first reported that intra-uterine infusions with streptomycin appeared to be effective in overcoming sterility associated with vibriosis several workers have obtained good results with this method of treatment.

A combination of streptomycin 1 gm. and penicillin 300,000 i.u. in 20 ml. sterile water is infused by means of an insemination pipette during oestrus, and approximately half is placed into each uterine horn. The cow is inseminated at the next oestrus, or even during the same heat. In the latter case the treatment is applied either two hours or more before or one to 48 hours after insemination. In this manner it cannot have a harmful effect on the sperm or the fertilised ovum, since sperm are in the Fallopian tubes within $2\frac{1}{2}$ to 5 minutes after insemination and the fertilised embryo only reaches the uterus on the third or fourth day.

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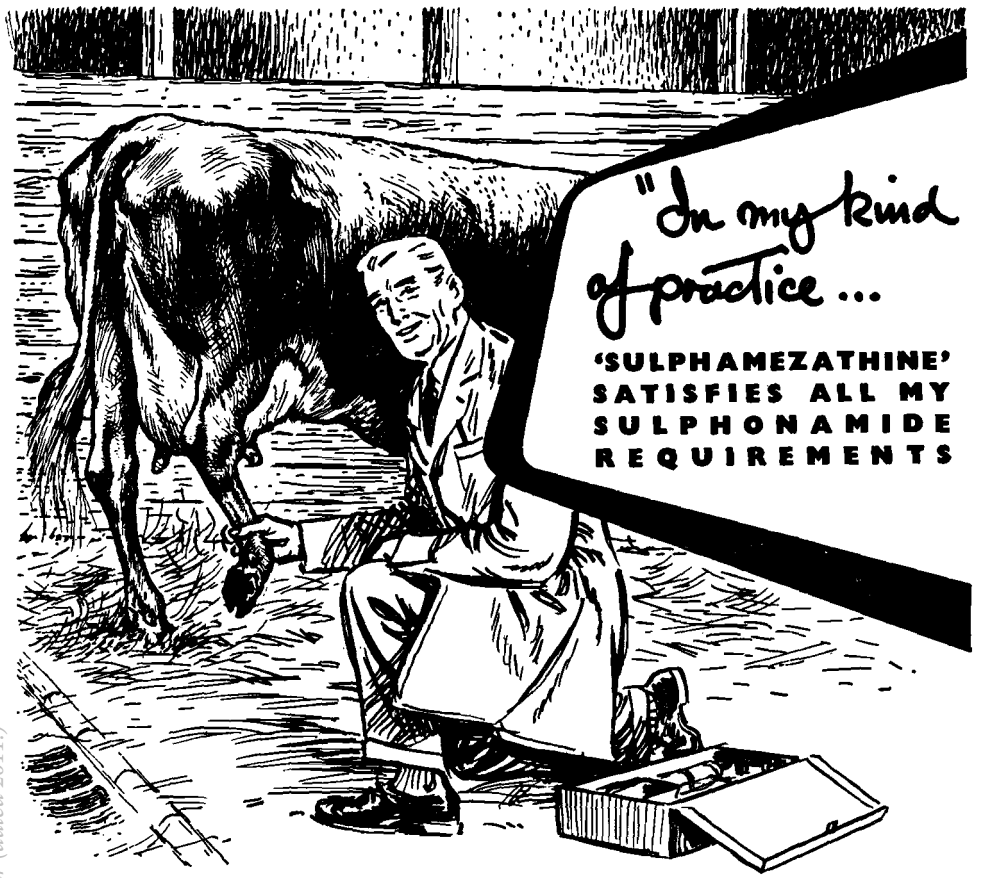

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THE ARTIFICIAL TRANSMISSION OF *GLOBIDIUM BESNOITI* MAROTEL, 1912, TO CATTLE AND RABBITS.

J. W. POLS,
Onderstepoort.

Bovine cutaneous globidiosis is a protozoal disease caused by *Globidium besnoiti* Marotel, 1912. According to Hofmeyr (1945) the clinical syndrome can be divided into three stages. The primary stage is characterised by fever, photophobia, lachrymation, a variable degree of oedema of the subcutaneous tissues of one or more limbs and the dewlap, inappetence, general weakness and swelling of the superficial lymphatic glands. During the secondary stage severe anasarcous changes occur. The skin loses its elasticity, becomes thickened, firm and wrinkly. It is liable to crack, thereby paving the way for secondary infection. A rhinitis accompanied by a mucopurulent discharge is frequently observed. The tertiary or *seborrhoea sicca* stage is characterised by a variable degree of depilation and by a thick scurfy layer on the skin. The convalescent period may persist for several months. Recent observations have shown that recovered animals remain carriers for life.

The diagnosis is based on the clinical symptoms and on the microscopical demonstration of the globidial cysts in the cutis and subcutis. Macroscopically these cysts are seen in variable numbers in the mucous membrane of the nose, larynx and trachea as well as in the subcutaneous tissues. In smears prepared from crushed cysts or from scrapings of the skin crescent-shaped spores can be demonstrated.

The disease has been recorded in Europe from Southern France, Besnoit and Robin (1912), and Portugal, Borges and Franco (1916), and from Africa in the Sudan, Bennet (1933), Belgian Congo, Herin (1952), Angola, Leitão, J. L. da Silva (1949) and South Africa, Schulz and Thorburn (1940), Hofmeyr (1945). Although the mortality rate does not exceed 10 per cent, it may nevertheless be responsible for severe economic losses. Affected animals lose condition, cows may abort, bulls often become sterile, and the hides are valueless for tanning.

The natural mode of transmission is unknown. It has been suggested by Montgomery (1910), Bennett (1933) and Hofmeyr (1945) that transmission follows contact between susceptible and affected animals. Barrairon (1938) is of opinion that arthropod vectors are responsible for the transmission. Successful artificial transmission to cattle has been achieved by Cuillé and Chele (1937) and Barrairon (1938) by the intravenous injection of blood collected during the primary stage of the disease. These observations naturally suggested that investigations should be continued on these lines.

An opportunity for such studies arose during December, 1953, and January and February 1954. Animals in the primary stage of

TABLE I
ARTIFICIAL TRANSMISSION OF *GL. BESNOITI* TO CATTLE

Animal No.	Origin	Donor	Date of Infection	Dose of Blood	Incubation period in days	Microscopical observations: Trophozoites in smears — Date	Trophozoites in smears — Results	Cysts in skin sections — Date	Cysts in skin sections — Results	Clinical symptoms	Remarks
Cow 6793	Lydenburg Received 31/1/53	Naturally infected ox which died from globe-diosis.	28.12.53	1000 c.c.	?	—	—	20.1.54	+	No fever or oedema of sub-cutaneous tissues.	Very mild case.
Ox 6840	Rustenburg Received 29/1/54 Natural Case		—	—	—	1.2.54	Gland +	18.2.54	+	Fever: 103°F 28.1.54 Oedematous swell-ling of front limbs below the knees and dewlap.	Relatively mild symptoms. Skin after 2 months showing sclero-derma accom-panied by de-pilation.
Heifer 6839	Rustenburg Received 29/1/54	6840	28. 1.54	1000 c.c.	10	8.2.54	Blood +	20.2.54	+	Febrile reaction for 3 days. Highest temperature 106.8° F. Oedematous swelling below the knees from 12.2.54 to 16.2.54.	Mild reaction showing slight scleroderma and depilation.
Bull 6851	Pretoria district. Received 2/2/54 Natural Case		—	—	—	4.2.54	Blood + Gland +	9.2.54	3+	Febrile reaction for 3 days. Highest temperature 106.6° F. Oedematous swelling of all limbs, dewlap and skin of thorax from 2.2.54 to 6.2.54.	Acute reaction accompanied by anasarca and scleroderma. Died on 14.3.54 in a very cachectic condition.
Ox 5895	Available animal	6851	2. 2.54	1000 c.c.	6	—	—	8.3.54	+	Febrile reaction for 3 days. Highest temperature 106°F. No swellings noticed.	Very mild case.

the disease were reported from the Lydenburg, Rustenburg and Pretoria districts. Blood transfusions from these animals into susceptible cattle were undertaken either on the farms or immediately after their arrival at Onderstepoort. Details of the experimental observations are listed in the appended Table No. 1. Daily blood and gland smears stained with Giemsa were examined during the primary stage of the disease, while skin sections stained with haemalum eosin, prepared from skin biopsies from the dewlap and/or escutcheon were examined over a period of 12 weeks.

It will be noticed from Table No. 1 that the blood donor of cow No. 6793 died from globidiosis. The naturally infected ox No. 6840 developed relatively mild symptoms, while bull No. 6851 suffered from the severe form of the disease. It died 40 days after the commencement of the fever. In the latter two animals extracellular trophozoites of *Gl. besnoiti* could be demonstrated in very

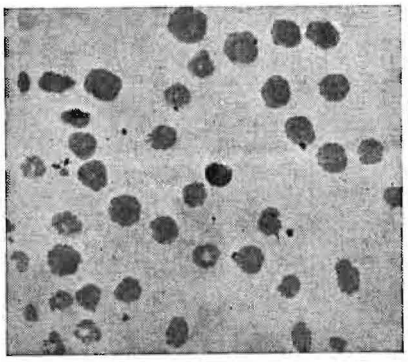

Fig. 1.
An intercellular trophozoite in a blood smear of Bull 6851.

rare numbers in blood and lymphatic gland smears. In the ox young globidial cysts appeared 18 days and in the bull 7 days after the first appearance of clinical symptoms. These observations confirmed the tentative diagnosis of globidiosis made at the time when the blood transfusions were performed.

The observations on the three recipients can be briefly enumerated as follows:- Cow No. 6793 developed an inapparent form of the disease. The transmission would have been regarded as negative had skin sections from the dewlap and the escutcheon not been examined regularly. Young cysts were observed in very rare numbers 23 days after the blood transfusion.

Heifer No. 6839 showed a rise in temperature 10 days after the artificial infection. The fever persisted for three days and moderate oedematous swellings of the subcutis developed below the knees. On the second day of fever extracellular trophozoites of *Gl. besnoiti* in very rare numbers were encountered in blood smears. Young cysts were found in skin sections thirteen days after the initial rise in temperature.

TABLE II . SERIAL PASSAGE OF *GL. BESNOITI* IN RABBITS AND CATTLE

Generation	Animal No.	Donor	Date of Injection	Dose of Blood	Fever commenced on day	Microscopic examination of blood smears: Date	Microscopic examination of blood smears: Trophozoites	Clinical symptoms	Duration of disease in days	Remarks
I	(R) R.B.	Ox 6840	28.1.54	5c.c. i.p.	+3	10.2.54	+	Hind limbs and base of ears very swollen. Temperature not taken.	3	Killed in extremis
II	(R) 2	(R) R.B.	10.2.54	3c.c. i.v.	6	16.2.54 17.2.54	+ +	Hind limbs and base of ears swollen. Highest temperature 106.2°F.	2	Died
III	(R) 24	(R) 2	18.2.54	10c.c. s.c.	14	4.3.54 5.3.54 6.3.54	2+ 2+ 2+	Hind limbs and base of ears swollen. Highest temperature 106.8°F.	3	Died
IV	(R) 39	(R) 24	4.3.54	2½c.c. s.c.	13	18.3.54 19.3.54 20.3.54	+ 2+ 2+	Hind limbs and base of ears swollen. Highest temperature 107°F.	3	Died
V	(R) 54	(R) 39	19.3.54	2½c.c. i.p.	8	29.3.54 30.3.54 31.3.54 1.4.54	+ – + 2+	Hind limbs and base of ears swollen. Highest temperature 106.2°F.	4	Died
I	(R) R.T.	Ox 6840	28.1.54	10c.c. s.c.	16	14.3.53 15.3.54	2+ 2+	Hind limbs, base of ears, front limbs and back very swollen. Highest temperature 105.8°F.	2	Killed in extremis
II	Ox 5887	(R) R.T.	15.2.54	13c.c. i.v.	7	–	–	No swellings noticed. Highest temperature 107°F.	–	Mild reaction. Cyst in sections on 10.3.54
III	Ox 5870	Ox 5887	25.2.54	250c.c. i.v.	9	6.3.54	+	Oedema of front limbs. Highest temperature 105.8°F.	–	
IV	(R) 43	Ox 5870	6.3.54	3c.c. i.p.	12	22.3.54	2+	Odema of hind limbs and base of ears. Highest temperature 105.6°F.	5	Died

+ = Parasites very rare.
2+ = Parasites fairly frequent.
(R) = Rabbit.
i.v. = Intravenous injection.
i.p. = Intraperitoneal injection.
s.c. = Subcutaneous injection.

In ox No. 5895 a febrile reaction commenced 6 days after the blood transfusion. The fever persisted for three days but trophozoites could not be demonstrated in the peripheral circulation. Globidial cysts in rare numbers in skin sections were demonstrated 28 days after the initial rise in temperature.

In mild infections cysts are sparsely distributed in the subcutaneous tissues and are, therefore, not readily demonstrated in sections prepared from skin biopsies. It is, therefore, possible that cysts could have been present before the 28th day after the commencement of the febrile reaction.

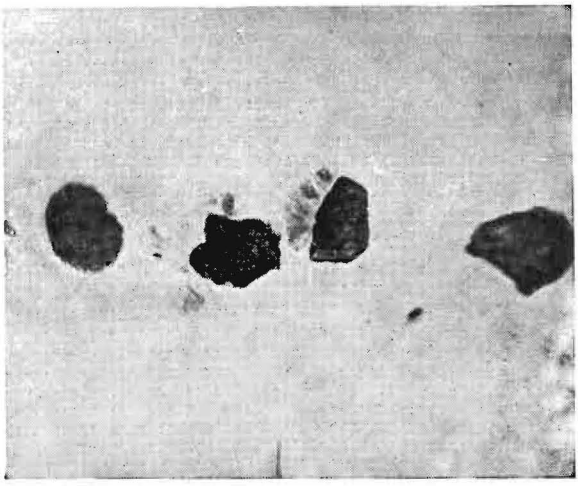

Fig. 2.
Intracellular Trophozoites in a blood smear of Rabbit 46.

Consideration of these observations shows that it is possible to transmit *Gl. besnoiti* during the primary stage of the disease, to susceptible cattle.

The hitherto undescribed trophozoites occurring in the peripheral circulation and/or the lymphatic glands were encountered during the primary stage of the disease. There is every reason to believe that this stage was responsible for initiating the infection in the artificially infected cattle. No satisfactory explanation can be given why the course of the disease in these animals was mild. Globidial cysts were encountered as early as thirteen days and as late as 28 days after the commencement of the febrile reaction.

At the time the investigations were started it became apparent that the maintenance of *Gl. besnoiti* in one or other species of laboratory animals would greatly facilitate studies on globidiosis. With this object in view attempts were made to transmit the disease with infective cattle blood to mice, rats, guinea-pigs and rabbits. The former three species of animals were kept under observation for two months and remained perfectly healthy. No attempts were made to establish whether or not they had developed an inapparent

form of the disease. However, two rabbits No. R.B. and R.T. developed clinical symptoms 13 to 16 days respectively after the artificial infection. The observations are recorded in the appended Table No. 2. Both rabbits developed oedema of the subcutis of the hind limbs below the hock and the base of the ears. Examination of blood smears revealed a small number of extracellular and intracellular trophozoites in monocytes as well as in a few neutrophiles. These were identical morphologically with those encountered previously in cattle. The infection was passed serially for six generations in rabbits. All the rabbits reacted after an incubation period varying from 6 to 14 days. There was a thermal

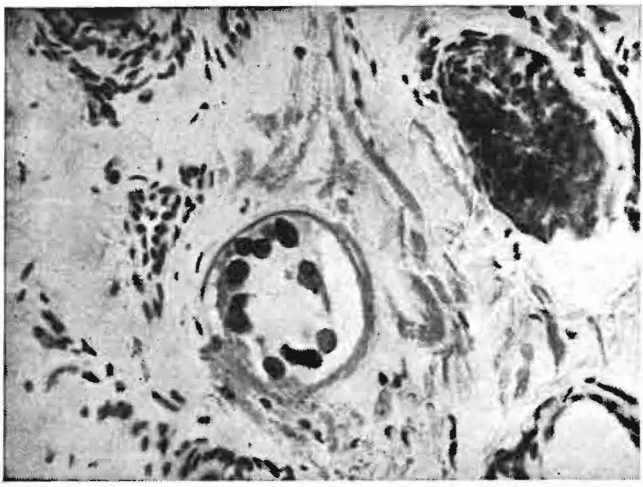

Fig. 3.
A young cyst in skin of Ox 5887 which received blood from Rabbit R.T.

reaction which persisted for 2 to 3 days. Clinical symptoms resembled those observed in the first two rabbits very closely. The duration of the disease varied from two to three days while trophozoites could be demonstrated microscopically during this period. The disease terminated fatally in all cases.

Up to this stage it was assumed that the trophozoites encountered in cattle and in rabbits were those of *Gl. besnoiti*. However, they showed a striking resemblance to *Toxoplasma gondii* Nicolle and Manceaux, 1909. According to the measurements quoted by Knuth and Du Toit (1921) *T. gondii* varies greatly in size. It measures from 3μ to 12μ in length and from 2μ to 5μ in width. The trophozoites of *Gl besnoiti* measure from 5μ to 9μ in length and from 2μ to 5μ in width. Both parasites are oval or crescent-shaped. They divide by binary fission and parasitise monocytes and neutrophiles. Rabbits are highly susceptible to both parasites. *T. gondii* is an euryxenous parasite. It has been demonstrated in birds and mammals including cattle. *Gl. besnoiti* appears to be a

stenoxenous parasite occurring in cattle, rabbits and possibly also in the horse. Its host range remains to be determined.

Consideration of these facts made it necessary to confirm the supposition that the trophozoites encountered in cattle and in rabbits represent a stage of the life-cycle of *Gl. besnoiti*. With this object in view the infectious agent in a rabbit was passed serially for two

Fig. 4.
Mature cysts in skin of heifer 6839 eight weeks after receiving a blood transfusion from Ox 6840.

generations in cattle and transferred back to a rabbit. The details of the observations are listed in the appended Table No. 2. The cattle developed a mild form of globidiosis after an incubation period of 7 and 9 days. Trophozoites in the peripheral circulation were seen in ox No. 5870. Young globidial cysts appeared in skin sections of ox No. 5887 16 days after the initial rise in temperature. Rabbit No. 43 developed the peracute form of globidiosis and died. Trophozoites could be demonstrated in blood smears on the fourth day of the reaction. These observations justify the conclusion that the blood parasites encountered in cattle and rabbits are the trophozoites of *Gl. besnoiti*.

CONCLUSIONS.

1. Of the three naturally infected animals one developed a relatively mild form, while two died from the severe form of globidiosis.
2. The artificial transmission of *Globidium besnoiti* to cattle and rabbits by the injection of blood collected during the primary stage of the disease was successful.
3. The incubation period in cattle varied from 6 to 10 days and in rabbits from 6 to 16 days and was followed by a thermal reaction which persisted for two to five days.
4. Four out of the five artificially infected cattle contracted a mild form of the primary stage of the disease, while skin lesions were observed subsequently in only one of these animals.

5. Rabbits invariably developed the peracute form of the primary stage and died within 2 to 5 days after the initial rise in temperature. Subcutaneous oedema of the hind limbs below the hock and at the base of the ears were characteristic symptoms.
6. Extracellular and intracellular trophozoites of *Gl. besnoiti* in monocytes were encountered in some of the naturally and artificially infected cattle and in all the rabbits during the primary stage of the disease.
7. In both the naturally and arificially infected cattle globidial cysts could be demonstrated 6 to 28 days after the initial rise in temperature.
8. Morphologically the trophozoites of *Globidium besnoiti* resemble those of *Toxoplasma gondii* very closely.
9. Alternating serial passages of *Gl. besnoiti* in cattle and in rabbits and the demonstration of globidia cysts in skin sections of cattle proved that the parasites seen in rabbits are the trophozoites of *Gl. besnoiti.*
10. The maintenance of *Gl. besnoiti* in rabbits will greatly facilitate studies on the life-cycle of the parasite, determination of the host range, and evaluation of chemotherapeutic agents.

ACKNOWLEDGEMENTS.

The writer wishes to express his gratitude to the Director of Veterinary Services for giving the facilities which enabled him to undertake these investigations, and to Dr. W. O. Neitz for advice and encouragement.

Thanks are also due to Dr. Jack Louw, State Veterinarian, Rustenburg and Dr. M. J. N. Meeser, State Veterinarian, Lydenburg, for their invaluable assistance; and to Prof. A. M. Bosman, Pienaarsriver, Mr. A. J. Marais, Mr. F. G. Marx, Dist. Lydenburg and Mr. A. J. Fuls, "Boshoek", Dist. Rustenburg, for presenting animals suffering from Globidiosis to the Onderstepoort Veterinary Research Laboratory for experimental purposes.

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LETTER TO THE EDITOR.

State Veterinarian,
Potchefstroom,
10 April, 1954.

Sir,

I wonder if your Editorial Committee would consider allocating a page for tips on similar lines to the one in the Fort Dodge Bio-Chemic Review under the caption — "I heard a Veterinarian say".

I feel assured that many Veterinarians who would jib at writing articles would make use of this page for passing on useful information to their colleagues.

Something like the following is envisaged:-

(1) When using Nembutal solution (1 gr. to 1 c.c.) to anaesthetize very small animals the danger margin can be reduced considerably by filling up with water the syringe containing the computed dose.

(2) On an emery wheel cut down your field inoculation needles to just *under* half an inch in length and touch up the points on an oil stone.

This will increase your speed and cut down your wastage of needles to "losings" and "pinchings".

Your faithfully,

J. R. FREAN.
State Veterinarian.

The suggestion in this letter seems to be a good one. The Editor would be pleased to have the opinion of members on the idea.

CASE REPORT.

DISLOCATED SHOULDER IN A MARE.

A. LITTLEJOHN,
Mooi River.

References to this condition in equines are few and far between in the literature. A case is decribed in the Veterinary Bulletin, December 1927 (Frank).

The subject was a child's pony aged five, about thirteen hands. The owner phoned to say that a stallion had broken loose and savaged the mare, throwing her heavily to the ground. When she got up she was acutely lame and the owner thought that her "shoulder was out".

This delightfully comprehensive description proved to be substantially correct on arrival at the farm.

The leg was held in a state of partial flexion of the elbow and knee, similar to the stance adopted in a fracture of the olecranon.

The forelimb was markedly adducted, so much so that the hoof of the affected limb knocked the pastern of the other forelimb when the mare was made to walk.

The lateral tuberosities of the humerus were prominent. No weight was placed on the limb and the mare violently resented any attempt to flex or extend the shoulder joint.

A tentative diagnosis of dislocated shoulder was made and it was decided to anaesthetize and cast the mare in order more fully to examine the shoulder joint and attempt reduction.

Anaesthesia was accomplished with chloral hydrate, followed by Pentothal Sodium, and good relaxation was obtained. Examination under anaesthesia confirmed the diagnosis, and that there was no complicating fracture.

The limb was then fully extended. A rope was fastened above the fetlock and three assistants instructed to pull hard. At the same time forcible and sudden pressure was applied to the lateral tuberosities of the humerus. Reduction took place with a resounding click. The shoulder joint could now be freely manipulated.

The mare got to her feet without difficulty twenty minutes later and immediately placed full weight on the limb. She was still lame however and a guarded prognosis was given as to her further usefulness. Two months later, however, the pony was being ridden normally and has shown no lameness since.

SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION.

Abstract of minutes of Council Meeting held on April, 22, at 2.15 p.m. at the Residency Hotel, Schoeman Street, Pretoria.

Present: Drs. A. M. Diesel, (President), G. D. Sutton (Hon. Treas.), R. Clark, M. C. Robinson, A. C. Kirkpatrick (Hon. Life Vice-President), P. S. Snyman, M. de Lange, S. W. J. van Rensburg, A. D. Thomas (Vice-President), R. A. Alexander, E. M. Robinson (Editor), and K. E. Weiss (Hon. Sec.). On request Drs. O'Brien and C. F. B. Hofmeyr.

Apologies: Drs. M. H. V. Brown and G. Pfaff.

1. *Minutes of Council Meeting* held on 18th February, 1954 adopted.

2. *Arising from these minutes*:

   (a) Employment of Veterinarians by Co-operative Societies: Report of Committee on Code of Ethics. It was pointed out by Drs. Thomas and Van Rensburg that all the suggestions by Council members have been incorporated into the memorandum of suggested amendments to the rough draft of the Code of Ethics submitted to the Veterinary Board. These amendments were adopted by the Board and a copy of the code of ethics will shortly be issued to each member of the profession for further comments before it is finally drafted.

   (b) Presidential Chain of Office: Progress report by Dr. Clark. Correspondence read. The President thanked Dr. Clark for his trouble.

   (c) Pretoria Branch of the S.P.C.A.: The President welcomed Drs. Hofmeyr and O'Brien, who have been invited to take part in the discussion, it was decided to appoint a committee consisting of Drs. Nelson, Diesel, Van Rensburg and O'Brien, to interview the Executive Committee of the S.P.C.A. in order to settle the matter. Dr. Hofmeyr suggested that Council should go into the whole question of employment of Veterinarians by Animal Welfare Societies. Drs. Thomas and Van Rensburg appointed to go into the matter.

   (d) Financial Matters: Maud Bales Memorial Fund. Recommendations of Finance Committee: Dr. Sutton reported that four applications were received namely from Messrs. G. M. H. Shires, S. K. Bakker, D. F. Wege and L. van Wyk. After careful consideration the Committee recommended that the bursary be divided equally amongst Messrs S. K. Bakker, D. F. Wege and L. van Wyk. Approved by Council.

3. *Jubilee Celebrations* 1955:

   The President asked for suggestions and pointed out that Dr. Hofmeyr requested that he be allowed to participate in discussions. Dr. Hofmeyr made a number of tentative suggestions which were referred to an organising committee on the proposal of Dr. Snyman. The Committee to consist of the President, The Secretary, Treasurer, Editor, Drs. Clark and Hofmeyr. Dr. Robinson (Editor) appointed as Convenor.

4. *Annual Congress* 1954:

   The next Annual Congress to be held from August 24th to 26th. The Secretary to circularize Town Clerks at an early date. Dr. Sutton explained that the Association showed a loss on the last dinner and dance and suggested raising the price of the tickets for the dinner and dance form £1.5.0 to £1.10.0. Approved. Further arrangements left in the hands of the programme Committee consisting of Dr. Robinson (Editor), Dr. Clark the Treasurer and Secretary.

5. *Financial Matters*:

Various financial matters discussed and approved by Council.

6. *Correspondence*:

Letters of thanks from Mrs. Cooper and Miss Dickson read. Letter from Honorary Secretary, Natal Branch of S.A.V.M.A. re licensing of Veterinarians by Jockey Club and deposit accounts read. Council instructed Secretary to reply.

7. *General*:

Dr. Sutton proposed an alteration to the Constitution under heading

(5) Resignation:

change "June" to "April".

Add

"The Member shall still be liable for his subscription for the financial year in which his resignation was submitted".

Approved by Council. Notice of motion to be circularized to members before next Annual Congress.
Meeting closed at 5.15 p.m.

BOOK REVIEW.

BRITISH VETERINARY CODEX, 1953. Published by the Pharmaceutical Press, London. Pp. xxiii plus 737. Price 45/-.

This book consists of three parts: (i) Monographs on drugs, chemicals and related substances; (ii) Antisera, vaccines and related products; (iii) Formulary, and therapeutic and pharmacological index. This gives only a very broad outline of the contents of this unique compilation, which sets out to "supply standards for the numerous substances and preparations used in the prophylaxis and treatment of animal diseases and to give authoritative information on their actions and uses."

The British Veterinary Codex is the result of a suggestion made by the Pharmaceutical Society of Great Britain to the Royal College of Veterinary Surgeons and the British Veterinary Association that a book similar to the British Pharmaceutical Codex, but devoted to medicinal substances and preparations used in veterinary practice, might be a useful addition to the literature of veterinary medicine. This suggestion was received with enthusiasm, and in 1950 an organization consisting of a British Veterinary Codex Committee, assisted by specialist subcommittees, was appointed. The ad hoc subcommittees dealt specifically with: actions and uses, biological products, formulary, analytical standards, antibiotics, and hormones. In addition, drafts of monographs were submitted to Corresponding Members in various parts of the Commonwealth, Eire, and the United States, for comments, which were considered by the various subcommittees and in many cases accepted.

The appearance of this Codex constitutes recognition of the advances the veterinary profession has made and of its present status as a profession with a sound scientific background. Much of the empiricism of the past has been replaced by a much more thorough understanding of the underlying principles governing treatment, and in particular, chemotherapy. Throughout the world this volume has been received with acclaim. Its reception in South Africa deserves to be equally enthusiastic, and it constitutes no cliché to say that it well merits a place on the bookshelf of every veterinarian in the country.

W.D.M.

LETTER FROM THE TRANS-AFRICAN INSURANCE CO. IN CONNECTION WITH PERSONAL ACCIDENT AND SICKNESS INSURANCE OF MEMBERS OF THE ASSOCIATION.

For local enquiries:-
Mr. Van Niekerk,
22 Equity Buildings,
Phone 2-6919, Pretoria.

The Secretary,
S.A. Veterinary Association,
P.O. ONDERSTEPOORT, Tvl.

Dear Sir,

In accordance with your request to tender for the personal accident and sickness insurance for members of your Association, we have pleasure in submitting the following quotations:

EVENT	Amount Insured	Annual Premium
In the Event of ACCIDENTAL INJURY causing:-		
Death	£2,500	£2.10.0 per Capita
Loss of hands or feet or eyes or of one hand or foot and one eye, or of one hand and one foot	£2,500	£1.17.6 per Capita
Loss of one hand or foot or eye	£1,250	
Total Disablement	£30 per week	£12.0.0 per Capita
Partial Disablement	£10 per week	£2.10.0 per Capita

The weekly allowances are payable up to 52 weeks.

For the sickness insurance we can quote the following:

The amount insured would be £30 per week. If the weekly allowances are payable up to 26 weeks, the annual premium would be £30; or £36.15.0 if the weekly allowances are payable up to 52 weeks. These rates are based upon a seven days' franchise which means that there will be no compensation for the first seven days of the disablement, but if the disablement is lasting longer than seven days we will pay for the whole duration of the disablement.

We can offer you an alternative quotation based on a seven days' excess which means that the Insured will be his Insurer for the first week of his disablement so that if he is disabled for four weeks we will be responsible for three weeks.

The quotation concerned is as follows:- £26.5.0 in the event of weekly allowances payable up to 26 weeks and £32.10.0 in the event of weekly allowances payable up to 52 weeks.

We trust the above quotations will be acceptable to you and we are looking forward to your further instructions.

Assuring you of our best attention at all times,

Yours faithfully,

(Sgd.) H. J. JANSEN.
ACCIDENT MANAGER.

PRESIDENTIAL ADDRESS
49th ANNUAL CONGRESS
SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION
AUGUST 24th, 1954

A. M. DIESEL
Pretoria

Ladies and Gentlemen,

In giving you a digest of the conditions which have obtained in the affairs of the Association during the past year, let me assure you of the earnest endeavours on the part of your Council to meet the situations which have arisen and to attend to them in great detail to the best advantage to the majority of members. Reference to the extracts of council meetings published in the Journal will corroborate what I say.

Some members have expressed concern at the apparent indecisions and delays which have taken place in Council, in attending to matters of considerable concern to the profession.

Our relationship towards each other and our endeavours to collaborate with the persons and bodies whom we serve, sometimes give rise to differences of opinion. When wise council prevails progress is assured.

As Veterinarians we are bound by the protective legislation of the Veterinary Act and by the code of ethics formulated by the Veterinary Board, under the authority given to it by the Act. Quite recently a draft of a proposed new Guide to Professional Conduct has been passed to you for your views. I trust you have informed the Board on any matters concerning professional conduct which you consider should receive its attention, for when the proposed guide is finally published you will be expected to comply strictly with its provisions.

I would particularly draw your attention to the proposals contained in paragraphs 9 and 12 of the draft.

You will recall that up to about 1941, comparatively few Veterinarians in this country made a living outside of the State and Municipal Services. Since then, those engaged in private practice and employed by private enterprise, have increased numerically to such an extent, that collectively they now outnumber their colleagues in the combined State and Municipal Services, by 2 to 1 We have approved of this situation; indeed we consider it should be proportionately encouraged on the grounds that it is going hand in hand with the development of

the country, although I have from time to time stressed the stabilising influence exercised by adequate State and Municipal Services.

If, therefore, your Council or the Veterinary Board has appeared to be indifferent to the problems which have arisen as the result of the infiltration of Veterinarians into the avenues of employment which have developed in recent years, this has surely been due to the complexity of these problems on the one hand and to the need for an up-to-date code of ethics.

The whole question of "farming out" of Veterinarians, as we call it, is a very serious one. In principle it should not be tolerated; certainly not without adequate control. I have no doubt that the Veterinary Board is mindful of all the snags connected with the subject of the ethical relationship between Veterinarians and their employers. We can rely on the Board to safeguard our interests through the code of ethics as well as to take steps against our insufficiencies.

I would like to draw your attention to a few aspects of Veterinary advancement in South Africa. At present Veterinarians are employed in fundamental and biological research, in public health, in animal nutrition, in private practice and in the field of epidemiology.

The matter of how many Veterinarians a nation or territory should have is an old and unsettled question, even in the more advanced countries of America and Europe. It is very difficult to say how many there should be in a rapidly developing country like South Africa.

The Adams Committee, in its report in 1945, considered that the State Veterinary Service should be increased to 250-300 Veterinarians in the succeeding 15-20 years. This report also compared the ratio of Veterinarians per million of livestock and human populations in certain more advanced countries, with that obtaining in South Africa at the time. The report quoted the following ratios :—

Country	Vets. per million of large stock population.	Vets. per Million of human population.
U.S.A.	60	109
Britain	94.4	52.2
France	98.8	82.5
The Netherlands	140	91
Norway	123	143
Belgium	191	78
Denmark	148	278
Switzerland	247.8	170.8
South Africa	15	20

If we apply the findings of the Adams Committee to the present ratio of 2 private practitioners to every 1 in the State service, adding in the proportionate numbers of Veterinarians employed in other spheres, then South Africa by 1960 should have 800 Veterinarians. That Committee stressed the need to encourage private practice. In terms of the figures and information given in an article by a member, appearing in the current issue of the Journal, this number, even now, should be very much greater.

The U.S.A. has a cattle population of 94 million, and an overall livestock population, inclusive of dogs and poultry of over two hundred million. It has over 18,000 Veterinarians and a human population of one hundred and sixty million. The Americans consider that their human population by 1975, will be one hundred and ninety million. They graduate Veterinarians at the rate of 800 per annum. Their wastage amounts to about 5% per annum and they therefore add about 500 to their numbers each year. Thus by 1975 the U.S.A. should have about 28,000 Veterinarians.

Britain has 3,700 Veterinarians, graduates them at the rate of 250 per annum, and probably increases its total by about 100 every year.

Our Veterinarians at this moment are largely young men and our wastage rate is probably only 2½% per annum. On the figure of 300 therefore, our wastage at present is about 7 per annum. If therefore the Veterinary Faculty can in the near future graduate 27 Veterinarians per annum, we should be able to add 20 to our numbers each year, and by 1975 have a total of about 700.

Whatever the numbers of Veterinarians should be, either now or by 1975, I think you will agree that there is still much scope for our profession in South Africa.

There is no doubt that the recent reorganization of the Department of Agriculture will soon bear fruit and materially assist in the expansion of the livestock industry. The activities of the Agriculture and Livestock Boards, the development of A.I., the improvements which are being effected by C.S.I.R., the Bureau of Standards and other bodies, are all likely to assist materially in the development of the Union as an exporting country of livestock and their products.

The increased use of these products of animal origin by trade and industry must eventually call for the employment of a greater number of Veterinarians in this hitherto untouched field. It is impossible for this progress to maintain itself in the absence of a sufficiency of Veterinarians.

Disease travels as man and his animals travel — as they travel faster, infection does likewise. Quarantine isolation, and

import restrictions will always be important weapons in preventing the entry of disease. Veterinarians must take part in the opportunities in research which confront them, in order that the functions, rightly the concern of our profession, do not pass into other hands. There are far too few Veterinarians in the field of public health and too many individuals other than Veterinarians, engaged in various aspects of food control, which aspects are rightly the duty of the Veterinarian.

The question is whether a full-time State service alone can maintain the standard of Veterinary Services necessary for the development which is taking place in South Africa. The article which I have referred to by a member in the current issue of the Journal, attempts to answer this question.

Some members, I know, are very pessimistic about the future of the profession in South Africa, and contend that we shall not always be able to add twenty Veterinarians to our numbers each year, because of the lack of opportunity for employment which is bound to arise. They visualise a largescale return to the State Service and when that is full, the graduation of fewer Veterinarians.

I would remind them that at the beginning of this century we had very few Veterinarians — probably less than a dozen. At the time of Union and up to the end of World War I we had enough to meet the needs of the country at the time, and they were readily available for importation if we required them. When our first students graduated in 1924 and for a few years after, the apparent prospects for Veterinary Medicine as a career in the world generally were at their lowest ebb. After the depression of the early nineteen thirties, the position began to improve again, and while interrupted somewhat by World War II, it has gone steadily forward since 1949, to the peaks we have known in recent years. Recessions and depressions are bound to recur and the prospects of Veterinary Medicine as a career will once more come into question, but these lean years will surely be followed by prosperous ones, for Veterinarians as well as for others.

I would like to say a few words about the provisions of the new Medical, Dental and Pharmacy Amendment Act (Act No. 29 of 1954). Its object is of course not to bind the Veterinarian in any way but to curb the indiscriminate use of these potentially harmful drugs, by members of the public. Authorised Veterinarians may use them in the same way as they use poisons and habit-forming drugs. The new sections appearing in this amended Act, deal with the declaration, definition, sale or supply of the potentially harmful drugs. An authorised Veterinarian of course means a Veterinarian holding a current certificate issued by the Minister of Health under Section 89 of the Principal Act (Act No. 13 of 1928). Persons may sell or supply potentially harmful

drugs to authorised Veterinarians without prescriptions. Chemists, etc., may sell or supply to other persons on prescriptions signed by authorised Veterinarians. Section 65 bis, (1)(C) and (d) states the details to be given in the prescriptions by authorised Veterinarians. In an emergency, potentially harmful drugs may be supplied to any person on the direct verbal instructions of an authorised Veterinarian, if the supplier knows the Veterinarian personally. In such cases the Veterinarian must within 24 hours, furnish the supplier with a prescription.

These potentially harmful drugs are listed in the Sixth Schedule to the new Act. You are strongly advised to study this Schedule and to appreciate particularly the exceptions made in respect of antibiotics and drugs registered under the Fertilizers, Farm Feeds, Seeds and Remedies Act (No. 36 of 1947).

The direct use without prescription of the substances scheduled, is thus not permitted.

The draft Veterinary Bill has been prepared and put out for criticism and should be ready for presentation to Parliament early next year.

I must congratulate our Free State members on the formation of their branch.

They have 27 members and held their inaugural meeting on July 19th, 1954.

The Association thus now has five branches, viz. Natal, Western Cape, Eastern Cape, South West Africa, and O.F.S.

In conclusion I would like to express my thanks to the Secretary, to the Treasurer, to all our Council members and Standing Committees for the very efficient service they have given to the Association during the past year. To the two part-time women members of our staff I also extend our grateful appreciation. During the year a sub-committee was appointed to study the arrangements which will have to be made in order that we may be able to celebrate the Golden Jubilee of the Association, next year. To it also we extend our appreciation and thanks.

'MYSOLINE'

A NEW ANTICONVULSANT

"MYSOLINE" is a new anticonvulsant which has been evolved in the I.C.I. Research Laboratories. This drug is of a chemical type not hitherto used in veterinary medicine.

"Mysoline" is a white, stable, crystalline powder which is practically tasteless. It is only very sparingly soluble in water (0.6 gramme per litre at 37 deg. C.).

ACTIONS AND USES

In laboratory animals, including dogs, "Mysoline" has been shown to be highly active against convulsions artificially induced by various methods. Its toxicity, both acute and chronic, is very low, and it is devoid of hypnotic effect. Comprehensive clinical trials, carried out on a large number of dogs suffering from epilepsy, canine hysteria, and other nervous conditions, have shown that "Mysoline" can be used with a high degree of success in these disorders. There is also some evidence that it will give control of the nervous symptoms following or accompanying virus infections such as canine distemper and canine encephalitis ("Hard Pad").

INDICATIONS

"Mysoline" is indicated in epilepsy and epileptiform conditions in the dog. Its use in the nervous complications of virus diseases in this subject has also been suggested.

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SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

The 49th General Meeting of the Association took place at the Onderstepoort Laboratory from August 24th to 26th, 1954. This report deals only with the scientific side of the meeting.

The Congress, as it has been decided to call it, was opened by Dr. M. S. du Toit, Director of Technical Services in the Department of Agriculture. In his address he laid great emphasis on efficiency and stressed the importance of food production at reasonable cost, proper marketing and efficient soil conservation. The conditions should be created under which the technical man could work adequately and efficiently. This he felt was more important than the salary question, seniority, etc. Administrative men should understand the language of the people they control and frustration must be avoided. The training of technical men for research must be efficient and sound. Revision of this training is now being undertaken. Veterinary training is now in being and agricultural will follow. A new name is suggested for the work envisaged, "planned co-operative effort." There must be avoidance of watertight groups and there must be the right background and the correct approach.

In the new set-up, Onderstepoort will put its own house in order under the reorganization and there should be co-operative planning with other agricultural sections. Veterinarians have developed a view point of their own as a result of years of annual congresses.

Dr. Alexander in thanking Dr. du Toit said that the veterinarian's function was to safeguard animal health for maximum production. It would be easy for him to take his place in the new scheme. Dr. du Toit was a dynamic force who would achieve his aims.

After the opening ceremony, the first paper on the agenda was one by Dr. Thomas, which was a plea for the institution of a Veterinary Investigation Service such as exists in Great Britain and Holland.

Dr. Thomas said that the centres of the Service were concerned mainly with diagnostic work but also carried out investigations and tested the value of drugs. In spite of the long distances in South Africa an attempt should be made to establish such centres and adapt the Veterinary Investigation Service to South African conditions. Much of the diagnostic work must be done on the spot to be of value and 60% of such work can be done

by post mortems and simple laboratory technique. The main point is to get the diagnosis as quickly as possible and contact is established between the diagnostician and the farmer or practitioner. Such a diagnostic service would be very welcome. Diagnosis would not be its only function. Another could be the collection of vital statistics. We have little in the way of accurate data on stock diseases and mortality, such as the numbers of animals dying of particular diseases. This information is of vital importance and would be very useful. It might not be possible to get all the information but what was obtained would be very useful. One could take a few representative farms and keep proper records of them. In Great Britain the testing of drugs and new vaccines was a minor function of the Veterinary Investigation Service but here it could be a major one. Testing vaccines by information on their value from farmers takes a long time before any results of significance are obtained, but they could be got more quickly by this service. Proper testing of drugs by the practitioner is hopeless and the state veterinarian can do very little on account of lack of time. A further function could be extension work amongst farmers and giving them instruction. The V.I.O. centres should be within easy reach, and not 200 miles away. Dr. Thomas hoped that the Veterinary Investigation Service would be given a trial. The title was well chosen and it was significant that it was not called simply diagnostic. One of its functions was to study ways and means of improving veterinary services in a particular area. There are diagnostic centres in South Africa but the areas they serve are far too great.

In the discussion which followed it was mentioned what a lot of valuable investigational work had been done by this service, instances being the work on virus pneumonia in calves, enzootic abortion in ewes, etc. Many local problems were investigated which would otherwise just have been left untouched. In Holland the work was financed by the farmer. Young veterinarians might like the work as an alternative to the state service. It was mentioned that an investigation centre had a limited range and that very simple buildings would be found quite adequate. In New York State there were five first class diagnostic laboratories and the duck industry had one to itself.

The next paper on the agenda was one on "Protrusion of intervertebral discs in the dog" by Dr. J. L. Doré and will be published in this Journal with some notes of the discussion.

During the afternoon of the first day of the meeting the first paper was given by Drs. McFarlane and Haig on "Experiences with Three-Day Sickness." In the 1953-54 summer season the disease was unusually severe and the authors gave their experience of the symptoms noted and the effect of treatment. The paper will be published in this Journal.

It was followed by a film in colour describing the operation for amputation of the fore-leg in the dog, presented by the operator, Dr. C. F. B. Hofmeyr. A description of this operation has been published in the journal of the Association. The final item on the first day's programme was a film in colour on "Sweating sickness in calves," shown by Dr. W. O. Neitz. The film showed the symptoms seen in experiemental cases of the disease and a running commentary was given by Dr. Neitz.

On the second day of the meeting the first paper was given by Dr. E. J. Ortlepp on "Experiences in Feline Practice" and will be published in the Journal with the discussion on it. It was followed by two films in colour presented by Dr. van der Spuy of Baragwanath Hospital and kindly lent by Dr. Fatti, specialist in heart surgery, on intra-thoracic operations, one on repair of the heart in the so-called "blue baby" condition and the other on the surgery of mitral stenosis.

These films were very much appreciated as showing the recent advances which have been made in cardiac surgery.

Dr. Clark then gave a demonstration on hypothermia in the dog and some notes by him on the technique employed, etc., are given elsewhere in this number of the Journal.

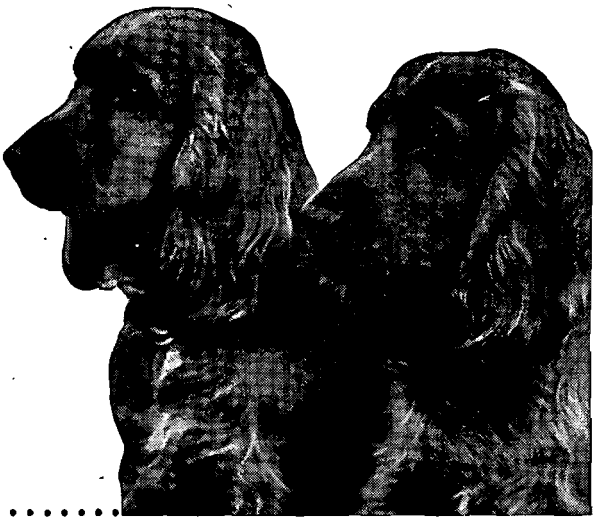
This demonstration was followed by a paper on "Veterinary Health Certificates" by Dr. A. M. Diesel, which is published in this number of the Journal. It stressed the importance of the care necessary in giving these certificates.

In the afternoon of the second day Dr. P. L. le Roux of the London School of Tropical Medicine and Hygiene, London, made an appeal to veterinarians to assist in the collection of specimens of trematode parasites and gave some of his personal experiences on diseases caused by these infestations.

Dr. W. O. Neitz then read a paper on "Corridor disease," a condition in cattle recently investigated in Zululand and which is a form of theileriasis. The final paper of the afternoon was given on Lupin Poisoning by Drs. Groenewald, Adelaar and Smit, each from a different aspect. The condition which occurs in the Malmesbury District of the Western Province has recently been investigated and the paper will appear in the Journal.

On the final morning of the meeting, Drs. Boswell and Hempstead gave a demonstration of Caesarian section in a cow which was very well attended and much appreciated.

E. M. ROBINSON.



new

SERUM TO COMBAT DISTEMPER AND SECONDARY INFECTION

The majority of cases of distemper are first seen by the Veterinary Surgeon when secondary invaders have become established. At that stage, distemper serum obtained from dogs hyperimmunised against the virus only is often of limited therapeutic value.

During recent years, the problem thus created has been investigated at The Wellcome Research Laboratories with the result that an antiserum of high therapeutic value has been produced in the horse. Issued as 'Wellcome' Distemper Therapeutic Serum (Mixed), it contains antibodies against *Bact. coli*, *Salmonella enteritidis* (Gærtner), *Salmonella typhi murium* (Aertrycke), Streptococci Type G, and *B. bronchisepticus* as well as against the distemper virus itself. It is available in containers of 50 c.c.

'WELLCOME' BRAND

DISTEMPER THERAPEUTIC SERUM (MIXED)

PREPARED AT THE WELLCOME RESEARCH LABORATORIES, BECKENHAM, ENGLAND

Supplied by
BURROUGHS WELLCOME & CO. *(The Wellcome Foundation Ltd.)* LONDON
Depot for South Africa
BURROUGHS WELLCOME & CO. (SOUTH AFRICA) LTD., 5, LOOP ST., CAPE TOWN

THE TRADE EXHIBITION AT THE CONGRESS

Now that the Congress meetings are being held in the new Faculty Buildings, more space than formerly is available for the Trade Exhibit. This was taken advantage of fully by the various drug and instrument firms. The exhibition was opened by the president of the Association directly after the opening function, in an appreciative speech to which the president of Medical Exhibitors Association, Mr. Stabler, suitably replied. More time than previously was allowed during the Congress for members to visit the exhibition and full advantage was taken of the opportunities. The descriptions of the exhibits have been put in alphabetical order.

Agricura Laboratoria Ltd. displayed an extensive range of surgical instruments, of reputable manufacture, and remedies pertaining to the veterinary profession.

Special attention was paid to the artificial insemination equipment, and the full range of items required in this field is in ready supply.

A new Sulphonamide has been introduced, namely Aristamid, which is effective against a wide range of bacterial infections. This item is available in a 33⅓% Sodium solution, as well as in tablet form at competitive prices.

Also a very effective and attractively designed transparent dosing syringe was on display for the first time and will be available to the public shortly.

The exhibit was in charge of Mr. E. Consul.

The Burroughs Wellcome and Co. stand, in addition to featuring their well-known range of sex hormones and intra-mammary products, gave prominence to a number of newer drugs. Prominent amongst these was "Themalon" for producing varying degrees of analgesia, hypnosis and narcosis in dogs, from quieting fractious dogs to use for minor operations.

A companion product "Lethidrone" causes rapid recovery of dogs narcotised with "Themalon" (also pethidine and morphine). Wellcome Feline Infectious Enteritis Vaccine for protecting cats against Infectious Enteritis (Panleucopenia) was the subject of considerable interest.

Cooke, Troughton & Simms were pleased to have their range of Microscopes displayed at the 1954 Veterinary Congress.

On display were a number of the new M25 series Microscopes. These consist of a basic stand with an accurate course and fine movement and objective protection device, which can be expanded from the simple student model to a research stand of a high order by means of the complete range of accessories which are available, besides the conventional type stand model with built-in illumination.

The research instrument M4003 was on show also, with free and accurate movements of stage and focussing, and is a bench model of the world renowned Vickers Projection Microscope.

Glaxo Laboratories this year introduced Procaine Penicillin 300 Veterinary Cerate. Each single dose tube contains 300,000 units Procaine Penicillin — sufficient to ensure the presence of the antibiotic in the udder for at least a week in concentration adequate to inhibit the most frequently occurring organisms responsible for mastitis.

Also featured was Benapen, an aqueous suspension of benethamine penicillin, a new compound evolved in the Glaxo Research Division. By intramuscular injection, Benapen provided very prolonged penicillin action, effective serum levels of penicillin being maintained for a minimum of three to four days after injection.

The Veterinary Pharmaceutical Products of Imperial Chemical (Pharmaceuticals) Ltd., a subsidiary company of Imperial Chemical Industries Ltd., are becoming increasingly well-known to the veterinary profession.

For several years these products have been featured at the annual Veterinary Congress. Among the products displayed at the 49th Congress was "Sulphamezathine," the versatile sulphonamide for the treatment of calf scour, footrot and heartwater, "Avlothane" for liver fluke, "Avlinax" for frothy bloat in ruminants, "Avdet" teat bougies for the control of mastitis, and "Mysoline," a new anticonvulsant for controlling canine epilepsy and encephalitis (hard pad).

Lederle Laboratories featured Aureomycin at their stand.

The following products were on display :-

Aureomycin Intravenous Veterinary 2.5G

Aureomycin Intravenous Veterinary 1000 mg.

Aureomycin Intravenous Veterinary 100 mg.

Aureomycin Tablets for the control and treatment of metritis.

Aureomycin-Mastitis Ointment.

Veterinarians showed great interest in Aureomycin Veterinary Tablets 20 mg., Lederle's new addition to the Aureomycin range. The indications for this preparation are for increasing weight

gains and reducing the incidence of calf scours. The dosage for calves is 1 or 2 tablets daily by mouth, from birth up to the age of 16 weeks.

Another product which attracted attention was Caricide (Diethylcarbamazine) Tablets, an exceptionally effective, outstanding treatment for ascariasis and filariasis in dogs and ascariasis in cats.

Maybaker (S.A.) (Pty.) Ltd.

The following products were exhibited.

"Compron". Highly effective in the prevention and treatment of post-partum infections after difficult birth, and in cases of retained placenta.

"Dibrogan" Cream. Indicated in allergic and pruritic skin disorders, and in the treatment of wounds and burns.

"Embazin", an established treatment for effective and economical control of outbreaks of coccidiosis in poultry.

"Protegan" with Penicillin: gives full coverage against mastitis of gram-positive and gram-negative origin, also of value against Penicillin resistant strains.

"Thalazole": for the successful and safe treatment of enteritis, dysentery and other intestinal disorders.

"Trinamide": Combines potent antibacterial activity with low toxicity against common animal pathogens.

Milborrow & Co. (Pty.) Ltd., 70 Payn Street, Pietermaritzburg..

The exhibit was shown with Messrs. A. S. Ruffel (Pty.) Ltd., Transvaal Distributors of Milborrow's Veterinary Products, and was attended by Mr. G. E. Milborrow and Mr. J. Fourie.

The combined stand included possibly the most extensive range of veterinary instruments and appliances ever displayed in South Africa.

Of the drugs displayed special emphasis was placed on Milborrow's Antibiotic Preparations. These included: Pen-Strept-Amide, Intramammary Ointment, Pessaries, and Wound Powder (all based on Procaine Penicillin, Streptomycin, Sulphanilamide and Cobalt Sulphate). Canker-Cillin Ear Ointment (based on the above formula but also containing Lindane insecticide and a mercuric fungicide), Phenicol Eye Ointment (based on chloramphenicol) and Strepta-Guanidine Scour Powder (based on Streptomycin, Sulphaguanidine and Kaolin).

M. & J. Pharmaceuticals (Pty.) Ltd.

A. J. White (S.A.) (Pty.) Ltd.

P.O. Box 784, 2 Diesel Street, Port Elizabeth.

The following preparations were exhibited:

Euthanex: Inexpensive non-sterile barbiturate preparation for the painless destruction of small animals. NOT for surgical anaesthesia.

Furacin Veterinary Dressing with Anaesthetic: A water soluble dressing with a wide antibacterial range. Indicated in the prophylaxis and treatment of superficial mixed infections, e.g. cutaneous ulcers, abscesses after surgical incisions, eczema, etc.

Mandelamine (Methenamine Mandelate): For the treatment of urinary tract infections in small animals. For details of dosage and treatment see the Journal of the S.A. Veterinary Association, 25, 49.

Pragmatar: Sulphur, Salicylic Acid, Coal Tar distillate in a non-greasy base for the treatment of pedal eczema and other eczematous conditions.

Messrs. Optical Instruments (Pty.) Ltd., the ZEISS Agents for South Africa, showed a representative cross-section through the ZEISS manufacturing programme. Besides the ZEISS Research, Routine and Students Microscopes, Micro-Projection Apparatus, Micro-Photographic Apparatus were on show. Also other Optical, Scientific and Laboratory Apparatus such as the Warburg Apparatus, Ultra-Thermostats, ZEISS Electric Colorimeters, and the well-known Heraeus Ovens were on display and were ably demonstrated by members of the technical staff of Messrs. Optical Instruments (Pty.) Ltd.

Outstanding amongst their Microscopes was in the first instance the large CARL ZEISS Research Microscope Model "W" with which the most difficult microscopic observations either in bright-field, dark-field, or phase contrast can be executed. The new instrument has a magnification variator, the so-called "Optovar", built into the Microscope, which obviates the changing of eyepieces.

The Warburg Apparatus can be described as an instrument which measures the breathing of plants or living tissues. The Warburg Apparatus is being used more and more in all research laboratories together with such instruments as Ultra-Thermostats and Electric Colorimeters, the former instruments to control the temperature of liquids down to one-hundredth of a centigrade while the latter measures the absorptive qualities of liquids and solids.

All in all the stand of Messrs. Optical Instruments (Pty.) Ltd. showed a series of the most up-to-date laboratory instruments and could be described as an advanced laboratory by itself.

Messrs. Reckitt and Coleman (African) Ltd. again exhibited their range of pharmaceutical products which consisted of Dettol Antiseptic, Obstetric Cream and, in the Analgesic field, "DISPRIN" the neutral soluble calcium aspirin, also the recently introduced "CODIS" the soluble aspirin with phenacetin and codein.

Instrument Dettol. This preparation has been specially formulated for disinfection and storage of surgical instruments and rubber appliances.. It provides a clear solution with soft or distilled water or with Surgical spirit.

Surgical Dettol. This product has been specially designed for the surgical preparation of the skin. It is quick drying and leaves the skin in a non-slippery condition.

Surgical Dettol is intended for direct application to the skin, and should be used undiluted. The preparation is available in two colours namely, Orange and Blue.

Messrs. Roche Products S.A.R.P. ,(Pty.) Ltd.

Maintaining an established practice, the House of Roche this year presented an interesting range of its specialities.

"Prostigmin" Roche, the well-known parasympathetic stimulant in the very economical and convenient 50 c.c. veterinary pack, was again the main feature. Of interest to the Veterinary Gynaecological Section was the introduction of "Ephynal" Roche (Vit. E) in the new strength of 300 mg. amps. of 1 c.c. Other products included the well-known sulphonamide "Gantrisin" in the form of Eye Drops, Syrup and Tablets; "Litrison" tablets for liver support therapy and "Bepantol" ointment and solution notable for its effectiveness against slow healing wounds and for the production of a lustrous fur.

Messrs. A. S. Ruffel (Pty.) Ltd., in conjunction with Messrs. Milborrow & Co. Ltd., exhibited a wide range of Veterinary Instruments and Appliances, Pharmaceuticals and Livestock Remedies.

Rufus Instruments' display included a new pistonless 2 ounce Dosing Gun and the Rufus Metal Detector. Burdizzo and Hauptner Hoofcutters as well as the range of Artificial Insemination Equipment attracted much attention as did the new Terramycin with Polymyxin B Sulfate in liquid in an Intramammary pack.

Considerable interest was evinced in the Rufus Stock Brick containing 20% soluble Phosphate as well as Trace Elements.

Chas. F. Thackray (S.A.) Ltd.

A range of "Thackray" Surgical Instruments and Equipment was on exhibition together with a number of new products including the Davis and Geck Milman Orthopedic Composition, in both Powder, Bandages and Splint form and "Chance" Interchangeable Syringes. A feature of these syringes is that the barrels and plungers are interchangeable. The syringes are sterilizable up to 300°C. and are available with glass nozzles also metal tipped in Record, Luer and Luer Lok fitting.

A cordial invitation was extended to all members of Congress to visit their Showrooms at both Johannesburg and Cape Town.

VETERINARY HEALTH CERTIFICATES

A. M. DIESEL

Deputy Director of Veterinary Services (Field)

Pretoria.

DEFINITION:

A Veterinary Health Certificate can be described as a written declaration concerning the state of health and usefulness of a live or dead animal or of any product derived from such an animal.

To be significant, the certificate must be completed and signed by a Veterinarian of good standing, in the branch of Veterinary Science in which he is engaged.

FORM AND STYLE OF THE CERTIFICATE:

A carefully prepared certificate is a most valuable document to the person or authority for whose use it has been prepared. One carelessly completed wastes everyone's time, satisfies nobody and may be responsible for much loss and damage.

Being a declaration, it is expected to comply in form and style with that in common use for documents of its kind.

There are numerous types of certificates. The form and style of each will depend on the kind of animal or animal product to be certified and the use for which it is intended.

PREPARATION OF THE CERTIFICATE:

Certain basic requirements have been accepted, through usage and by arrangement, as standard to the preparation of all Veterinary Health Certificates.

The following are among the more important of these standard requirements:—

1. **The identity of the Veterinarian:**

Every Veterinary Health Certicate must bear the date on which it was completed as well as the business address and designation of the Veterinarian who signs it.

It must take the form of a declaration and either be addressed to the person or authority desiring it, or state at whose request it has been prepared.

The Veterinarian who undertakes the examination usually signs the certificate. Several Veterinarians or other scientifically trained persons may be concerned with the examinations and tests

necessary for the completion of the certificate. In such cases the Veterinarian who has been authorized or requested to prepare it, must sign it upon receipt of reports submitted by the others. Copies of these reports are usually attached to the certificate in confirmation of the tests which have been carried out.

2. **Description of the animal or animal product:**

A full description of the animal or animal product is essential. In the case of an animal, its age, breed, sex, state of pregnancy, colour markings and all identification marks must be clearly stated. When the colour of an animal is characteristic of its breed, copies of photographs may have to be pasted on to the certificate, to complete the identification.

All animal products must similarly be fully described whenever this is possible. All inspection stamps, trade marks, labels, or consignment references appearing on the product, or on the container, wrappings, cases, etc., in which it is enclosed, must be indicated. It is essential to reconcile the animal or animal product with the certificate in a manner which leaves no doubt as to its identity. If this is not done malicious substitution is possible and the certificate becomes valueless.

3. **The report on the state of health of the animal or animal products.**

The steps taken to determine the state of health of the animal or the safety of animal products must be stated in detail. The types and methods of examination must be indicated. These will depend on accepted principles and on what information the certificate is required to convey. Without exception, however, the types of examination must be determined by the diseases and disorders to which the animals may have been exposed and the use for which they or their products are intended. It would be insufficient merely to examine clinically a stallion or mare grazed in a Dourine area without causing it to be subjected to the Dourine test.

A person who acquires an animal or animal product generally expects to use it immediately for the purpose for which it was obtained. Veterinary examinations conducted in support of warranties or guarantees must therefore fully cover all their aspects. If a Veterinarian is requested to examine, and to complete a certificate, in respect of a milch cow, his examination would be incomplete if it merely indicated the state of health of the udder. It must include a determination of any communicable and intercommunicable disease such as Tuberculosis, Contagious Abortion, etc. It must satisfy all standards appertaining to the general health of a milk producing animal.

When the Veterinarian is able to state that the health of an animal has been further assured by its vaccination against a particular disease he must not fail to disclose this fact in his certificate. In doing so he should supply full particulars as to the type of vaccine used, its viability, batch number and the date and place of vaccination. If any identification mark or brand has been placed on the animal or if any certificate has been given in support of such vaccination, this should be mentioned.

In certifying a raw animal product, the state of health of the animals at the time of derivation, must as far as possible be indicated, together with the results of any ante- and post-mortem examinations conducted. This is not always possible. Veterinarians, for example, who are employed in countries where hides and skins originate frequently have no evidence as to their freedom from Anthrax. It is usual in these circumstances to certify that such hides and skins have been obtained from an area *"where Anthrax is not prevalent"*, unless of course the area of origin is heavily infected with this disease.

If a statement cannot be made with certainty it must either not be made at all, or worded in a manner which leaves no doubt as to its true significance. Thus if the certificate is required to state the freedom from Pullorum Disease of an untested flock from which hatching eggs or tested poultry have been derived, it is competent for the Veterinarian to certify that " to the best of his knowledge and belief" such a flock is free from B.W.D. and Fowl Typhoid, *only if he has good reason to believe it* to be free. This type of certification must only be resorted to if the Veterinarian, although not certain, has good grounds for supposing freedom from disease. It must not be resorted to to cover an entirely unknown situation, as then it will create confusion. If the position is entirely unknown to the Veterinarian he must either fail to certify it or indicate that he has no knowledge of it — preferably the latter. All Veterinary health certificates purport to be an honest attempt by the Veterinarian to state without fear, favour or prejudice the results of his examinations.

A Veterinarian is expected to be acquainted with the susceptibility of all animals to the various diseases of their class and he must examine them in consideration of this knowledge. He is not permitted to make a cursory examination. His examination must be thorough and complete. He is expected to conduct such examinations as in his opinion will reveal the requirements stipulated by the person or authority desiring the certificate.

4. Demands by persons or authorities requiring Veterinary Health Certificates.

Veterinary health certificates are invariably given at the

request of persons or authorities. Persons desirous of buying or selling animals or their products approach Veterinarians for these certificates. Often the certificates are required to settle disputes. It is the duty of the Veterinarian to ascertain exactly, what information concerning the health of an animal or the suitability of an animal product, his certificate is intended to cover.

If a private practitioner is approached to examine a horse for soundness and to give a certificate in support of a warranty, he must bear in mind the use to which the animal is to be put. Likewise a Veterinarian employed in the meat trade when requested to complete a certificate concerning the freedom from disease of meat and offal must ascertain the type of examination he is expected to conduct in case it should differ from that practised in the area in which he is engaged.

State Veterinarians are usually requested to complete, sign or countersign the certificates connected with the import and export of animals and animal products.. Most countries have regulations governing the import and export of animals and animal products. In these regulations are stipulated the requirements which must be fulfilled before the import or export will be permitted.

These include the following :—

(1) The freedom from infectious and contagious disease and of external parasites, of farm animals, pets, poultry, birds, performing animals, zoological specimens, laboratory animals, fur-bearing animals, fish, amphibians, reptiles, etc.

(2) The freedom from infectious and contagious diseases of products of animals origin, e.g. hides, skins, gloves, wool, hair, bristles, blood, bloodmeal, hoofs, horns, bones and substances containing them, meat and offal, biltong, sausage casings, curios, game trophies, eggs for hatching, etc.

(3) The freedom from infectious and contagious diseases of the area from which the animals and certain animal products originate.

It is insufficient for a State Veterinarian merely to indicate that the animals or animal products and their area of origin "are free from all infectious and contagious diseases", without mentioning in particular the diseases which all countries regard as those most likely to create epidemics and trade dislocation, e.g. Rinderpest, Foot and Mouth Disease, Contagious Bovine Pleuropneumonia, Rabies, Newcastle Disease, Surra, Sheep Pox, etc., etc. Similarly is it insufficient for him to certify that the animal product is "safe and suitable for the purpose for which it is intended and has been handled in a sanitary manner" or words to that effect, without giving a detailed description of the process which has been

followed and the examinations which have been made, to ensure its freedom from disease.

Veterinarians, for example, who sign certificates of freedom from disease, of farm feeds containing products of animal origin, should indicate that they have been present during all the stages of sterilization, manufacture or preparation of such products and that they are therefore able to certify the safety of the product.

Lastly under this heading, must be mentioned the requirements of the Criminal Procedure and Evidence Act (Act No. 31 of 1917) and the circumstances under which the Courts will admit reports by bacteriologists, biologists, chemists, physicists, astronomers and geographers, without their having to appear in person, as witnesses.

Section 268(4) of this Act, reads as follows:—

"Whenever any fact ascertained by any examination or process requiring any skill in bacteriology, biology, chemistry, physics, astronomy, or geography, is or may become relevant to the issue in any criminal proceedings, a document purporting to be an affidavit made by a person who in that affidavit, alleges that he is in the service of the Union or of a Province, or in the service of, or attached to, the South African Institute for Medical Research, or any University in the Union, or any other institute designated by the Governor-General for the purpose of this section, by proclamation in the gazette and that he has ascertained any such fact by means of any such examination or process, shall on its mere production in those proceedings by any person, but subject to the provisions of sub-section (5) be admissible to prove that fact: Provided that such affidavit shall not be admissible in an inferior Court (if objected to by an accused or his representative where the affidavit is produced by the prosecutor or if objected to by the prosecutor or by an accused or his representative, where the affidavit is produced by another accused or his representative), unless the objector or his representative has received, not later than three days after the day upon which the accused was summoned or otherwise notified of his trial, and has not within three days of the day of the receipt of such notice, given notice in writing to the person who gave such first-mentioned notice, that he will object to the production of such an affidavit."

CONCLUSION:

The rapidity of modern travel, the advances of science, the ever increasing need for food conservation are all factors which make the Veterinarian of today a most important person in the life of a nation. He should not fail to appreciate the responsibility which rests on him in this regard.

Some of the examinations and tests which are necessary before a health certificate can be completed, call for skill and ingenuity on the part of the Veterinarian and he is entitled to a fee commensurate with his task, so long as he executes it in a fitting manner.

In this apparently simple matter of preparing Veterinary Health Certificates he can play a most important part in the health of his people and he can save his country untold loss and misery.

ARTIFICIAL HYPOTHERMIA

Description of the demonstration given by Dr. R. Clark at the 49th General Meeting of the South African Veterinary Medical Association.

The technique of artificial reduction of body temperature or hibernation has received considerable attention in many countries over recent years. It has been proved that the blood temperature of mammals can be reduced to 25°C or even lower without any irreversible changes occurring. At this temperature the oxygen requirements of the tissues, including that of the brain, are so low that the blood remains adequately oxygenated despite a complete cessation of breathing which may last for 4 to 6 hours, yet the heart continues to beat strongly and regularly. The main use of the technique envisaged is in the realm of intra-cardial surgery. In the "cooled" dog the entire venous supply to the heart (anterior and posterior vena cava and v. azygos) can be clamped off and the completely empty, yet the still beating, heart can be opened. Intra-cardial manipulation can then be carried on for some 10 minutes before the heart shows signs of embarrassment. Should more time be required the opening in the heart wall can be temporarily closed and only the vena azygos released. This supplies sufficient blood to resuscitate the heart within two to three minutes, when the azygos can again be clamped off and the operation continued. The author has himself seen this procedure repeated three times in succession giving a total "intra-cardial time" of nearly 30 minutes. Another remarkable feature is that shock is never manifested in the cooled animal and the technique may play a major role in the treatment of shock and in operations where shock is a major hazard. Furthermore, it has been shown that whereas most of the bacteria pathogenic to warm blooded animals cease to multiply at a temperature of 25°C, antibodies are still active at that temperature. Experimental infections of burns have been shown to disappear spontaneously after cooling.

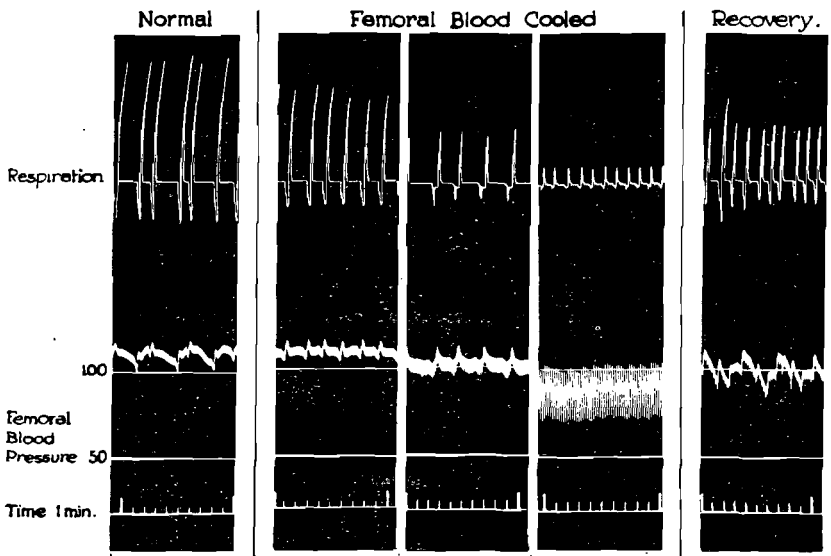
If an animal is merely anaesthetized and then placed in ice, the normal reaction of shivering, etc., tend to even raise the temperature and if cooling is continued severe shock may ensue. Internal or blood cooling has, therefore, been resorted to in which the blood is circulated from an artery (usually the femoral) through about 9 feet of polythene tubing surrounded by ice and back into the corresponding vein. The resulting drop in blood temperature causes very little reaction indicating that the temperature control centre is more sensitive to temperature gradients between the skin and the blood circulating through it, than to the latter factor alone. More recently, external cooling has been used in conjunction with the so-called "lytic cocktail" (metabolism depressant.) consisting of Largactil, Phenergan and Pethedine. Under the action of these drugs the reaction to external cold is suppressed.

As the temperature drops the depth and frequency of breathing becomes progressively less until it may be entirely suspended at about 25°C. The blood pressure also drops slowly as the temperature drops and at about 30°C there is a rapid fall to 60-88 mm. Hg. The pulse rate of dogs falls to 50-60 at 25°C, but the pulse pressure is increased, i.e. a slow but very strong beat is maintained.

Spontaneous recovery of body temperature is very slow owing to the low metabolism of the cooled animal and should be aided by warm baths or hot blankets. In this way a normal temperature can be restored in 2 to 3 hours. Consciousness and normal function return with the rise in body temperature.

The tracing reproduced shows the typical effects of cooling on the respiration and arterial blood pressure of the dog, and was made at Onderstepoort.

ARTIFICIAL HYPOTHERMIA IN A DOG



Rectal Temp. °C:	37·0	35·0	29·6	24·6	32·5
Pulse Rate	160	154	98	52	120
Time	9·10 a.m.	9·20 a.m.	10 a.m.	11 a.m.	2·30 p.m.

THE SIXTH SCHEDULE "POTENTIALLY HARMFUL DRUGS" OF THE MEDICAL, DENTAL AND PHARMACY ACT No. 13 OF 1928

P. S. SNYMAN,
Pretoria.

The Medical, Dental and Pharmacy Amendment Act of 1954, Act No. 29 of 1954, which amends Act No. 13 of 1928 (the Principal Act) contains provisions which should be noted by Veterinarians. This Act, besides amending certain provisions of the sale and use of habit-forming drugs also contains a sixth schedule which lists a number of drugs defined as "Potentially Harmful Drugs".

The main points of interest to the Veterinarian in the case of habit-forming drugs are :—

No habit-forming drug may be sold or supplied except on the production of a *written and signed* prescription of an authorised Veterinarian, and not more than one issue of the drug mentioned in any such a prescription shall be made thereon, except where the drug or any preparation, admixture of extract therof forms merely a component part of the medicine prescribed and is in quantity insufficient to constitute the finished preparation of a habit-forming drug.

The conditions for the sale or supply of potentially harmful drugs may be summarised as follows :—

(a) The container shall be conspicuously labelled with the name and address of the person by whom supply is effected.

(b) In the case of a drug intended for external use the words "For External Use Only" and the Afrikaans equivalent thereof shall appear on the label.

(c) A potentially harmful drug shall not be supplied unless, on a prescription *written and signed* by a medical practitioner, dentist or authorised veterinarian setting forth clearly :

  (i) date of issue of the prescription ;
  (ii) the name and address of the person to whom the drug is to be delivered ;
  (iii) the name and quantity of the drug, the number of times and the intervals at which the prescription may be dispensed, the dosage, etc.
  (iv) the usual signature, address and professional qualification of the person who issued the prescription ;
  (v) the prescription also shall be headed by the words "For Veterinary Purposes Only". Only potentially harmful drugs may in the case of an emergency be supplied to any person on the verbal instruction by a

veterianarian direct to a chemist to whom the veterinarian is personally known, on condition that the written prescription shall be furnished within 24 hours.

In the long list of drugs mentioned in the schedule of potentially harmful drugs certain substances like antibiotics, hormones, oestrogenic substances, the sulphonamide group and phenothiazine are exempted provided they are registered and sold under the provisions of the Fertilizers, Farm Feeds, Seeds and Remedies Act (Act No. 36 of 1947).

No regulations have been promulgated as to how the preparations registered as stock remedies shall be marked so as to indicate that they have been registered. Arrangements have, however, been made with the Registrar of Stock Remedies to register these remedies provided there is indicated on the pack, firstly that they are intended to be used for Veterinary purposes only, secondly that they have been registered and thirdly, for what particular condition or diseases they are to be used with dosage and any method of treatment.

It is provided in Section 65 bis of the Medical, Dental and Pharmacy Act, as amended, that all prescriptions for potentially harmful drugs shall be retained by the persons who dispense them for the last time and entered into the prescription book.

Medical practitioners, dentists and veterinarians who dispense such prescriptions must keep a prescription book and retain the prescriptions in the same way as is required of chemists and druggists.

Sixth Schedule

POTENTIALLY HARMFUL DRUGS

Acetylcholine.

Acetyl-Beta-Methylcholine.

Allylisopropylacetylurea.

Amidopyrine, its salts; and preparations and admixtures thereof.

Antibiotics, any antimicrobial substance synthesized by bacteria, fungi or protozoa, and any substance the chemical properties of which are identical with or similar to any such antimicrobial substance but which is not produced from living organisms, being a substance which is used in the specific treatment of infections, except those substances, preparations and admixtures intended for external use, lozenges and pastilles and except those substances, preparations and admixtures registered and sold under the provisions of the Fertilizers, Farm Feed, Seeds and Remedies Act, 1947 (Act No. 36 of 1947).

Anti-histamine substances indicated hereunder; their salts;
antazoline;
chlorcyclizine;
diphenhydramine;
3-di-n-butylaminomethyl-4:5:6-trihydroxyphthalide;
phenindamine;
promethazine;
substances being tetra-substituted N-derivatives of ethylenediamine or propylenediamine; and preparations and admixtures containing them, except when intended for external use.

Barbituric Acid, its salts ; derivatives of barbituric acid, their salts ; compounds of barbituric acid, its salts, its derivatives, their salts ; with any other substances except preparations or admixtures containing 0.25 per cent or less of any of these in association with medicinal substances and except the following :—

Preparations containing not more than one half grain per dose of these substances in combination with :

(i) not less than five grains of theobromine, or

(ii) not less than one quarter grain of ephedrine, or

(iii) not less than one and one half grains of theophylline ethylenediamine.

Beta-amino-propylbenzene ; alpha-methyl-phenethylamine and derivatives having any group substituted by another radical ; and preparations and admixtures thereof, except when contained in appliances for inhalation in which the poison is absorbed in inert solid material.

2-Benzyliminazoline hydrochloride.

Carbaminoylchloline.

Carbamylchloline.

Dicoumarol and Ethyl Biscoumacetate ; and substances of a like nature.

Di-isopropyl fluorophosphonate ; and preparations and admixtures thereof.

Dinitrocresols, dinitrophenols, dinitronaphthols, dinitrothymols ; and preparations and admixtures thereof, except preparations and admixtures not intended for the treatment of human ailments.

Gallamine triethiodide.

Hormones (natural of synthetic) except those substances, preparations and admixtures registered and sold under the provisions of the Fertilizers, Farm Feeds, Seeds and Remedies Act, 1947.

Nitrophenols ; and preparations and admixtures thereof except preparations and admixtures not intended for the treatment of human ailments.

Oestrogenic substances (natural or synthetic) except those substances, preparations and admixtures thereof registered and sold under the provisions of the Fertilizers, Farm Feeds, Seeds and Remedies Act, 1947.

Oxycinchoninic acid, its salts and esters.

Para-acetylamino-benzaldehyde-thiosemicarbazone (also known as thiosemicarbazone).

Para-aminobenzenesulphonamide ; its salts, derivatives of para-aminobenzenesulphonamide having any of the hydrogen atoms of the para-amino group or of the sulphonamide group substituted by another radical ; their salts ; and preparations and admixtures thereof ; except those substances and praparations and admixtures thereof intended for external use and except those substances, preparations and admitures registered and sold under the provisions of the Fertilizers, Farm Feeds, Seeds and Remedies Act, 1947.

Para-aminosalicylic acid ; its salts and preparations and admixtures thereof.

Paraldehyde ; and preparations and admixtures thereof.

Phenothiazine ; preparations and admixtures thereof ; except those substances, preparations and admixtures registered and sold under the provisions of the Fertilizers, Farm Feeds, Seeds and Remedies Act, 1947.

Phenylbutazone ; and preparations and admixtures thereof.

Phenylcinchoninic acid ; its salts and esters.

Phenytoin (5:5-diphenylhydantoin).

Polymethylenebistrimethylammonium salts.

Salicylcinchoninic acid ; its salts and esters.

Sulphonal, alkyl-sulphonals ; and preparations and admixtures thereof.

Tetra-ethyl-thiuramdisulphide.

Tridione (3:5:5-trimethyloxazolidine-2:4-dione).

Urethanes and ureides ; all poisonous forms of ; and preparations and admixtures thereof, except preparations and admixtures not intended for the treatment of human ailments.

Vitamin B_6 (Pyridoxine hydrochloride).

Vitamin B_{12} (Cyanocobalamin).

Vitamin D_2 (Calciferol).

Vitamin E (Tocopherol).

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THE STANDARDIZATION OF POULTRY FEEDS IN SOUTH AFRICA

J. D. W. A. COLES
Onderstepoort.

INTRODUCTION

The outbreak of the second World War found the South African poultry industry in one of its not infrequent transition periods. Many farmers were still mixing their own mashes, often using formulas of somewhat mysterious origin. On the other hand, two or three firms were cautiously entering the balanced poultry feeds business. Technical advisers were enrolled on their staffs, but their recommendations were sometimes ignored, when this course of action paid better dividends. Nobody would assert that the directorates were dishonest but, almost without exception, they were composed of ordinary business men, who were ignorant of the amazing advances being made in the field of nutrition. The general attitude was that if the mashes were inferior, the farmer would not buy them. Actually, most feedstuffs were fairly good, but there was much room for improvement. The major defects were associated with insufficiencies of protein, riboflavin, pantothenic acid, manganese and vitamin A. There was often an excess of fibre or calcium.

With the great increase in lucerne growing, due mainly to the efforts of the feed firms themselves, all mashes soon came to contain adequate quantities of lucerne meal. This put an end to the vitamin A problem and helped considerably to alleviate the chronic shortage of riboflavin. Ultimately, the riboflavin and pantothenic acid difficulties were overcome, when the manufacture of butyl alcohol from molasses was begun. The cheap by-product of this new industry contained the much needed vitamins.

South Africa is rather a poor country from the agricultural point of view and supplies of vegetable proteins have always been very limited. During the war the protein shortage became most acute. Fortunately, the cold Benguella current off the west coast is rich in fish and, within a very few years, large amounts of fish meal became available.

By about 1947, the poultry feed manufacturers had at their disposal fairly adequate supplies of fish meal, lucerne meal and maize meal, augmented by smaller amounts of peanut and sunflower oil cake meals, wheaten bran and carcase meal. Maize was by far the most important cereal, as it always had been.

These were excellent ingredients for poultry mashes, but they were often not blended properly. And in order to compete with less scrupulous rivals, the better firms were frequently forced to use considerable amounts of inexpensive and rather worthless maize germ meal and similar products.

The Department of Agriculture took steps under the Fertilizers, Farm Feeds, Seeds and Remedies Act, No. 36 of 1947, to protect the purchasers of balanced poultry feeds, but because of the large number of independent firms engaged in the business, and the utter impossibility of finding the necessary staff of analysts to examine all the samples from so many sources thoroughly, the Government laid down figures only for calcium, phosphorus, protein and fibre. It was perfectly simple for firms to comply with the requirements of the law, without taking much notice of the nutritional requirements of the poultry. The Division of Veterinary Services was very concerned with the state of affairs, and saw in the newly created South African Bureau of Standards a means of escape from their dilemma. Nothing could be easier than for the Bureau, even with a small technical staff, to organize and run a modest but adequate voluntary scheme, in which the four or five large poultry feed manufacturers would participate. And as these four or five firms sold 80% or more of the mashes bought by the farmers, the back of the problem could very simply be broken.

The Bureau agreed in principle to draw up a specification and a committee was appointed, representing the balanced feed manufacturers, various sections of the Department of Agriculture and the Bureau itself. In the background, the South African Poultry Association did much to support the idea.

In due course, a fairly elaborate specification was published, which took cognizance of the few government stipulations, and for all practical purposes the Bureau became the guardian of the interests of the poultry farmers — and, in many more subtle respects, of the feed firms' too.

THE SOUTH AFRICAN BUREAU OF STANDARDS

In the Standards Act, No. 24 of 1945, as amended, the promotion of standardization in Industry and Commerce is cited as the

first of the objects for which the Bureau has been established. Since the specification is probably the most common device for fostering standardization in the industrial and commercial spheres, one of the main tasks of the Council of the Bureau is the framing of specifications. Linked with the issue of a specification is the use of the a mark which, when applied to a commodity, will immediately indicate that the commodity complies with the requirements of th relevant standard specification.

The Standards Act gives the Council of the Bureau power to issue permits for the use of its standardization marks.

The advantages offered to consumers of these commodities are obvious, but the producer also gains by the protection which the mark affords him against unfair competition.

Before the Bureau issues a permit granting permission for the use of its mark, the applicant has to submit samples of the commodity concerned for examination. The applicant's factory in the Union of South Africa or in South West Africa has also to be approved, and the Council has to be satisfied that the applicant is in a position to carry out laboratory tests regularly and systematically on his wares. In the case of poultry feedstuffs the Bureau is content if accurate analyses can be made for protein, fibre, calcium, phosphorus and manganese. Factories have to keep proper laboratory records and data of the batches mixed and formulas used, so that inspectors of the Bureau can ascertain rapidly exactly what has been happening.

When the Council of the Bureau grants a permit to a firm to use its mark, the fact is published in the Government Gazette. If a firm begins to sell an inferior product, and either cannot rectify matters or is indifferent to requests from the Bureau to mend its ways, the Council withdraws the right to use the Bureau's mark. The withdrawal notice also appears in the Government Gazette. An aggrieved firm has the right to appeal to the Minister of Economic Affairs, whose decision is final.

A small levy is made for the use of the mark and estimated fees are payable annually in advance.

The specification for poultry feeds was approved by the Council of the Bureau on 26 June, 1950, and shortly after its publication, the four largest producers of balanced poultry feeds in South Africa applied for permits to use the standardization mark on their mashes. By the middle of 1951, permits were granted to all these applicants.

During the three years that this purely voluntary scheme has been in operation, the firms have solved all their major technical problems and the progress claimed by them is substantiated by the analytical data now being collected in the Bureau's laboratories.

SPECIFICATIONS FOR POULTRY MASHES

The manner in which any country draws up specifications is influenced by the prevailing local conditions. It is not feasible or rational to specify and administer requirements for every essential mineral, vitamin or amino acid for every poultry mash. In South Africa, for instance, there is no evidence that any of the mashes are deficient in magnesium, choline, methionine, pyridoxine, thiamine and B_{12}. Possibly, they are occasionally low in niacin and it may be necessary to bear this in mind when the specification is revised. Obviously, our attention has been focussed only on those factors that have proved in practice to be of special importance.

Surprise may be expressed at the amount of pantothenic acid demanded in the chicken mash. However, nobody in South Africa would have it otherwise, because chick dermatitis is now a thing of the past — and it used to be very prevalent, particularly in the warm weather. Some may suggest, probably with justification, that the calcium in the all-mash ration for fowls should be raised to 2.4%.

All the mashes must be slightly coarse and not floury, and they must be sold in sealed bags that are clean and do not harbour any of the agents responsible for poultry infectious diseases and parasitic infestations. The label has to bear the name of the firm and indicates exactly how the mash has to be mixed with maize meal, if necessary, and how it is to be fed; there must be symbols to enable the Bureau to determine the number of the batch, the mill in which it was mixed and the date of mixing.

All battery mashes are fortified with D_3 — the chicken mash contains 22,680 chick units per 100 pounds weight, the growing mash 36,288 chick units, and the all-mash ration for fowls, ducks and turkeys also 36,288 chick units.

Although the specification leaves it to the individual firm to decide in what proportions the various ingredients are to be used, it contains a list from which they must be chosen. This is to prevent the use of materials like hominy chop, which may be worthless if not harmful. Moreover, lucerne meal, cocoanut oil cake meal, cotton seed oil cake meal, wheaten bran and some other ingredients may not be mixed in excess of certain clearly stated percentage. No charcoal is permitted. Again, this is done to ensure that the health and productivity of the birds will not suffer.

There are nine mashes for which specifications have been drawn up and the details will be found in the table.

Type of Mash	Specification Requirements							
	Protein per cent minimum	Fibre, per cent maximum	Calcium per cent	Phosphorus, per cent	Manganese, per cent minimum	Pantothenic, acid, g. per 100 g. minimum	Riboflavin, g. per 100 g. minimum	Vitamin A I.U. per 100 g. minimum
1. Chicken and duckling mash	19.0	7.0	1.4–2.0	0.7–1.0	80	1,750	300	250
2. Maize-free chicken and duckling mash	30.0	11.5	2.8–4.0	1.1–1.7	160	2,500	500	500
3. All-mash growing ration for chickens, ducklings and poults	17.0	7.0	1.4–2.0	0.7–1.0	70	1,750	300	500
4. Maize-free all-mash growing ration for chickens, ducklings and poults	30.0	14.0	3.5–5.0	1.3–2.0	175	2,900	600	1,250
5. Laying meal for fowls, ducks and turkeys	20.0	10.0	2.0–3.0	1.0–1.5	120	1,500	325	1,000
6. All-mash ration for fowls, ducks and turkeys	15.0	7.0	1.4–2.0	0.7–1.0	70	1,200	225	500
7. Maize-free laying meal for fowls, ducks and turkeys	30.0	17.0	4.0–6.0	1.7–2.7	240	2,000	540	1,300
8. Fattening mash for fowls	13.0	7.0	1.4–2.0	0.7–1.0	—	—	—	—
9. Turkey starting mash	23.0	7.0	1.6–2.0	0.8–1.0	80	1,750	300	700

Samples of mash are sometimes found to be low in manganese. Almost invariably, this is due to difficulties in mixing and not to any absolute deficiency.

Probably no workable scheme can ever be devised that will be fool-proof and firms have on occasion unwittingly marketed chicken mashes, that complied with the requirements of the specification in all respects except that the chickens failed to grow. The incorporation of too much maize germ meal, the cheapest of all our ingredients, was responsible for this. It will probably be necessary to prohibit the use of maize germ meal in poultry rations, certainly in chicken and growing mashes, in order to keep these low energy mixtures off the market.

Instead of wasting time, trying vainly to close all loopholes, the Bureau is wisely fostering the spirit of co-operation between the feed firms and itself, and this is the surest guarantee that the farmers will almost invariably be able to purchase poultry feedstuffs of the highest quality. Firms may sell other mashes not covered by the specification, but not under the same trade-mark. If the Bureau's mark is coupled with a trade-mark, everything sold under that trade-mark must conform with the requirements of the specification.

TESTING FEEDSTUFFS

In addition to sending inspectors to collect samples at the point of mixing or from factory stock, sealed bags of mash are bought on the open market. A complete chemical examination is carried out on every sample and vitamin determinations are made on most. Samples are drawn from every factory at regular intervals.

If circumstances demand it, the Bureau intensifies sampling of the products of a factory to ensure compliance with the specification. Methods for the determination of the various requirements are described in the specification, but in the light of the experience gained so far, some of these methods will be revised in the near future. Copies of S.A.B.S. "Specification for Poultry Feeds" 81-1950, may be obtained at a cost of five shillings, post free, from the South African Bureau of Standards, Private Bag 191, Pretoria, South Africa.

The biological test for chicken growth should, however, be described. The Bureau obtains White Leghorn eggs from an approved farm and incubates them. The chickens are divided into groups of 40 to 50, each group consisting of approximately equal numbers of pullets and cockerels, and these groups are housed in properly heated battery brooders in a well ventilated room, artificially illuminated for 12 hours a day, into which no sunlight can penetrate. Except in the case of battery mashes, all mixtures to be tested are first fortified with vitamin D_3 in accordance with the specification. A control group is always included, and the standard ration fed to these birds just meets all the requirements laid down.

STANDARD RATION

Ingredients	Parts of Weight
White maize meal	40
Oatmeal (with hulls)	30
White fish meal (68 per cent protein)	12
Peanut cake meal	8
Wheat bran	5
Lucerne meal	2
Limestone flour	2
Bone meal	1.5
Salt	0.25
Manganese sulphate	0.02
Pantothenic acid	0.00044
Riboflavin	0.00015
Vitamin D_3	22,680 chick units per 100 lb. mash.

The various mashes are fed ad libitum for six weeks, after which the chickens are weighed individually, and the average weights of the pullets and cockerels in the different groups are calculated. These average weights are then compared with 90% of the average pullet and cockerel weights in the control group. When the specification is revised, the Bureau will probably propose that all chick mashes must produce growth fully equal to that obtained on the standard ration.

During the six weeks of the test, the chickens are all kept under careful observation, to make sure that no signs of deficiency diseases appear. As a matter of interest, the weights attained on a few mashes, all from different factories, are given.

	Average Weights in Grams of :	
	Pullets	**Cockerels**
Mash A	425	480
Mash B	401	419
Mash C	408	459
Mash D	416	487
Mash E	436	512
Mash F	370	424
Mash G	423	528
Control mash	412	442

Under the conditions in the laboratory of the Bureau, it is felt that White Leghorn pullets on a really good mash should weigh about 435 grams at six weeks, and cockerels 500 grams.

To cover the cost of administration of the standardization mark scheme, and the analytical check control once a permit has been issued, a mark fee is levied, amounting to £3-15-0 per 100 tons of feed sold by a firm. The price of most poultry mashes in South Africa is now about £20 per ton, so the extra ninepence collected by the Bureau is negligible.

About 170,000 tons of poultry mash was sold under the mark of the Bureau in 1952 and this represented about 80% of all the mash supplied to chicken farmers. This figure of 80% will rise steadily, as the farmers learn to appreciate the value of the mark more and more.

THE RESULTS OF STANDARDIZATION

On the whole, the scheme has worked admirably. No longer do farmers have to listen to the slick sales talk of the representatives of competing firms. They simply buy their requirements from any firm entitled to use the mark of the Bureau, provided they are satisfied with the financial arrangements that can be

made. It is equally easy for veterinarians and others to advise their clients on the purchase of poultry feedstuffs.

Deficiency diseases of poultry are now very seldom seen. When they are encountered, they are generally due to the farmer buying mashes from firms having no dealings with the Bureau — and he seldom makes the mistake twice. Sometimes, however, farmers fail to feed the "Bureau" mashes correctly and get into trouble; for instance, chickens may be given grain as well as mash, when the latter alone should be fed, and so develop curled toe paralysis. The Bureau is always ready to investigate any grievances farmers may have against the products of mark-holders, but as poultrymen often blame the mashes instead of infectious diseases and bad management for deaths and poor egg production, the Bureau goes into action only when state veterinarians deem it necessary.

The feed firms, after being rather hesitant and doubtful at first, are now completely co-operative and realize that participation in the scheme is well worthwhile. The mark scheme affords protection to the manufacturers, when unscrupulous farmers attempt to browbeat them into paying damages for losses attributed to poultry rations, proved to be satisfactory by the Bureau. Mark-holders' products are confidently recommended to farmers by government officials and others and so enjoy much free but valuable publicity. Firms no longer need to send their salesmen out to woo the farmers, with even more fantastic stories than those concocted by their competitors. All the farmer wants to know now is whether the firm has the mark and what the terms are. Finally, there is no doubt that managements have learnt to appreciate their technical advisers better and become more conscious of their simple duty to the farmers.

The South African Poultry Association deserves much credit for fostering excellent relations between the Bureau, the feed firms and the farmers. Without their good offices, the scheme could not have been such a success.

The Bureau itself is entitled to praise. Standardizing poultry feedstuffs is no simple task, for they are compounded of many ingredients, that are seldom constant in composition. To this drawback must be added the fact that few, if any, of the firms were really well equipped for analytical work and that the mixing machinery often left something to be desired. The Bureau has always gone out of its way to advise and assist the firms wherever necessary, rather than admonish them for shortcomings. This helpful attitude has borne fruit, and practically all the branches of the participating firms are now in a position to guarantee that all batches of mash will meet every requirement. Of 394 samples

of various mashes tested for pantothenic acid and riboflavin between October, 1952, and September, 1953, 343 were completely satisfactory, whereas 33 were low in pantothenic acid, 15 were deficient in riboflavin and 3 failed in the case of both vitamins. Considering the short time the scheme has been in operation and that the great majority of the mashes which failed to comply with the requirements were not markedly defective, these figures are by no means discouraging.

SUMMARY

The balanced poultry feeds business in South Africa really began to develop at the time of the second World War. Too little attention was paid to the very exact nutritional requirements of the different classes of poultry and deficiency diseases were often encountered.

The central government attempted to remedy matters by laying down figures for protein, fibre, calcium and phosphorus in poultry mashes. No staff was available for determining also the amounts of vitamins, and the position was aggravated by the necessity of assaying samples of mashes sold by numerous, relatively insignificant firms. The manufacturers were able to comply with the letter of the law, without necessarily meeting the nutritional requirements of the birds.

With the creation of the South African Bureau of Standards, the opportunity arose to enrol the few, large feed manufacturers in a voluntary scheme, which would definitely ensure that the firms concerned would market only mashes meeting the comprehensive nutritional requirements of the specification.

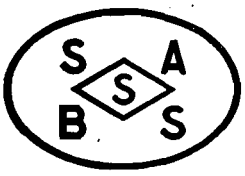
The sealed bags of feed sold by these firms carry the special mark of the Bureau, which is the farmer's protection. In 1952 about 170,000 tons of mashes were sold under the mark of the Bureau. This represented about 80% of the mashes sold by all firms put together. The tendency is for farmers to stop patronizing firms not participating in the Bureau's scheme.

Poultry mashes cost about £20 per ton in South Africa. This is increased by the insignificant sum of nine-pence to meet the cost of the administration of the mark scheme and the examination of thecheck control samples.

The scheme has been a great success, in spite of many early difficulties, and deficiency diseases of poultry are now seen only rarely.

Both farmers and the poultry feed manufacturers have come to realize that this voluntary scheme is a blessing to them, even if for different reasons, and the pig breeders have been so impressed, that they also have arranged to enjoy similar benefits in the near future.

THE MARK OF THE BUREAU OF STANDARDS



NOTES ON ANTRYCIDE METHYL SULPHATE

D. K. SHONE,

Salisbury.

The methyl sulphate salt of "Antrycide" has been used in Southern Rhodesia for the treatment of slaughter cattle being moved out of a trypanosomiasis infected area. The cattle were slaughtered at the Salisbury abattoirs 3-4 days subsequent to treatment and an oedematous reaction with a chalky deposit was found at the site of injection. The drug was administered subcutaneously as a 10% solution at the recommended rates of dosage viz.

up to 150 Kilograms	5 mgm. per Kilo.
150 to 200 Kilograms	1 gram (10cc. of a 10% sol.)
200 to 350 Kilograms	1.5 grams (15cc. of a 10% sol.)
350 Kilograms and over	2 grams (20cc. of a 10% sol.)

Approximately 75% of the animals slaughtered showed this reaction deposit and as this entailed the trimming of 5-10 lbs. of meat from each carcass it was a considerable economic loss to the owner. Material from these lesions was submitted to the Laboratory for investigation. Direct microscopic examination showed the deposit to be of a crystalline nature.

These lesions were readily reproduced in guinea pigs using a 10% solution at ten times the recommended dosage but no deposit was observed when a 1% solution was used at the recommended dosage. In vivo tests with a mixture of "Antrycide" methyl sulphate and bovine serum resulted in marked precipitation. Progressive dilutions of an initial 10% Antrycide solution from 1 : 1 at a dilution of 1 : 2. Similar results were obtained with equine serum.

It was then decided to determine whether the precipitating agent was in the protein component of the serum or not. The protein in the serum was precipitated with absolute alcohol and centrifuged. The supernatant fluid was drawn off and mixed with the Antrycide solution and a heavy precipitate resulted.

It was also found that the precipitate and fluid obtained with bovine serum was fifty times less toxic for guinea pigs than the 10% Antrycide methyl sulphate solution.

Further tests were carried out by the addition of solutions of inorganic salts, normal components of serum, to a 10% solution of antrycide and the following results were obtained :—

10% Antrycide methyl sulphate plus Sodium carbonate — no precipitate; 10% Antrycide methyl sulphate plus Magnesium sulphate — no precipitate; 10% Antrycide methyl sulphate plus Sodium Chloride — heavy precipitate; 10% Antrycide methyl sulphate plus Ferric sulphate — no precipitate; 10% Antrycide methyl sulphate plus Potassium carbonate — no precipitate; 10% Antrycide methyl sulphate plus Sodium phosphate — no precipitate; 10% Antrycide methyl sulphate plus Sodium sulphate — no precipitate; 10% Antrycide methyl sulphate plus Potassium phosphate — no precipitate.

The assumption is that the precipitation was a result of the conversion of the methyl sulphate salt of "Antrycide", to the practically insoluble chloride salt.

At the same time as the above experiment was in progress an alternative route of administration, the intravenous, was tried.

Two animals were weighed and one was given a 10% solution of antrycide methyl sulphate at the rate of 5 mgm. per kilgram and the other at the rate of 5.9 mgm. per kilogram. In both cases the drug was administered slowly. The animal which received 5 mgm. per kilo showed severe shock symptoms within 5 minutes of completion of injection and collapsed but recovered without suffering any apparent after effects. The animal which received 5.9 mgm. per kilo collapsed and died within five minutes of completion of the injection.

Conclusions :

1. Antrycide methyl sulphate may be very readily converted to Antrycide chloride by the addition of a solution of sodium chloride.
2. On the subcutaneous administration of Antrycide methyl sulphate the sodium chloride present in the body tissues results in the conversion of a proportion (Undetermined) of the antrycide methyl sulphate to the relatively insoluble chloride salt.
3. The intravenous administration of "Antrycide" methyl sulphate has too narrow a margin of safety for its use in the field by this method.

ACKNOWLEDGMENT

I wish to acknowledge with thanks the advice given by Doctor D. A. Lawrence, Assistant Director of Veterinary Services, Research, and for his permission to publish this paper.

INTERAFRICAN BUREAU FOR EPIZOOTIC DISEASES

The third Annual Session of this C.C.T.A. organization took place at Muguga near Nairobi, Kenya, from July 28th-30th, 1954, under the Chairmanship of M. Larrat, Inspecteur-Général, Veterinary Services in Overseas France.

The representative of the Union of South Africa was Dr. R. du Toit, Sub Director of Veterinary Research, Onderstepoort. Delegates were present representing other C.C.T.A. territories, viz. Belgium, the Federation of Rhodesias and Nyasaland, France, Portugal, and United Kingdom. All the delegates were veterinarians.

The work of the Bureau in the preceding twelve months was discussed and further recommendations were made for strengthening the information, liaison and administrative functions of the organization which concerns itself with no less than 25 of the common diseases of domestic animals in Africa.

The *Bulletin of Epizootic Diseases of Africa* is compiled and edited by the Bureau and published in both French and English. It contains original articles on animal diseases in Africa, extracts and reviews of departmental annual reports and abstracts of special interest to Veterinarians in Africa from hundreds of scientific periodicals.

The inaugural meeting of the Inter-African Advisory Committee on Epizootic Diseases took place at the same time. This Committee was established by the Member Governments of the C.C.T.A. to advise these governments on the control, and research into, epizootic diseases in Africa.

The Committee considered a report on the recent outbreak of Rinderpest in buffaloes and other wild animals in the region north of the Equator along the common boundaries of the Belgian Congo, Sudan and Uganda. The subject of Rabies was considered at length and it was recommended that a CCTA/WHO training course on laboratory techniques and field control be held in Africa in 1955. Several of the new diseases which have been established or are in danger of being introduced into Africa were considered. Special consideration will be given at the next meeting of the Committee to the questions of sero-diagnosis in Contagious Bovine Pleuro-pneumonia, Vaccination in Foot and Mouth Disease in Africa, and Bovine Cutaneous Streptothricosis.

W. G. BEATON,
Director.

CASE REPORT

OPERATIVE TREATMENT OF COLIC IN A FOAL

A. LITTLEJOHN,
Mooi River.

The subject was a five-weeks old thoroughbred foal.

On examination, the foal showed typical symptoms of flatulent colic. Both flanks were distended, the left one particularly so, and the patient was continually lying down, kicking, then getting up and pawing the floor. A proprietary drench mixture had been administered by the owner before the writer's arrival.

A carminative was administered per os., a copious saline enema given, and an injection of Prostigmine (Roche) administered. Little improvement was obtained after a suitable interval, and the patient was trocharised on both flanks, after which there wase great relief and the foal started to suckle.

Three hours later, the patient again started to go down, rolling and kicking. Repeated enemas and a second injection of Prostigmine had failed to produce bowel evacuations. There was no flatulence present, and an impaction could not be detected either by rectal exploration with the finger or by palpation of the abdomen.

The condition of the patient speedily deteriorated, as shown by a rising pulse and temperature (103°) and an injected conjunctiva. The foal now lay on her side, legs stretched out with occasional kicking and straining, and refused to get up. No bowel evacuations had taken place for, as near as could be ascertained, about ten hours.

After discussion with the owner, immediate laparotomy was decided on. Anaesthesia was accomplished with 18 cc. of nembutal (a further five cc. were administered during the course of the operation). The left flank was chosen as the site, since the pelvic flexure is the most common site of impaction, and can be most readily exposed at this incision. This choice subsequently proved to be a wrong one.

An incision large enough to admit the hand was made and the abdominal cavity explored. The left dorsal and ventral colons were devoid of faeces, and contained a little gas. It is of interest to record that no sign of the trocarisation was seen on careful examination of both dorsal and ventral colons.

On palpation of the right dorsal colon, a firm fibrous mass was felt, distending it for about half its length. It was decided that the lesser risk lay in attempting to disperse the impaction mass by manual manipulation than in enlarging the incision and bringing the impaction through it. This was accordingly done, and the fibrous mass was broken down by pressure of the fingers and thumb through the bowel wall and distributed throughout the length of the right and left dorsal colons. The wound was then closed, the peritoneum being sutured separately with a continuous "shoelace" stitch and the muscles with interrupted 20 day catgut.

Four hours later, the foal got to her feet and immediately started to pass dung, which consisted mainly of hard, dry stalks and roots of Kikuyu grass, on which mare and foal had been running. The foal was given Penicillin injections for five subsequent days, and made an uneventful recovery.

This case presents some puzzling features not encountered in colics in equines and provokes some pertinent questions — viz. was the flatulence subsequent to the impaction, or vice versa? It is the writer's opinion that the impaction at the entrance of the small colon took place first, and that fermentation of this mass or of milk subsequently drunk produced the flatulence. The owner stated that the foal had not passed dung for some hours prior to his noticing colicky symptoms.

Secondly, had the condition anything at all to do with the eruption of the temporary teeth — the laterals and first, second and third molars? Digestive troubles are commonly coincidental with the eruption of teeth and on such tough dry pastures as Kikuyu in the late winter, the foal may well have bitten off more than she could chew.

The difficulties of pinning down an impaction to any particular part of the bowel, in a foal of this age, are only too apparent. In a newborn foal hard balls of meconium can be easily palpated, as far as eighteen inches along the colon and rectum anterior to the anus; but abdominal palpation is of little value in a foal more than one month old. Rectal palpation with the finger is of little value in a foal of this age, unless the impaction were in the pelvic flexure, when it might be touched with the tip of the finger.

For the benefit of those who are superstitious, the foal's name was Lucky Ray and she was born on the thirteenth of August, 1953.

I wish to acknowledge with thanks the helpful telephonic advice given by Prof. J. B. Quinlan regarding this case.

Jl. S.A.V.M.A. 25(3), 1954.

PRELIMINARY NOTES ON THE BEHAVIOUR OF GLOBIDIUM BESNOITI MAROTEL, 1912, IN THE RABBIT

J. W. POLS,
Onderstepoort.

The artificial transmission of *Globidium besnoiti* Marotel, 1912, to the rabbit (Pols, 1954) provided an opportunity of studying the behavour of the parasite in this animal.

Initial subinoculations were carried out by the intravenous, subcutaneous and intraperitoneal routes. Subsequent passages were all done intraperitoneally. Temperatures and blood smears were taken daily after the inoculation. Up to date 19 serial passages have been made. Altogether 145 rabbits were used for this study.

The incubation period, symptomatology and course of the infection during the earlier passages have been described (Pols, *loc. cit.*). During subsequent passages the incubation period did not seem to vary. From the 11th passage onwards an occasional rabbit was found to live much longer and in still later passages cases of this nature became more frequent. At the present stage of observations it would appear that in more rabbits the disease takes a protracted course with the increase of the number of passages. In addition to the symptoms described, scrotal and testicular swelling were noted to constitute the first clinically observable lesion in males. Furthermore, some rabbits developed swelling of the whole head and parts of the body. It is not clear whether the latter observation may be ascribed to a modification of the reaction pattern due to repeated subinoculations, or to the fact that the larger number of animals employed since the first study allowed one to observe a wider range of symptoms. A similar doubt exists with regard to those cases which did not show any clinical symptoms apart from a febrile reaction. An increase in the white cell count to as much as three to four times the normal with a distinct monocytosis was observed. In many cases a serious drop in the number of erythrocytes, as much as 50% or even 75%, was noted.

In the blood, lung and testis smears *G. besnoiti* varies in size from 5μ to 9μ in length and from 2μ to 5μ in width. Similarly, there is a variation in shape. Oval forms, slightly pointed at one end, are the most common. Curved forms with rounded ends (banana shaped) and crescentic types are found more rarely. Only a few round forms have been observed.

The cytoplasm is granular and stains blue with Giemsa, usually slightly lighter at the one (blunt) end. At this end one often observes a yellowish red area or cap from which fine striations

radiate towards the nucleus. Occasionally darker granules as well as vacuoles are noticed. Usually the staining of the crescent shaped forms is more intense than that of the oval forms.

The nucleus is situated near the centre. It, may, however, occur in various positions, and does not conform to a definite pattern or size. In the oval shaped parasite it varies from a fairly compact form to a loose net-work of chromatin. Double nuclei are also seen. In the case of the crescent shaped parasite it is contracted and stains darkly as a rule.

Apart from single trophozoites, great numbers of divisional forms are seen in different stages. The most common of these is a binucleate oval parasite (*vide* Plate, No. 4). Note that the cytoplasm is in the initial stage of division. All transitional stages between this and figures No. 5 and 6 can be demonstrated. One may thus infer that simple binary fission is the usual mode of multiplication. Nevertheless, multiple divisions do occur, as illustrated by figs. 7 and 8. Compared with the former they are so rarely observed as to lead one to suspect that they represent aberrant forms.

As stated elsewhere (Pols, *loc. cit.*) all the above forms may be seen extra-cellularly as well as in monocytes and, rarely, in neutrophiles.

Histological sections, single and serial, were prepared from skin biopsies and organ specimens taken *post mortem*. The staining used throughout was haemalum-eosin. Examination of these sections revealed trophozoites, both singly and in groups, in connective tissue from two weeks after the date of infection. The initial stages of cyst formation were observed as early as 16 to 18 days after inoculation. Thus far cysts have been found in the cutis vera and subcutis from various parts of the body, as well as in the connective tissue of the testis.

The cyst develops as follows :-

When one trophozoite or more invade either wandering or fixed histiocytes there seems to be a reciprocal stimulus to division between the host cell and the parasites : there is multiple division of the nucleus of the former and the trophozoite starts to multiply by binary fission inside a vacuole formed in the cytoplasm of the host-cell (Figs. 9 and 10). In sections trophozoites are seen in a much contracted form ; they measure approximately 3μ in length by 1.5μ in width. The vacuoles are quite small at first and measure approximately 8μ in diameter. They enlarge with the multiplication of the parasite and 9 weeks after the date of infection range from 80μ to 120μ with extremes of 50μ to 200μ. These sizes are about one quarter to one third of those seen in cattle. The outer hyaline capsules (*vide infra*) are not fully developed. It is thus quite possible that these stages of cyst formation do not represent the fully mature state. If more than one trophozoite

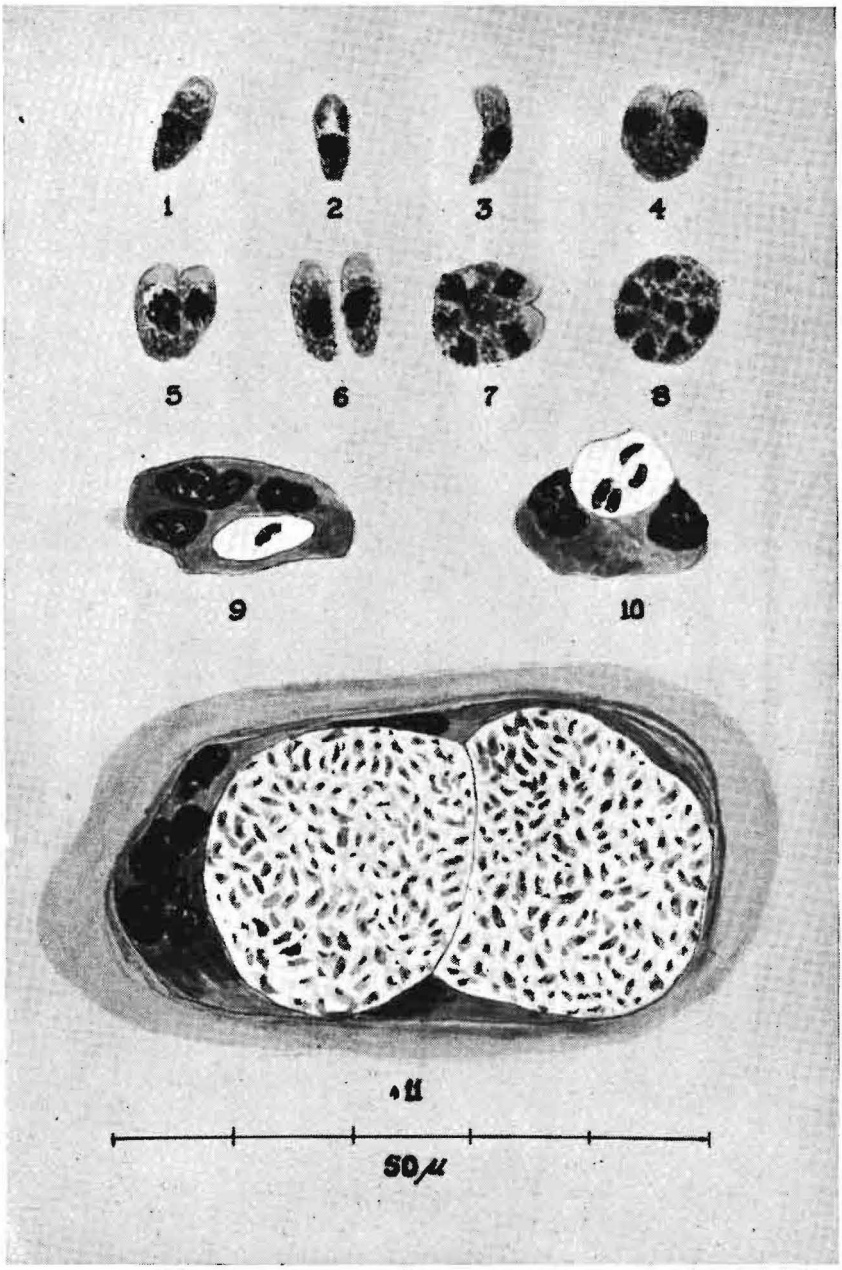


PLATE I : Figures 1-8. Forms of *Gl. besnoiti* found in smears. Figures 9-10. Stages in the development of the globidial cyst.

develops in different vacuoles in the same cytoplasm, the resulting structure shows the individual groups of so-called "spores" each enclosed in its own membrane (Fig. 11) which may be formed by the rim of the vacuole, or by the parasite itself, or by both. This membrane will be referred to as the inner membrane.

As stated previously the nucleus of the host cell divides repeatedly to form a multinucleate cell. As a result of the development of the parasite(s) in the vacuole(s) the cell cytoplasm is compressed to form a narrow rim, which then constitutes and intermediate membrane. The nuclei are interposed between the intermediate and the inner membrane. Around the host cell concentric layers of collagenous fibres form an outer wall, which undergoes hyalinisation to form the hyaline capsule referred to above. Traces of concentric layers, which at times still may be visible, betray the capsuler morphogenesis.

SUMMARY AND CONCLUSIONS

(1) Repeated subinoculations of *Gl. besnoiti* in rabbits did not modify the incubation period but a more protracted course generally characterised the later passages.

(2) The additional symptoms observed varied from a febrile reaction only to severe swelling of the head and body. In males scrotal swelling was often the first symptom observed. No definite correlation existed between the number of subinoculations and severity of symptoms.

(3) A description of the parasite in blood, lung and testis smears is given.

(4) It is inferred that simply binary fission is the usual mode of multiplication, but multinucleate aberrant forms occur.

(5) The globidial cysts are formed in the cutis vera, subcutis and connective tissue of the testis by invasion of histiocytes by trophozoites. These multiply by binary fission in intracellular vacuoles to form one or more groups of so-called "spores" each enclosed in its own inner membrane. These are surrounded by an intermediate membrane representing the cytoplasmic and multinucleate remnants of the host cell. The outer wall or capsule arises through hyalinisation of concentrically layered collagenous fibres.

ACKNOWLEDGMENTS

The writer wishes to express his gratitude to the Director of Veterinary Services, Dr. R. A. Alexander, for the facilities provided to continue these investigations and to Dr. W. O. Neitz, under whose supervision this work was done, for his invaluable advice.

REFERENCES

POLS, J. W. (1954). The artificial transmission of *Gl. besnoiti* Marotel, 1912, to cattle and rabbits. J.S.A.V.M.A. 25-2, p. 37-44.

CASE REPORT

PUNCTURE OF CYSTERNA MAGNA FOLLOWING HEAD INJURY IN DOG

J. F. BROWNLIE,
Cape Town.

SUBJECT

Pomeranian dog about three years of age.

HISTORY

He had been struck by a passing car some ten minutes before being brought to my surgery.

CLINICAL SIGNS

He was just able to stand, with head arched back and to the left. The eyes were wide and staring, the pupils contracted, and the eyeballs oscillated rapidly. In the left eye the sclera in particular was a uniform dark red. Abrasions of the head were also in evidence.

Examination of the rest of the body revealed no abnormality.

PROVISIONAL DIAGNOSIS

Severe head contusions with possible fracture, and/or dislocation or fracture of cervical vertebrae.

DIAGNOSTIC PROCEDURE

Lateral and P.A. X-Rays of the head and cervical vertebrae were made, and the head screened, rotating it slowly as this was done. (A breach of continuity can often be seen by this "rolling").

None of these methods disclosed any fracture or dislocation.

DIAGNOSIS

Bruising of the brain substance, and very probably haemorrhage producing increased intra-cranial pressure.

TREATMENT

An exploratory puncture of the Cysterna Magna was decided upon, firstly to determine if in fact haemorrhage had occurred, and secondly if it had, to drain some of it off before coagulation occurred. I believe that in human neurological practice if coagulation occurs, pressure degeneration of brain tissue results unless an operation for decompression is carried out.

Accordingly under I-V Thiopentone anaesthesia, and with aseptic technique the Cysterna Magna was tapped. (The procedure is relatively simple, and is fully described in Canine Surgery, Radiology in Canine Practice, etc.).

I was relieved to see a few drops of clear Cerebro-spinal fluid giving way to an obviously haemorrhagic fluid.

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Pen-Strept-Amide "Wound Powder"

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LETTER TO THE EDITOR

P.O. Box 145,
GERMISTON.
4th May, 1954.

Dear Sir,

RE: MUNICIPAL VETERINARY SERVICE.

Permit to write a few lines on the above subject, with particular reference to your excellent article in the March. 1954, issue of the Journal and also that by Dr. M. C. Robinson which appeared in a previous issue.

Firstly, in emunerating the duties of a Municipal Veterinarian, mention was not made of his duties in respect of milk control generally, i.e. apart from the health of the milk producing herds. In Durban, Cape Town, Pretoria, Bloemfontein and Germiston, the Municipal Veterinarian is directly responsible to the Medical Officer of Health for all aspects of milk control. With a staff of Health Inspectors he controls production of milk in all its stages, as well as the final handling and processing e.g. pasteurization and bottling. His knowledge of all the technical aspects of this work has led him to become recognized by Medical Officers and Health Inspectors alike as the man best qualified to deal with Municipal Milk Control.

Secondly, on the Reef there exist several towns which employ veterinarians on a part time basis, and in time these will grow into full time appointments. It is however, highly desirable that some of the larger cities e.g. Port Elizabeth, East London, Pietermaritzburg, etc. realise that a veterinarian is essential for proper control of the cities' milk and meat supplies and to this end some persuasive propaganda on the part of individuals and/or the Association might be in order.

The Public Health Amendment Act does, unfortunately, not encourage local authorities to appoint Veterinarians by withholding the subsidies on salaries of all Municipal Veterinarians except those fully employed in meat and milk control i.e. as soon as some other duties (e.g. supervision of transport animals or Zoological gardens) are performed, subsidy is withdrawn. Also, no provision is made in the Act for the salaries of part-time veterinarians to be partially refunded by the Union Health Department, to the local authority. In view of the financial stringency at present imposed on municipal affairs, the absence of encouragement from the Union Health Department mitigates against new posts being created. This deficiency in the Public Health Amendment Act matter might well be taken up by the Association.

Yours Sincerely,

L. W. VAN DEN HEEVER.

Veterinary Research Laboratory,
ONDERSTEPOORT,
1st May, 1954.

The Director of Veterinary Services,
ONDERSTEPOORT.

"CEREBRAL REDWATER": Cow: J. Booysens, Bethal.

I would like to bring the following case to your notice.

On 17.4.1954 a Mr. Booysens saw me. He had lost some 12 cattle in 14 days on his farm at Babsfontein (near Isis Estates). The description of the symptoms was rather vague as he lives on another farm in the Bethal district. One had purged blood, another passed red urine and a third had "looked like heartwater". Dr. MacFarlane had seen some of these animals and diagnosed

"aberrant three-day stiff-sickness". (The same as he had had in his herd). Mr. Booysens brought with him a blood smear from the latest case, a cow. The smear showed few B. bigem. and no anaemia. I told the owner I could not ascribe the symptoms to such a light infection, but he should give it pirevan. In view of the vague history I asked for further smears, brain and toxicological specimens should the cow die. These duly arrived and the spleen smear showed a light infection with Babesia but the Pathology section reports ± 100% of the cells in the brain capillaries to be infected. The liver was negative for arsenic.

When working in the Pathology section I encountered cases from Zululand where the animals showed nervous symptoms and negative blood smears. Examination of the brain (for heartwater) revealed the cells of the capillaries heavily infected with Babesia.

Years ago the late Dr. Parkin had a dog showing the clinical signs of Biliary Fever (haemolytic icterus) but no parasites could be found. On examination of the brain the capillaries were found to be packed with cells infected with B. canis.

I bring this to your notice as a possible explanation of deaths with negative blood smears. Does "cerebral babesiosis" occur as a complication to other conditions such as virus infections?

R. CLARK.

BOOK REVIEW

TIERARTZLICHE LEBENSMITTELUBERWACHUNG. EIN PRAKTIKUM van Dr. G. Wundrum und Prof. Dr. F. Schonberg. Sechste Auflage 1953. Paul Parey in Berlin und Hamburg.

This book, an veterinary food inspection, gives a useful and complete account of the subject as applied in Germany. It deals with the regulations concerning the inspection of meat products. There is chapter on meat technology which describes the properties, appearance and differentiation of the meat and organs of slaughter animals, the way the various cuts are obtained from a carcase, the utilization of the internal organs and changes which occur after slaughter. Routine methods of inspection and diseased conditions found in carcases are described. Chilled meat, frozen meat, dried meat, meat products and sausages including their properties and the processes used in producing them are given. Bacterial food poisoning is dealt with. This is followed by chapters on whale meat, fish, crustacea, poultry, game and eggs which are dealt with in the same systematic manner as the section on meat. There are numerous clear illustrations and the book is well printed on god quality paper.

This book will be found useful by those concerned with meat inspection.

G.D.S.

Director of Veterinary Services,
P.O. ONDERSTEPOORT,
24th July, 1954.

All Sub-Directors of Veterinary Services,
All State Veterinarians.

REVISED PRICES OF VACCINES

Owing to the rapid progress that has been made with the production of freeze dried and other vaccines, a recent costing was undertaken at Onderstepoort and Treasury Authority has now been obtained for an amendment in the selling prices of the following vaccines and other products :—

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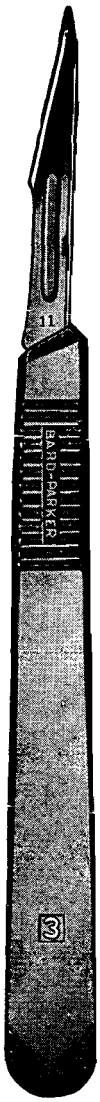
Ring test Antigen	1/–	,, c.c.
Nodular Worm Remedy	3/–	,, tin

These prices will have effect as from the 1st August, 1954 and a revised price list, reflecting these changes, will be compiled in due course.

(Sgd.) H. DE BRUIN,
for Director of Veterinary Services.



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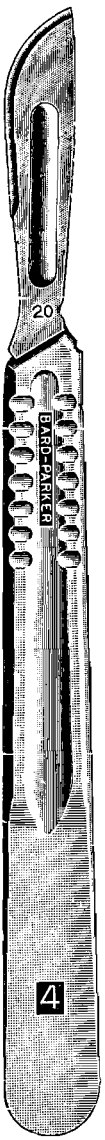

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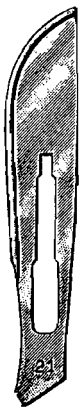

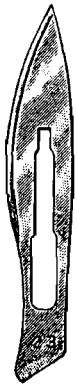

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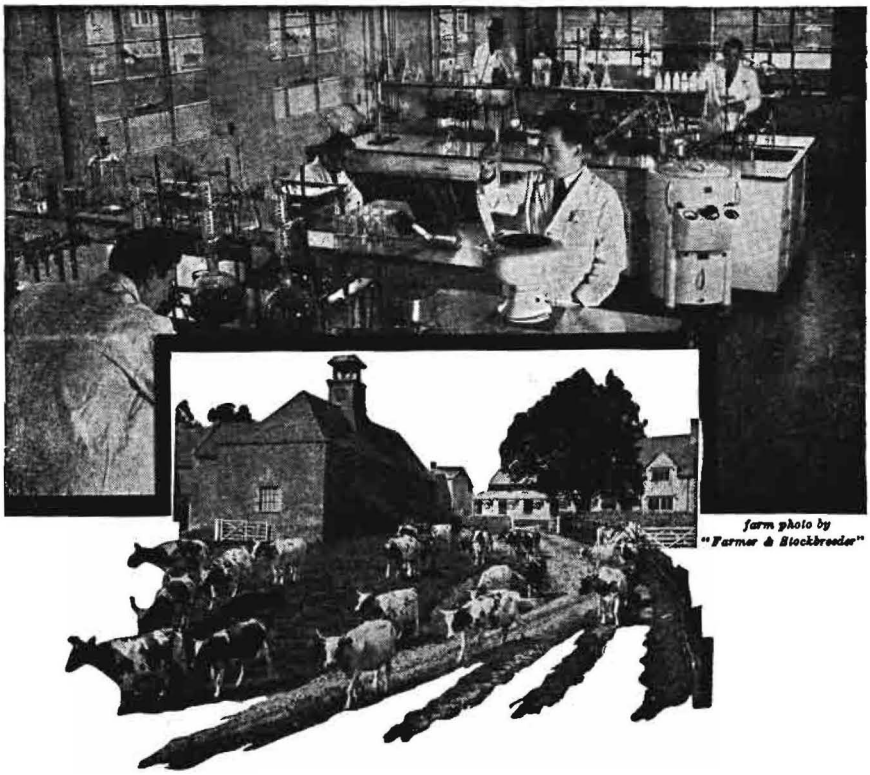

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Jl. S.A.V.M.A. 25(4), 1954.

ON THE CHEMOTHERAPY OF CALF PARATYPHOID

by

M. W. HENNING,

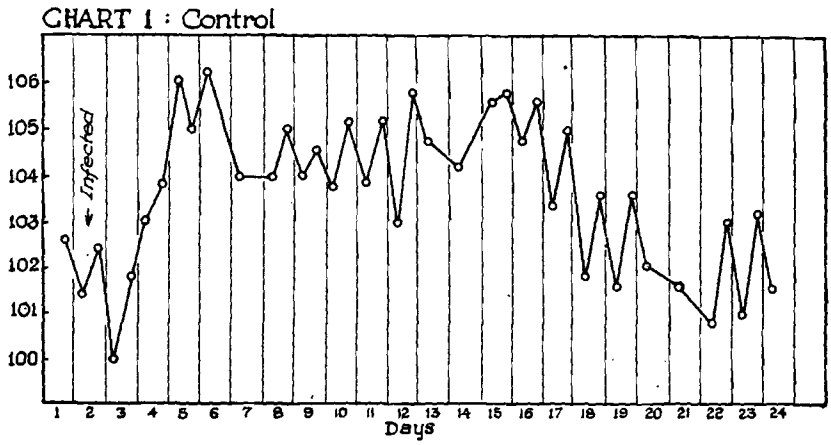
Onderstepoort.

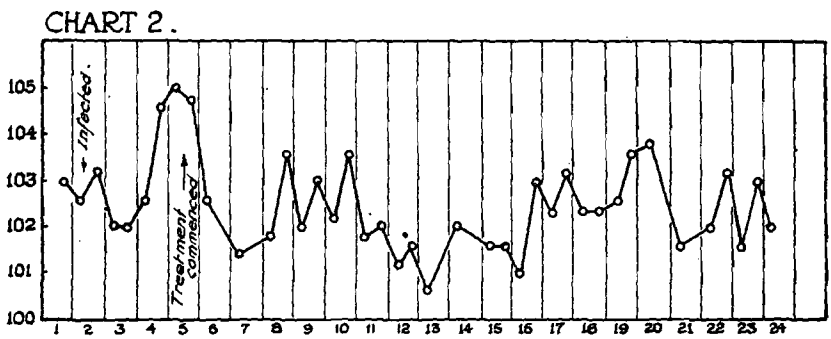
In previous reports Henning (1939, 1953a) showed that over 95 per cent of all cases of calf paratyphoid in South Africa were due to *Salmonella dublin*. He further (Henning, 1953b) reported that experimental cases of this disease, produced by feeding fresh cultures of the organisms in the milk, could be effectively treated by means of large doses of phthalylsulphathiazole. The drug was pulverized and administered in the milk. The daily dose varied from 15 to 30 grams, and treatment was continued for three days or more, and until the clinical symptoms had disappeared. In some cases treatment was resumed when symptoms returned after a few days of apparent improvement. Two of the treated calves remained carriers for some time, one of them for an indefinite period.

In another study Henning (1952) showed that experimentally produced cases of calf paratyphoid could be effectively treated with chloromycetin administered parenterally. Two grams of the antibiotic were administered subcutaneously every eight hours for a period of three days, i.e. a total of 18 grams of the drug were given per calf. Howarth, Cordy and Bittle (1954) treated a number of *S. bredeney* infected calves with streptomycin and chloromycetin. The response to streptomycin was poor, and 10 of the 12 treated calves died in spite of the treatment, whereas only one of the 12 calves that received chloromycetin succumbed. Dickson (1954) found neomycin sulphate effective for natural cases of *S. dublin* infection. Of the 40 calves treated 33 recovered, but the seven that died were in a moribund state when treatment was commenced. One gram of the drug was administered every 12 hours for three days, followed by 0.5 gram doses until recovery was complete. Brennan and Lasky (1954) reported excellent results with chlortetracyeline (aureomycin) in salmonella infection in calves ; 500 mgms. of the antibiotic was given orally every 8 hours, first for a period of four days, but later treatment for 48 hours was found to be sufficient. They recommended ruminal inoculation once a week after treatment in order to hasten the convalescence. Intravenous administration of 5 mgm. per pound body weight did not give such favourable results.

Another drug, furazolidone, one of the nitrofurous compounds viz. N—(5—nitro—2—furfurylidene)—3—amino—2—oxazolidone

was tested by Williams Smith (1954) and Grumbles, Wills and Boney (1954) in the treatment of fowl typhoid. When given in a mash at levels of 0.02, 0.011 and 0.0055 per cent it was found to be effective in preventing mortality due to *S. gallinarium* infection in both fowls and turkeys. Grumbles et al. (1954), however, found





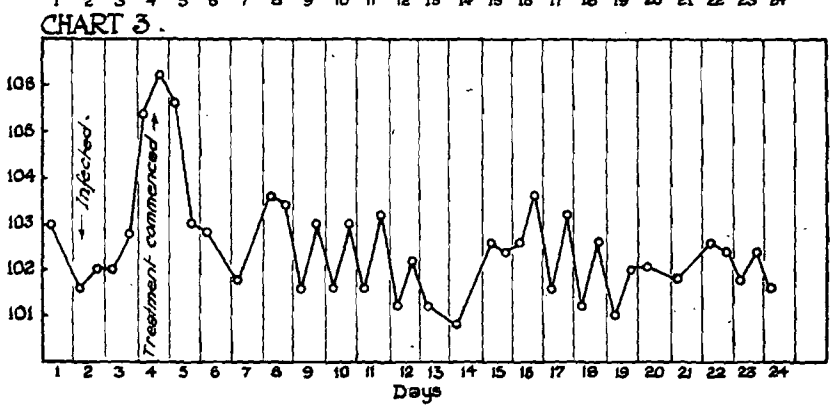


Chart I. The temperature chart of the control group.

Chart II. The temperature chart of the chloromycetin group.

Chart III. The temperature chart of the furazolidone group.

that exposed and treated birds were susceptible to re-infection and to be carriers of *S. gallinarium*.

On account of the seriousness of the calf paratyphoid problem in this country it was decided to carry out further tests on the therapeutic value of two of these drugs, viz. chloromycetin and furazolidone, in the treatment of this disease. Twelve calves of approximately seven days old were procured for the experiment and all were infected per os according to the method described by Henning (1953b) i.e. by adding daily for three days approximately 10 c.c. of an 18-hour broth culture of *S. dublin* to the milk ration of a calf. The milk was previously heated to blood heat and kept in the incubator for 2 hours before being given to the calf. A temperature reaction and a foetid diarrhoea were generally evident on the third day. On the fourth day the hyperthermia was usually very marked and the diarrhoea very severe. On the fourth day the temperatures of the calves varied from 105 to 106°F and all were scouring more or less severely. The calves were then divided into three groups of four each. Four of the calves were given chloromycetin, four received furazolidone, and four were kept as controls. The temperature reactions of the calves in the different groups are given in charts I, II and III.

THE CHLOROMYCETIN GROUP. (*Chart No. II.*). The calves were infected on September 14, 15 and 16th and treatment was commenced on September 17th. Calves 7526 and 7527 were injected intramuscularly with 2 grams chloromycetin in oil twice a day for seven days, while calves 7523 and 7525 received one gram twice a day, also for seven days. In all four of the calves the temperature dropped from approximately 105°F to 102.5 in 24 hours and to 101.5 in 48 hours after the treatment was commenced. After the third day the temperature fluctuated between 101.5 and 103.5. Although the temperatures of the calves had dropped to more or less the normal level the scouring continued for some time. But the calves appeared normal and took their feed eagerly.

Faeces cultures made on September 20th and 25th and on October 1st, 6th, 12th and 25th, were all negative for *Salmonella dublin*. On the 40th day the calves were discharged as being apparently normal.

Discussion. There did not appear to be much difference in the response of the calves that received two grams and those that were given four grams of chloromycetin per day. Both groups showed a very marked drop in temperature from the 24th to the 48th hours. Although the diarrhoea persisted for some time all the calves appeared to be fairly normal, and *Salmonella dublin* could not be recovered from the faeces of any one during six examinations made approximately at weekly intervals.

THE FURAZOLIDONE GROUP. *Chart No. III.* The calves were infected on September 14th, 15th and 16th, and treatment was commenced on September 17th. Calves 7511 and 7512

received 0.5 gram furazolidone in the milk in the morning and in the evening for a period of seven days. Calves 7513 and 7514 were given four grams a day for two days, viz. two grams in the morning and two in the evening.

On the second day of treatment, i.e. on September 18th, both calves 7513 and 7514 showed symptoms of intoxication associated with marked nervous disturbances, hyperaesthesia, and reflex irritability.

The slightest disturbance provoked the most marked reflex excitement, shivering and twitching of the muscles. When moving the calf walked with a high stepping gait. On the whole the symptoms manifested resembled those of an acute case of heart-water. The calves refused to drink and usually remained in the recumbent state. Treatment was discontinued on the third day, i.e. September 19th, and the symptoms gradually commenced to subside on September 21st. On the 6th day after treatment was discontinued, i.e. September 24th, both calves appeared to be normal again. Calves 7511 and 7512 never manifested any signs of intoxication but showed a marked improvment in the paratyphoid infection soon after the treatment was commenced.

In all four of the calves treated with furazolidone the temperature dropped from approximately 106 to 102.5 in 24 hours and to 101.5 in 48 hours after the treatment was commenced. After the third day the temperature fluctuated between 101.5 and 103°F, the diarrhoea gradually improved and the faeces became firmer in consistency. On September 25th, i.e. a week after treatment was commenced, there was no further evidence of diarrhoea, and the faeces of all four of the calves were firm and apparently normal.

Faeces cultures were made on September 20th and 25th, and on October 1st, 6th, 12th and 25th, but all were negative for Salmonella.

On October 9th the temperature of calf No. 7514 suddenly rose to 105.8. On October 11th the calf was found in a recumbent position and in a semi-comatose state. It was slaughtered on October 12th. On autopsy it was found to be suffering from a severe fibrinous pleuro-pneumonia, hyperaemia and oedema of the meninges, and on a histological examination of the brain focal softening and degeneration of the ganglion cells of the hippocampus were revealed. The bone-marrow was congested and was practically devoid of haemopoietic tissue.

Cultures were made from the heart, blood, liver, spleen and lungs and all were negative for *Salmonella dublin*, but an apparently pure culture of a pasteurella was recovered from the lungs.

A sudden and at present unaccountable exacerbation of temperature also recurred in calves 7511 and 7513 on October 14th, and in calf 7512 on October 11th. Otherwise the calves remained apparently normal and took their feed eagerly. The temperature,

however, returned to normal again after a few days. On the October 26th the three calves appeared to be entirely normal and were discharged from the experiment.

Discussion. In this preliminary test evidence is presented to show that furazolidone when given by the mouth, is highly effective in cases of experimental infection of calves with *Salmonella dublin*. The temperature of the infected calves returned to normal within 24 hours after treatment was commenced. Symptoms of diarrhoea disappeared and the faeces became firm in consistency and apparently normal within a week. Faeces cultures from the four calves made three days after treatment was commenced and again on five different occasions at approximately weekly intervals all failed to yield *S. dublin*. Eight grams of the drug given over a period of two days to each of two calves produced toxic symptoms associated with marked nervous disturbances. Although both the calves treated apparently recovered from the intoxication soon after the treatment was discontinued one was found in a moribund state 25 days after the drug was administered, and had to be destroyed. The lesions revealed on autopsy were fibrinous pleuropneumonia, hyperaemia and oedema of the meninges, focal softening and degeneration of the ganglion cells of the brain, and degeneration of the haemopoietic tisue in the bone-marrow. The organs were found to be negative for paratyphoid both bacteriologically and histologically.

The pleuropneumonia was probably the result of exposure while the calf was lying in a half comatose state on the floor. But the lesions revealed in the brain, which resemble those of heartwater, are likely to have been due to the intoxication.

Calves 7511 and 7512 received seven grams of the drug during a period of seven days and did not show any apparent signs of intoxication. This dosage resulted in a rapid fall in temperature, a cessation of the diarrhoea and the disappearance of *S. dublin* from the faeces. These results, therefore, suggest that the toxic dose of the drug lies between one and four grams per day, and that the therapeutic dose is one gram or less.

The cause of the temporary exacerbations of temperature manifested by all four of the calves that had received the furazolidone about three weeks after the temperature had dropped to normal cannot be explained at present. The fact that all the faeces cultures from these calves were negative for *S. dublin*, and that the organs of calf 7514, which was slaughtered, were negative for paratyphoid both bacteriologically and histologically, shows that the sudden elevation of temperature cannot be ascribed to a relapse of the paratyphoid infection.

THE CONTROLS. *Chart No. I.* Like the other calves this group, composed of calves 7518, 7521, 7528 and 7529, were also infected on September 14th, 15th and 16th. In comparing the three charts I, II and III it will be noticed that, whereas the

temperatures of the calves treated with either chloromycetin or furazolidone dropped to normal in 24 to 48 hours after treatment, or in four to five days after infection, the hyperthermia persisted in the control group for about two weeks. Moreover, the diarrhoea which continued for several days, was much more severe and lasted much longer in the control groups than in the other two groups. Faeces cultures made from this group yielded *S. dublin* from all the members on different occasions. In one of the calves, No. 7528, all six of the examinations made were positive for *S dublin*. On October 26th, when calves No. 7511, 7512, 7513, 7518, 7523, 7525, 7526, 7527 and 7529 were discharged, calf No. 7528 still persisted in excreting *S. dublin* in its faeces. As it appeared to be otherwise quite normal and healthy it was believed to be a carrier.

Although all four of the control calves suffered from a persistent diarrhoea, calf No. 7529 showed by far the most severe symptoms, and at one time it was scouring so badly that it was in imminent danger of death. At the same time *S. dublin* was recovered from cultures made from its faeces. After some time, however, it improved markedly, its faecal cultures became negative and it was finally discharged as apparently healthy on October 26th. On October 17th calf No. 7521 showed difficulty in breathing and made a hissing sound due to the presence of a necrophorus ulcer in the larynx. Treatment with sulphonamide and penicillin gave some relief but the condition was still persisting to some extent on November 1st.

SEROLOGICAL REACTIONS. Agglutination tests were performed at various periods during the course of the experiment. Only two of the control calves, viz. Nos. 7521 and 7529, gave a definite H-agglutination.

The H-titre of calf 7521 was 1:400 on October 13th and 1:1600 on November 2nd; the H-titre of calf 7529 was 1:1600 on October 13th, and less than 1:50 on November 2nd. There was no apparent O-agglutination at a dilution of 1:25.

No agglutinins could be detected in the sera of any of the other calves. It is significant that calf No. 7528, which excreted *S. dublin* continuously in its faeces, failed to disclose the presence of any agglutinins in its serum. This result confirms the previous observations of Henning (1953a) where he reported that, for the detection of carrier animals both faeces cultures and agglutination tests should be carried out, as some animals giving a negative agglutination reaction may discharge *S. dublin* in the faeces.

SUMMARY. Twelve calves were infected artificially with *S. dublin* cultures given in the milk. Four of these calves were treated with chloromycetin intramuscularly, four with furazolidone by the mouth and four were kept as controls.

The temperature of the four calves treated with chloromycetin dropped to normal in 24 to 48 hours, but the diarrhoea persisted

for some time. Cultures made from the faeces of these calves three days after treatment was commenced were negative for *S. dublin* and remained negative throughout the experiment.

The temperatures of the four calves that received furazolidone also dropped to normal in 24 to 48 hours after treatment was commenced. The diarrhoea disappeared after a few days and the faeces became firm. At no time could *S. dublin* be recovered from the faeces. Four grams of the drug administered on each of two successive days provoked marked toxic symptoms, but was apparently effective in bringing about a cure. When treatment was discontinued the calves apparently recovered from the intoxication after a few days.

One gram of the drug given daily for seven days effected a complete cure. It is, however, possible that the effective dose of the drug is less than one gram per day, or less than seven grams per week. Although not one of the calves in the control group died from paratyphoid both the hyperthermia and the diarrhoea persisted much longer in these calves than in either of the treated groups. All four of the control calves discharged *S. dublin* in the faeces for variable periods, and one of them remained a carrier. Another one developed calf diphtheria.

ACKNOWLEDGMENTS

The author wishes to thank Dr. K. Schulz for the histological examination of specimens.

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GOITRE IN ANIMALS IN THE UNION OF SOUTH AFRICA

By
DOUW. G. STEYN and W. SUNKEL
Pretoria.

INTRODUCTION.

Dr. A. J. Snyders, Research Officer, Onderstepoort Research Laboratories, kindly informed one of us (D.G.S.) that goitre in calves had been reported from a farm in the Cathcart district, Cape Province. Through the kind co-operation of Dr. P. S. Snyman, Assistant Director of the Division of Veterinary Services (Field Section), Pretoria, Dr. G. McIntyre, State Veterinarian, Queenstown, accompanied one of us (D.G.S.) on this investigation. Dr. McIntyre had already investigated these cases of goitre and prescribed sodium iodide treatment of the affected calves.

SITUATION OF THE FARM.

The farm is situated on the south bank of the Black Kei River. It is 1007 morgen in extent and is divided into seven camps. Rotational grazing is practised with the sheep and cattle.

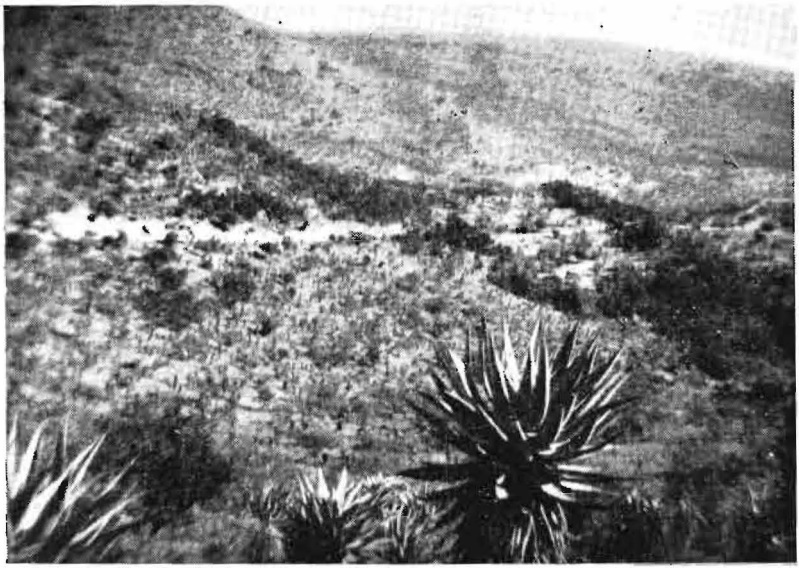
The nature of the surroundings is very mountainous and the vegetation consists chiefly of grass, mostly *Aristida* species, mixed with bush, chiefly thornbush of the *Acacia* type. The geological formation is chiefly of the dolerite type mixed with layers of sandstone and limestone. The soil is very porous which renders the building of dams on this particular farm most unsatisfactory. The accompanying photos (Plates I and II) were taken from different angles on the farm and they clearly reflect the mountainous nature of the country.

HISTORY OF THE DISEASE.

Before the present owner occupied the farm, his father ran a herd of Friesland cattle there for 33 years and before him another farmer bred Friesland cattle there for 10 years. We therefore have a history of cattle-breeding on the farm for a continuous period of approximately 50 years, including the period of experience of the present owner who commenced his farming operations there in March, 1946. Up to and including 1946, not a single case of goitre had been seen in any of the animals (stock and game) on the farm. On the farm there also are many "duikers" and rhebuck; the former in such large numbers that they are pests.

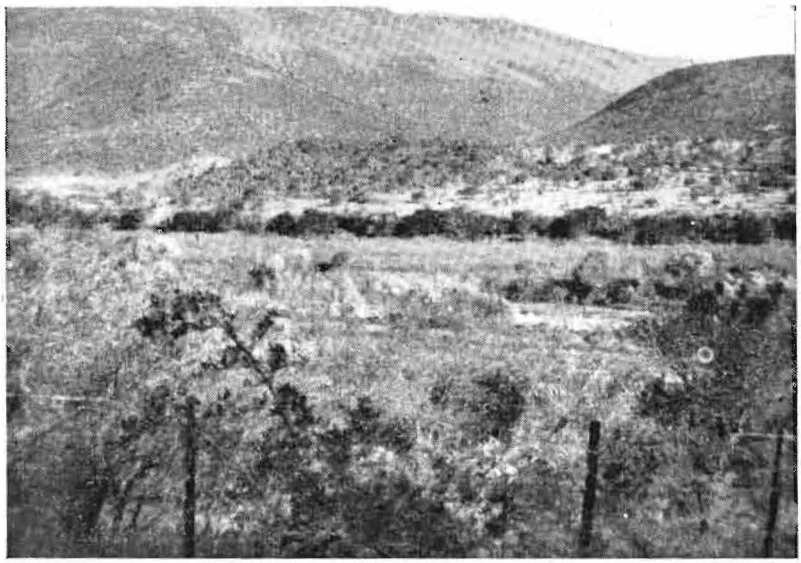
The present owner of the farm took over from his father in March, 1946. In that year he bought a group of Afrikander cattle

PLATE I



Type of country where goitre occurred.

PLATE II



Type of country where goitre occurs.

from a neighbouring farm. In 1944 these cattle were brought to the latter farm from a very distant area known to be free from goitre. A second group of Afrikander cattle were bought in the Grahamstown district. These two groups of cattle have been running mixed on the farm since their arrival. There can be no question of intensive inbreeding as the owner obtains new Afrikander bulls at regular short intervals from various well-known Afrikander breeders in different parts of the country. One of us (D.G.S.) saw two of the three bulls at present being used and they are of a good type. At the time of our visit there were 202 Afrikander cows, oxen and young stock and 41 very young Afrikander calves on the farm. In April, 1953, one Jersey bull and 16 Jersey cows were brought to the farm and are running with the Afrikander cattle. Furthermore, there were 352 merino sheep and 267 Persian-cross sheep on the farm. All the above animals run on the same grazing and drink the same water. The owner and his family (wife and 3 small children) drink rain water. Extensive enquiries made by Dr. McIntyre, Dr. Swift, district surgeon, Cathcart, and one of us (D.G.S.), revealed that, with the exception of the case under consideration, no goitre in animals or human beings has ever been reported from the Cathcart-Queenstown-Molteno-Burghersdorp-Aliwal North area. Dr. McIntyre has been State Veterinarian in this area for 16 years and Dr. Swift, District Surgeon at Cathcart for 6½ years. During this period Dr. Swift has seen only one case of toxic goitre in a 20 year-old European woman.

All cases of goitre seen on the above farm were in new-born Afrikander calves. The first case was born at Christmas, 1947, 21 months after the present owner had occupied the farm. Since that time, three to seven goitrous calves were born each year with an average of about four per year. In the 1953-54 season five goitrous calves were born. The percentage of goitrous calves born annually varied from six to twelve. From information supplied by the owner there appears to be a tendency for the disease to be worse during years of very low rainfall. Dr. McIntyre prescribed a dose of 2.0 gm. sodium iodide twice daily for each of the affected calves. Some of them benefited by the treatment whilst others became worse and died or had to be shot. The owner complained of the very heavy cost of treatment and said that it was prohibitive as the treatment of a single calf amounted to approximately £7. An interesting observation made by him was that a dose of sodium iodide double that recommended by Dr. McIntyre caused marked loss of hair, salivation, and loss in condition, symptoms typical of chronic iodine poisoning. The owner has never seen any cases of goitre in mature animals, including the cows which gave birth to calves with enormous goitres.

A significant observation made by the owner is that the same cow repeatedly gave birth to goitrous calves. They may, however,

skip a year in which a normal calf is born. Some months ago he sold 7 cows because of this very marked tendency displayed by them. All the Afrikander calves, young stock and cows are undersized, but in fairly good condition. The 1953-54 season has been a very good one. The rainfall for the period 1950 to May, 1954, was as follows:

1950	21¼ inches
1951	14¾ ,,
1952	16¾ ,,
1953—May, 1954	22 ,,

SYMPTOMS EXHIBITED BY THE CALVES.

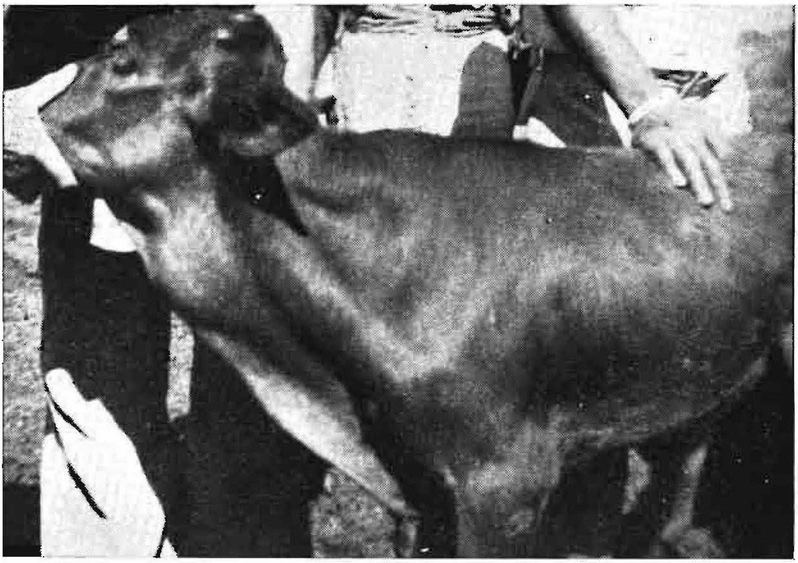
All the goitrous calves were born with the disease. In a few cases the swellings were so large that the calves died from suffocation (trachea completely compressed) immediately after birth. In those that survived, the swellings increased in size until the calves were choked to death or had to be killed, with the exception of four cases which completely recovered with iodide treatment. The affected calves experienced great difficulty in sucking as the condition caused increased and distressed breathing. This led to decreased milk intake with consequent loss in condition. Those calves which recovered during and after treatment appeared quite normal at the age of 5 to 6 months and the previously enlarged thyroids had then become invisible.

At the time of our visit we saw two affected Afrikander bull calves, aged 3 and 4 months respectively. The owner informed us that both were born with large goitres which had slowly decreased in size since treatment with sodium iodide began. In the older calf the thyroid gland was too small to be visible, but was still palpable, while the younger one had a fair-sized, very soft non-nodular gland (see photo: Plate III). The consistence of the gland was like that of a lipoma. Unfortunately no cases were available for autopsy and histological examination of the enlarged thyroid glands.

There were no signs of enlargement of the thyroid glands of the mothers of these two calves, nor did any of the other adult animals show enlargement of these glands.

GRAZING AND ADDITIONAL FEED.

As stated previously the grazing consists of thorn bush (chiefly *Acacia*) and short grass types, chiefly the latter. A short type of "steekgras" (*Aristida*) is very prevalent. The calving season is from November to February and during *the whole period of pregnancy* the cows run in a camp called "The Nook No. 2." In addition to grass and thorn trees (*Acacia*) there is a prevalence of a creeping type of legume (*Indigofera argyrea* E. & Z.), which, according to the owner, is quite eagerly eaten by cattle and sheep. As a rule summer rains begin to fall from September, thus green grass is available from October. The pregnant cows receive no additional feed, but the milch cows are given ensilage and a little



Three months old Afrikander calf with goitre.

green barley or green lucerne, if available. No animals receive concentrates, nor are licks given to any of the stock.

Specimens of mealies grown on the farm, the grasses and the legume eaten by the cattle, and soil were collected. For purposes of comparison specimens of grass were also collected from a neighbouring farm where goitre in stock is unknown. (See list of specimens.)

It is of interest to note that "The Nook" was only bought by the present owner's father in 1944 and that the latter's Friesland cattle had never grazed on this newly-acquired property or drunk that water, (specimen No. 4).

DRINKING WATER FOR STOCK.

There are four sources of drinking water and as rotational grazing is practised, all the stock drink from all the sources at one time or another. However, it is note-worthy that, as stated previously, the cows run on "The Nook No. 2" during their whole period of pregnancy and drink water obtained from a bore-hole sunk by the present owner's father in 1945. The bore-hole is 68 feet deep (water specimen No. 4). The other three sources of drinking water for the stock are: (a) Mountain spring (specimen No. 1). This is also the water supply for cattle and sheep on a

neighbouring farm where goitre is unknown; (b) The Black Kei River (specimen No. 3); and (c) the Turn Stream bore-hole which is 110 feet deep (specimen No. 5). Water specimen No. 2 was taken from the household supply which is rainwater.

SPECIMENS COLLECTED.

(a) Water.

Specimen No.	Origin	Iodine In parts per million	Fluorine (= mg./L)
1	Mountain spring	0.010	0.40
2	Rain water (household supply)	Less than 0.010	0.20
3	Black Kei River	0.022	0.40
4	The Nook No. 2	0.010	0.30
5	Turnstream	0.020	0.30
17	Queenstown Municipality. Water supply from Bongola Dam (before treatment)	0.044	0.50
18	Ditto (after treatment)	0.042	0.60

Aluminium sulphate and calcium hydroxide are added to the Bongola Dam water, sedimentation is allowed and the water is chlorinated after having passed through sand filters. Specimen No. 18 was taken at a tap in a house in Queenstown. From the above table it will be noticed that the iodine content of the Mountain spring and The Nook No. 2 is the same and only half of that of Turnstream and the Black Kei River. The rain water contains less than 10 *mg.* iodine per litre. The iodine content of the Queenstown municipal water supply is very satisfactory although perhaps slightly on the low side.

(b) Soil and Vegetation.

Topsoil and subsoil were collected from the same spot and mixed grasses were collected at various spots in the camps where the cattle were grazing or had grazed. Only those grasses extensively grazed by the animals were collected. Young green grass and mature grass in the seeding stage were collected separately. In "The Nook" camp No. 2 where the pregnant cows graze, a specimen of the very prevalent legume (*Indigofera argyrea* E. & Z.) was also collected. Specimens of vegetation were collected over wide areas in order to ensure material representative of the whole area.

RESULTS OF ANALYSIS.

Specimen No.	Nature of Specimen	Origin	Iodine Content (p.p.m. or mg:/kg.)
6	Red mealies	Grown on the farm (only fertilizer used is cattle kraal manure)	Less than 0.10
7	White mealies	Ditto	Less than 0.10
8	Topsoil	"The Nook No. 1"	1.6
8A	Subsoil	"The Nook No. 1"	1.46
9	Short green grass	"The Nook No. 1"	3.5
10	Topsoil	"The Nook No. 2"	1.4
11	Subsoil	"The Nook No. 2"	1.0
12	Mature grass in the very late seeding stage	"The Nook No. 2"	1.60
13	Young green grass	"The Nook No. 2"	1.44
14	Legume (*Indigofera argyrea*)	"The Nook No. 2"	1.95
15	Mature grass in the very late seeding stage	An adjoining farm (de Villiers)	1.04
16	Young green grass	From same camp as 15	2.30

"The Nook" No. 1 camp was grazed down so heavily that only very young green grass was available for collection. As stated before, the cows which gave birth to a fair percentage of goitrous calves, ran in the camp known as "The Nook No. 2" during their entire period of pregnancy. From the above table it is evident that the soil and vegetation (green grass and *Indigofera argyrea*) in "The Nook No. 2" contain much less iodine that the soil and green grass in other camps on the same farm and on an adjoining farm where goitre is unknown. Also the drinking water (bore-hole) in "The Nook No. 2" contains less than half the amount of iodine which is present in the water of the Black Kei River, which is the chief source of drinking water of stock in that area. It is therefore clear that the intake of iodine by the pregnant cows grazing in "The Nook No. 2" is much lower than that of stock grazing in the adjoining area and watering at the Black Kei River. All stock on the farms bordering on the Black Kei River water at the river and nowhere have cases of goitre been known to occur.

GOITRE IN ANIMALS IN OTHER PARTS OF THE WORLD.

Marine (1909-1911) was the first to conduct extensive investigations into goitre in animals. He found the disease very bad in trout reared in captivity and prevented it by iodine (Orr and Leitch[6]). In 1920 Kalkus (Orr and Leitch[6]) described goitre in colts and adult horses and in calves and adult cattle. It is stated that in pigs suffering from iodine deficiency enlarged thyroids are hardly ever seen. The sows usually give birth to litters of hairless pigs in which the mortality is very high. Goitre is also described in sheep.

In their valuable publications the Chilean Iodine Educational Bureau[5] gives a very complete review of goitre in all classes of stock and in wild animals throughout the world. It is stated that the disease may occur almost anywhere, but that most cases occur in areas where human endemic goitre is prevalent. It is accepted that goitre in animals is due to decreased availability of iodine to the thyroid gland. All the factors which may play a role in inducing an iodine-deficiency in the thyroid gland, thereby causing its enlargement, are fully discussed in a Report by the South African Goitre Research Committee.[2]

It appears that although goitre occurs in animals, it is much more rare than in human beings even in severe endemic goitre areas. In the course of investigations into stock diseases one of us (D.G.S.) has seen and examined many thousands of stock (cattle, sheep, goats and donkeys) all over South Africa, South West Africa, The Eastern Caprivi Strip, and Swaziland and has seen no cases of goitre, except in a small area in the Orange Free State where Merino ewes had been running on extremely poor grazing throughout the period of pregnancy. These ewes, which themselves showed no enlarged thyroid glands, give birth to a very high percentage of fully-developed lambs with enlarged thyroid glands. Approximately 5 per cent of the lambs were born dead and many showed nervous symptoms. There was no hairlessness.

There are three possible explanations of the phenomenon that in human endemic goitre areas, goitre in animals is either rare or absent *viz.* (1) the iodine requirements of animals are less than those of man. (2) the intake of iodine by animals through their food and water is higher than that of man. In endemic goitre areas the sources of drinking water for man and animal are not always the same. Animals frequently drink from different sources as they graze over large areas within short periods while the sources of man's drinking water in endemic goitre areas remain the same within certain limits; and/or (3) animals are less susceptible than man to anti-thyroid agents (F, Ca, Fe, etc.) which may be present in the drinking water.

Cattle grazing in very severe endemic goitre areas did not show enlarged thyroid glands and grasses eaten by the animals concerned were found by us to contain very large quantities of iodine[2]. In our investigations[2] it was found that in human endemic goitre areas the grasses eaten by stock contained *30 to 50 times more iodine* than the staple foods eaten by the human inhabitants of those areas. In these cases the sources of drinking water of the stock and human beings were the same and extremely low in iodine compared with that of goitre-free areas. The explanation of the rarity or absence of simple goitre in animals in most human endemic goitre areas most probably lies in the fact that the iodine content of the vegetation consumed by the animals is much higher than that of the food eaten by man.

DISCUSSION.

As in other parts of the world, goitre is very rare in animals in South Africa. In the course of extensive investigations made during the last 28 years by one of us (D.G.S.) into animal diseases throughout the Union of South Africa and South West Africa and investigations made by the South African Goitre Research Committee[2] during the last 6 years not a single case of goitre was found in stock with the exception of the Orange Free State case. It is of particular interest to note that goitre in stock was not even found in areas where endemic goitre in man was very severe. It is, however, possible that a certain percentage of the animals in the endemic goitre areas showed slightly, but not visibly or palpably, enlarged thyroid glands.

In 1934 Matthew and Thomas[3] investigated goitre in Afrikander calves on a farm in the Eastern Cape Province. The swellings were fibrous and firm. The cases were diagnosed as *struma diffusa parenchymatosa*. In their cases, in contrast to the present ones investigated by us, only two of the twelve affected calves were born with the disease. The twelve calves were born in the period 1929 to 1934. These calves were reported to develop "the swollen throats rapidly within a couple of weeks from the date of birth and they usually remained thus enlarged until the animals were two or three years old, in some being noticeable even at five years of age."[3] These characteristics are different to those seen in the cases investigated by one of us (D.G.S.) where all the affected calves were born with very large goitres. It may be that the disease in our cases was of a much more severe nature; unfortunately the percentage of calves which were affected, is not mentioned by Matthew and Thomas. Unlike the cases investigated by us, those investigated by Matthew and Thomas derived little if any benefit from potassium iodide administration. They suggested that heredity was probably an aetological factor in their cases. Recent enquiries made by us revealed that during the last 15 years no cases of goitre were seen in animals on the farm where Matthew and Thomas conducted their investigations.

In the course of his examinations of the endocrine glands of bovines in cases of sterility, Quinlan[4] found *struma colloides* in 6 out of 60 animals examined. These animals were of the Afrikander type. Unfortunately, he was unable to trace the origin of the affected animals. The glands were collected at the Pretoria abattoirs. Records at the Onderstepoort Laboratories revealed that struma is of very rare occurrence in animals.

In Swaziland and the Eastern Caprivi Strip specimens of grasses eaten by cattle were collected in very severe endemic goitre areas and found to contain much larger amounts of iodine than the human foods *eaten in these areas*. Apparently, this is the most probable explanation why, throughout the world, simple goitre is either very rare, or entirely absent in animals in severe

human endemic goitre areas. Some grasses possibly possess the ability to concentrate iodine in their leaves and stalks even though the iodine content of the soil and water is very low.

SUMMARY.

The occurrence of goitre in calves on a farm in the Cathcart district is described. From our investigations it appears that the cause of goitre is the very low iodine content of the vegetation and water consumed by the mothers of the calves throughout the period of pregnancy. The solution to the problem is either (1) the feeding of iodized salt or (2) the practising of rotational grazing as the pronounced iodine deficiency is present in the vegetation and drinking water of only one particular camp.

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INFECTIOUS ATROPHIC RHINITIS OR SNEEZING DISEASE OF PIGS

By

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Infectious atrophic rhinitis is a disease of swine characterized by partial or complete disappearance and decalcification of the nasal turbinate bones, and sometimes of the ethmoid turbinates. It is often asociated with sneezing and bleeding from the nose, nasofacial deformity and distortion, and retarded growth. The disease usually affects suckling or young pigs, but sometimes older pigs may also be affected.

HISTORICAL

The disease has been known in Europe for a very long time, and was apparently first described in 1849 by Franque*. Schneider (1878)*, Bang (1915)*, Jensen (1916) and Hoflund (1937) regarded it as being hereditary. In another publication Jensen (1933) suggested that the cause might be an infectious agent. Thunberg and Carlström (1940) were probably the first to draw attention to the seriousness of this disease in the Swedish Landrace pig, and they produced evidence to show that it was infectious. They believe that the infection was probably imported into Sweden from Denmark with Danish Landrace pigs intended for breeding purposes. The Danish Landrace pig from which the Swedish variety originated is a new breed evolved by crossing local pigs with the German wild pig. It is possible that the causal agent of atrophic rhinitis was derived from these wild pigs and maintained in the Landrace. Quin (1951) reports that the disease was also introduced into America by importations of Swedish Landrace pigs for breeding purposes. Flatla and Braend (1953) state that the introduction of breeding pigs from Sweden after the War in 1945 resulted in a widespread extension of atrophic rhinitis in Norway.

INCIDENCE

Atrophic rhinitis occurs fairly extensively in parts of Northern Europe, especially in Denmark, Sweden and Norway (Jensen, 1933; Thunberg and Carlström, 1940; Flatla and Braend, 1953). It apparently also has a widespread occurrence in the United States and Canada (Duthie, 1947; Moynihan, 1947; Schofield and Jones, 1950; Gwatkin, Plummer, Byrne and Walker, 1949, 1951; Gwatkin, 1953; Gwatkin, Dzenis and Byrne, 1953; Doyle, 1950;

* Cited by Thunberg and Carlström (1940).

Quin, 1951; Kernkamp, 1952; Jones, 1952; Heddleston, Shuman and Earl, 1954).

So far the disease has not yet been diagnosed in South Africa, but recently three consignments of Swedish Landrace pigs were imported into this country for breeding purposes. Although no information has so far been elicited to condemn these pigs as being infected, the possible existence of latent carriers among them cannot be excluded.

ETIOLOGY AND TRANSMISSION

At first it was thought that atrophic rhinitis was a hereditary condition associated with a primary atrophy of the turbinate bones, the secondary rhinitis following a secondary infection of the nasal mucous mebranes. This view received much support when the first transmission experiments carried out gave only negative results. Moreover, the fact that the disease frequently occurred in good breeding stock in which a greater or a lesser degree of inbreeding was practised lends further support to the hereditary view. Radke (1938), however, succeeded in transmitting the disease by means of intranasal instillations of infected nasal secretions. He thought that atrophic rhinitis was closely related to swine influenza. In sneezing disease the lesions were localized in the nasal chambers and the paranasal sinuses, whereas in swine influenza they were confined to the lungs. Thunberg and Carlström (1940), however, have shown that the disease may appear in the progeny of sows, which have produced several healthy litters, when a carrier animal is subsequently introduced into the herd. They reported that the disease might be spread by direct contact between susceptible and affected pigs, even when separated by a paling-fence. When they placed one-half of a litter of healthy baby pigs in infected premises while the other half remained in clean quarters, only those pigs that were exposed to infection developed the disease, the other half remaining healthy. Moreover, Flatla and Braend (1953) found that when baby pigs were removed from an infected dam at the time of birth not one of them would develop atrophic rhinitis. Schofield and Jones (1950) showed that the disease could be reproduced by the instillation of infected nasal washings into the nasal chambers of recently farrowed pigs, and that these pigs readily transmitted the infection to their litter mates.

Phillips (1946) suggested that a filterable virus was the primary cause, and that C. *pyogenes* was the most important secondary agent.

Gwatkin, Plummer, Byrne and Walker (1949, 1951) and Gwatkin (1953) reported that the intranasal instillation of nasal washings from pigs affected with atrophic rhinitis resulted in the partial or complete disappearance of the turbinate bones of baby

pigs in about 30 days. By means of the nasal washings of these pigs they managed to passage the condition serially to other baby pigs; some of the baby pigs that remained in contact with the infected ones also developed the disease. Further, they found that the washed sediment of centrifugalized infected nasal washings remained infective, but that filtrates from active material were entirely innocuous. Schofield and Jones (1950) and Flatla and Braend (1953) also had negative results with bacteria-free filtrates of nasal material. Moreover, active suspensions treated with streptomycin or penicillin could not transmit the infection. As the antibiotics are believed not to be virucidal these workers suggested that the causal agent was bacterial in nature. The nasal washing of an infected pig proved to be infective for baby pigs even when symptoms were no longer manifested. Nasal material kept under refrigeration remained active for months.

Duthie (1947) and Moynihan (1947) failed to transmit the disease to pigs by means of intra-nasal instillations of the nasal washings from infected pigs or by means of contact. But they had used pigs from 7 to 12 weeks old whereas Schofield and Jones (1950), Gwatkin (1953), Gwatkin et al. (1949, 1951) and Flatla and Braend (1953) found that baby pigs were by far the most susceptible.

Radke (1938) isolated a varied bacterial flora from the fresh nasal discharge. This included organisms such as the Haemophilus, Micrococcus, Diplococcus and Streptococcus types as well as Bact. Coli, Alkaligenes, Pasteurella, Actinomyces, and Pseudomonas.

Gwatkin (1953) also reported a variable bacterial flora in cases of rhinitis. By means of nasal instillations of *Pasteurella multocida*, Type B, cultures isolated from a field case of atrophic rhinitis Gwatkin, Dzenes and Byrne (1953) produced a rhinitis in baby pigs which was indistinguishable from the experimental disease. The addition of filtrates from infected nasal material did not increase the activity of the culture. A rhinitis was also produced in rabbits which had received intranasal injections of *P. multocida*.

Heddleston, Shuman and Earl (1945), however, could find *P. multocida* in only 6 of 74 cases of rhinitis examined and in 4 out of 96 of apparently normal pigs.

Flatla and Braend (1953) also observed several different bacteria in the nasal material, viz Streptococci, Staphylococci, Pasteurella, Haemophilus, Corynebacteria and other organisms. They succeeded in transmitting the disease to baby pigs by means of mixed culture material, prepared from nasal scrapings, but the pathogenicity of the mixed cultures readily deteriorated on sub-cultivation. They thought that *Haemophilus influenzae suis* was probably the most important inciting agent; positive transmission could, however, be effected only when this organism was combined with cultures of other bacteria , e.g. Streptococci and Staphylococci. When used alone the results were entirely negative.

Switzer (1951) reported that 80 per cent of the pigs affected with atrophic rhinitis harboured trichomonads in their nasal chambers whereas only 2.8 per cent of those not affected were positive. Gwatkin (1953), however, could not find any trichomonad activity in nasal washings preserved under refrigeration.

The disease is usually introduced into a clean herd by an apparently healthy pig — usually a boar or a sow required for breeding purposes. It is now generally accepted that it spreads by contact. Young pigs being most susceptible are first affected and may transmit the infection to their nursing mothers. Sometimes the introduction of an inapparent carrier pig has been made two or three years before the first evidence of the disease is obtained. Only a small proportion of the susceptible pigs are affected at first, but this proportion increases progressively from year to year until the disease is widespread. Some pigs which have picked up the infection when very young may appear to be quite normal, but nevertheless remain inapparent carriers. They may thus act as a source of infection for their offspring or for other susceptible pigs that come in contact with them.

PATHOGENICITY

Atrophic rhinitis is a disease which naturally occurs in pigs. Although young baby pigs are by far the most susceptible and usually develop the most typical symptoms, older pigs may also become infected, but more often they become inapparent carriers which are largely responsible for the maintenance and introduction of the infection into a herd, and for its spreading to other herds. All breeds of pigs seem to be susceptible. According to Thunberg and Carlström (1950) even cats and dogs that have been in contact with sick pigs may develop symptoms of rhinitis.

SYMPTOMS

(Thunberg and Carlström, 1940; Duthie, 1947; Doyle, 1950; Quin, 1951; Kernkamp, 1952; Flatla and Braend, 1953. Gwatkin, 1953.) It requires at least three or four weeks before recognizable clinical symptoms can develop in exposed pigs. Clinical symptoms are, therefore, seldom seen in pigs under three weeks of age. Usually, however, obvious symptoms are not manifested before the pigs are six or eight weeks old.

The symptoms may not always be clearly developed in individual animals — sometimes the clinical symptoms are so vague that a post mortem is necessary before the presence of the disease can be established. Typical lesions may, therefore, be found on autopsy in pigs that have shown no evidence of the disease during life. Sneezing is usually the first symptom — it is generally noticed just after a pig rises and moves about following a period of recumbency. The severity of the sneezing depends on the extent of the rhinitis, and it may increase in violence,

sometimes repeated paroxysms of violent sneezing being provoked. The naso-purulent discharge which has accumulated in the passages and which sometimes includes parts of the turbinate bone is often expelled during these paroxysms of sneezing. As a result of the sneezing bleeding of the nose may set in, especially during feeding. Some people regard the presence of blood in the nasal discharge as the most significant clinical sign of the disease.

The rhinitis may vary from mild to very severe. The nasal discharge is at first clear, watery and serous, but after a few days it becomes viscid and muco-purulent. The pig often shakes its head in an effort to expel the discharge. The irritation may cause the pig to push its snout under the litter or into the loose soil, or to rub it against any object within its reach. The nasal passages may be partly occluded owing to the swelling of the mucous membranes. Suckling pigs may have difficulty in breathing while sucking; snoring and gurgling sounds are sometimes made.

In the course of two or three months naso-facial distortion becomes evident in pigs which contracted the disease at a very early age. The snout has a pushed-in appearance causing shortening of the nose and wrinkling of the face. The result is that the snout often gets an accordion-like appearance. The deformity of the snout is either uni- or bi-lateral. In one-sided disfigurement the snout is twisted and crooked, and the corresponding nostril is dilated. In bilateral distortion the head developes a bull-dog-like appearance, being shortened and broadened, and at the same time the anterior maxillary area is raised. The peculiar facial disfigurement is usually the first abnormality to direct the attention of the owner to the presence of the disease. Symptoms of bronchial and pulmonary disturbances, conjunctivitis, and even encephalitis are sometimes also observed.

A constant symptom described by Quin (1951) is a circular black area just below the inner canthus of the eye which is especially noticeable in white breeds. Pigs affected with rhinitis have the peculiar habit of chewing each other's tails (Duthie, 1947).

The growth and development of a high percentage of the affected pigs are retarded or even arrested. As a result the animals become unthrifty. A decrease in fertility is sometimes observed in affected herds. The mortality among sneezing pigs is, however, low.

When the disease affects adult pigs, especially nursing sows, the main symptom is sneezing. There is no evidence of naso-facial disfigurement or of retarded growth. In nursing sows all clinical evidence of the disease disappears as soon as the little pigs are weaned.

LESIONS

The lesions depend on the extent and the severity of the infection, and are confined chiefly to the nasal chambers. In order to study the alterations it may be advisable to saw through the

nasal and maxillary bones. Schofield and Jones (1950) report very small foci of congestion on the mucous membranes of the turbinate bones during the very early stages. These foci are slightly depressed and give an eroded appearance to the bones. The turbinates become less rigid and can be easily penetrated by a sharp-pointed instrument, but the areas of softening are interspersed with firmer areas.

In other cases the mucous membrane is reddened, congested and swollen, causing obstruction of the passages. A stringy, muco-purulent, sometimes bloodstained, discharge collects in the nasal chambers and in the parnasal sinuses.

In the course of two to four weeks the turbinate bones disappear entirely and merely a narrow fold of mucous membrane remains. The ethmo-turbinates are apparently not affected during the early stages, but later they may show varying degrees of damage. The bones are removed, and the ethmoid meatuses are often found to be filled with a tenacious, muco-purulent exudate which is frequently overlooked.

In advanced cases the nasal and ethmoid turbinates undergo decalcification, leading to their partial or complete disappearance and the conversion of the nasal chambers into large cavernous sinuses. These are usually filled with a muco-purulent exudate. Sometimes the destructive processes extend into the paranasal sinuses, breaking down their septa. There may even be erosion and perforation of the palatine process of the maxilla. In view of these changes it is surprising, therefore, that meningitis does not supervene more often.

These changes may involve one or both nasal chambers. The rhinitis is a primary disturbance and the atrophy of the turbinates is secondary, but this atrophy can occur only in very young animals in which the turbinates are not properly developed yet. In adults a rhinitis is the only change; atrophy and decalcification of the bones do not occur. The facial bones in the young grow rapidly so that any interference in their development, if unilateral, will cause a deflection of the bones on the opposite side and thus accentuate the distortion and the deformity of the face. In bilateral involvement of the nasal chambers the deflection does not occur and the deformity is less marked, but the skin covering the snout is heavily wrinkled.

In some cases pneumonia involving the anterior lobes of the lungs is disclosed. In other cases, where there has been an encephalitis, a purulent meningitis may be revealed.

HISTOLOGY

At first scattered foci of damage are detected by the degeneration and desquamation of epithelial cells. The affected areas are infiltrated with lymphocytes. Later the damage to the epithelium extends and may cause wide areas to be denuded of epithelium.

The tubulo-alveolar glands increase and many of them are distended with tiny cysts. There is a marked proliferation of the fibrous tissue elements in the stroma causing a marked increase in its density.

Changes in the internal layer of the periosteum are frequently seen, even in the early stages. The osteoblasts increase in numbers, sometimes to such an extent that they may fill in the spaces left by the disappearing bone. Bone formation ceases, but the disappearance of the plates which form the skeleton of the turbinate is the most outstanding characteristic of the damage. As the disease progresses more and more of the bone structure disappears, leaving nothing but a dense, irregular band of fibrous tissue to mark the site of the vanished bone. Osteoclasts are not present as in rarefying ostitis (Schofield and Jones, 1950).

DIAGNOSIS

A study of the epidemiology of the disease will usually disclose the fact that a new boar or a sow has been recently introduced into the herd for breeding purposes. These animals may act as inapparent carriers of the disease and it may take two or more breeding seasons before the first cases are noticed. These cases may be recognized first by the appearance of symptoms of sneezing and epistaxis, and later by the naso-facial deformities. But definite clinical symptoms are not always manifested. The sneezing is often so mild that it is not noticed. It is only when the naso-facial distortions become manifest and the growth of the pig is retarded that the suspicion of the owner is aroused. In many cases the clinical symptoms are so indistinct and indefinite that a post mortem examination must be resorted to before a diagnosis is possible.

The diagnostic procedure described by Hoflund (1937) is recommended by Flatla and Braend (1953) in cases where a post mortem examination cannot be performed. The suspected pig is placed on a table, and an X-ray photograph is taken of the condition of the bones in the nasal chamber.

Earl and Shulman (1953) advise the use of a rhinoscope for the diagnosis of cases of atrophic rhinitis in an infected herd.

Transmission experiments in which intra-nasal instillations of infected nasal material are made into baby pigs may be advisable when other methods are not available.

CONTROL

Infectious atrophic rhinitis should be treated as a very serious menacing disease of the swine industry. On account of its insidious nature and the existence of a number of inapparent carriers in infected herds it presents a very difficult and perplexing control problem. The disease has already put a large number of swine breeders out of business. Pigs which have been exposed to infection during their youth may remain sources of infection

for many years without ever showing any apparent disturbance of health. They may transmit the disease to their offspring, when they are used for breeding purposes, or to other susceptible pigs. Contact between infected, or carrier pigs and susceptible animals must, therefore, be avoided at all costs.

The disease is generally introduced by new purchases and it may take a period of one to three years before the presence of the disease is recognized. After the purchase of an infected sow or boar, symptoms of sneezing are at first confined to only one or a few baby pigs, or there may be evidence of naso-facial distortion when they become older. But sometimes the alterations produced are not very distinct and may at first completely escape notice. It is only when the infected pigs grow and when there is a heavy incidence of clinical cases amongst litters farrowed by them, that the seriousness of the problem becomes apparent.

As the disease is widely distributed in Northern Europe and to some extent also in the United States and Canada importations of pigs from these countries should be controlled very carefully. If any importations are allowed the pigs should be kept under observation at least until the second generation pigs can be declared healthy, when they have reached the age of four months.

If any positive cases of atrophic rhinitis are revealed the whole herd should be slaughtered.

TREATMENT

Reparative and restorative treatment is not of much use as the damage already done cannot be repaired. Penicillin and streptomycin have given encouraging results (Gwatkin, Plummer, Byrne and Walker, 1951; Jones, 1952; Kernkamp, 1952; Gwatkin, 1953), but on account of the danger of propagating the infecting agent in clinically recovered animals as well as in inapparent, subsclinical cases, treatment is not advised.

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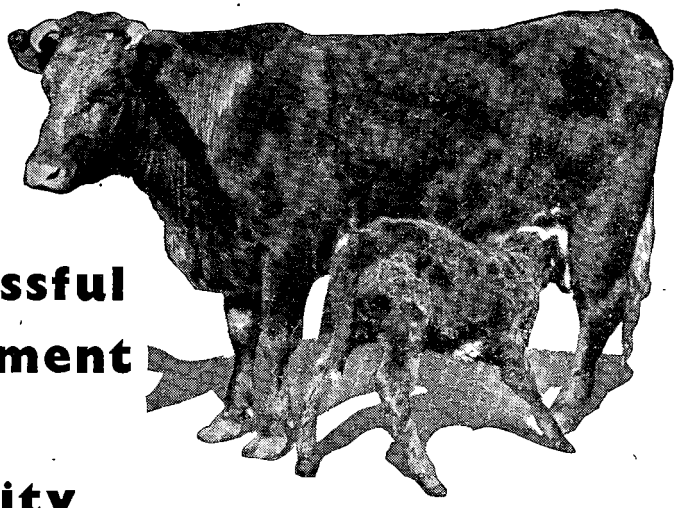

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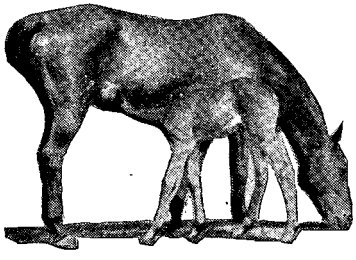

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METHIONENE DEFICIENCY, A POSSIBLE CAUSE OF LIVER INJURY IN SHEEP

By

J. W. GROENEWALD, J. D. SMIT

and

T. F. ADELAAR,

Onderstepoort

Lupines (Lupinus luteus and Lupinus angustifolius) have for many years been cultivated as a popular green manuring crop. The plant has even been used as a food for human consumption and a feed for animals for more than a century. However, the limiting factor in the use of this plant as feed has always been considered to be the presence of alkaloids in the stems as well as the seeds. In order to reduce the danger of lupinoses (alkaloid poisoning) attention was paid to the breeding and selection of varieties that would contain less alkaloid. The result is that more than 300 different varieties are known. For convenience these may be classed into two main groups: the sweet yellow varieties which are more palatable and less toxic on account of the reduced alkaloid content; and the bitter bluish white, red or violet varieties which contain a higher alkaloid content. Unfortunately the yield is very low in the sweet varieties. The sweet lupines are also very susceptible to fungus and plant lice attack. For these reasons the propagation of the bitter lupines has been far more popular.

In Germany the use of lupines for human consumption was greatly increased during the last war. The result was that after the war new supplies of lupine seed found their way to the Western Province of the Cape. According to Henning (1949), the crop did so well in the Swartland area, where it was used as a green manuring crop, that it has enabled wheat growing to be continued on many lands that would otherwise have had to be abandoned owing to the depletion of soil fertility. Farmers soon discovered that sheep could be successfully grazed on lupine lands without interfering too much with the manurial value of the crop. This led to a steady increase in the sheep population of this area. The high prices of wool made sheep farming as renumerative as wheat growing, consequently there was a natural tendency to overstock on lupine lands.

The actual practice is for sheep to be put on to young lupine grazing. In the case of the less palatable bitter varieties the lower leaves on the plant stems are consumed first. These appear to be more palatable and at the same time the growth of the plant

is not hampered. Sheep thrive and become fat as the plant matures. Towards late summer all that is left on the land is a coarse dry lupine stubble among which the sheep are able to scrounge for shattered seed. Due to the limitation of feed, sheep now start losing condition rapidly. A practical and simple form

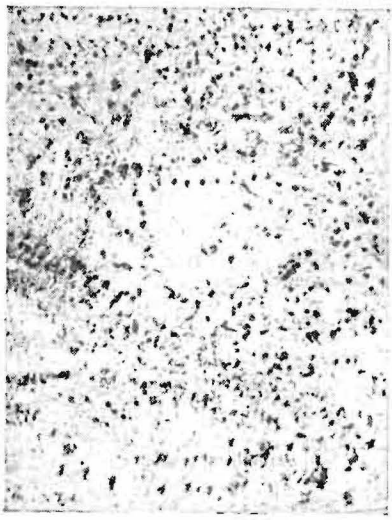

Fig. 1.
Liver Centrolobular necrosis.
Giemas. X100.

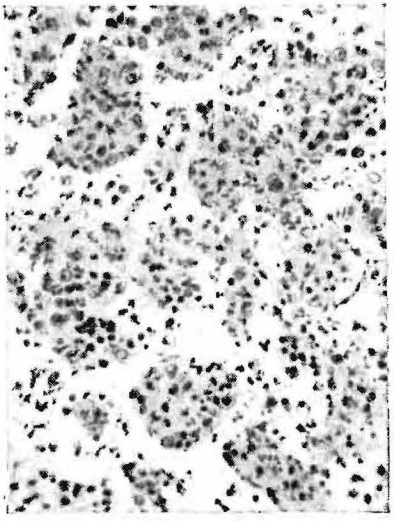

Fig. 3.
Spleen. Malpighian body showing karyorrhexis of the lymphoid cells.
Haemalum and Eosin. X400.

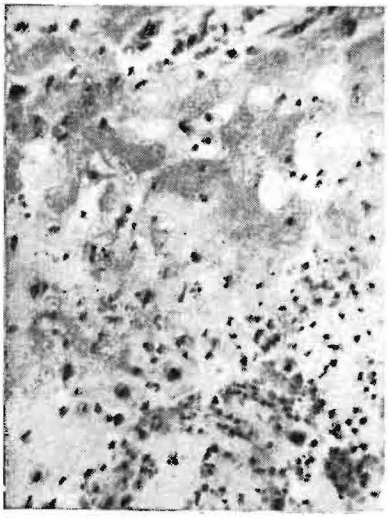

Fig. 2.
Liver Intranuclear inclusion bodies in the hepatic cells.
Giemsa. X400.

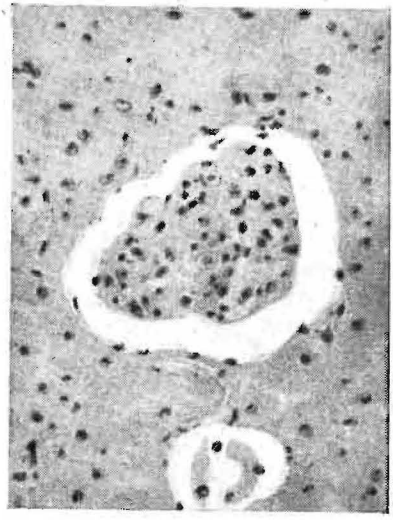

Fig. 4.
Kidney Intranuclear inclusion body in glomerular endothelial cell.
Haemalum and Eosin. X400.

of feed supplementation consists of broadcasting whole lupine seed over the old land. This is done to prevent animals consuming excessively large quantities of seed, as would be the case if feeding was from a trough. However, fairly heavy mortality is likely to occur notwithstanding this precaution.

Most of the losses occurred in young year old sheep and it was feared that serious warnings would have to be sounded against the use of lupines as feed. Certain factors, however, called for elucidation before taking such an unpopular step:

(a) Acute alkaloid poisoning was easily recognized in isolated cases. This is a condition of the nervous system and occurred where sheep had access to trough feeding or where the lupine seed had become wet.

(b) Cronic lupinoses had also been described by Lander (1951), but the symptomatology differed from that observed in the sheep from the Swartland.

(c) On lupine lands sheep showed marked emaciation, listlessness, ultimately refusing to get up, and died within a few days. The most consistent P.M. lesion was the hepatic necrosis and/or fibrosis. In many instances one of the liver lobes appeared no larger than a diminutive appendage of the other. In other cases the whole liver was only 4 inches in cross section. The presence of enzootic icterus was not uncommon.

(d) When trying to establish a safe level of Lupine angustifolius intake, Sastry (1942) found that sheep could be fed as much as half a pound per day with safety. Adelaar (1954) dosed more than half a pound per sheep for a period of three months with no ill effects. These workers also showed that the poison was not cumulative.

(e) There appeared to be no difference in the mortality rate of sheep grazing on Bitter or Sweet lupines.

(f) Mortality did not occur on farms where it was possible to supplement lupines with some other form of feed or grazing.

(g) Conditions such as enzootic icterus, pregnancy toxaemia and the prevalence of abortions are all common in the sheep of the Swartland and all point to the possibility of nutritional deficiencies.

It is evident, therefore, that there is strong circumstantial evidence that the mortality of sheep on lupine grazing is not entirely due to alkaloid poisoning. The possibility of actual nutritional deficiency assumes prominence. This is supported by the now classical work of Glynn and Himsworth (1944), in which they were able to produce necrosis of the liver in rats by feeding a diet which was deficient in methionene. Their rats were given complete protection against liver injury when receiving 20 mgm. methionene daily.

Himsworth (1950) in reviewing the literature on the liver and its diseases clearly describes the important role played by the sulphur bearing amino acids in the prevention of hepatic necrosis. Although cystine and tocopherol appear to exercise a saving influence, there is no doubt that the greatest single factor necessary in order to ensure a normal healthy liver is methionene.

The average analyses given for Lupines by the Stellenbosch-Elsenburg workers, Swart and Liebenberg (1954) are as follows:

	Protein	Fibre	Fat	Ca.	P.	Mn.	Cu.	Methionene
	%	%	%	%	%	p.p.m.	p.p.m.	%
Sweet-Lupine (Lupinus luteus)	35.70	14.96	5.16	0.26	0.6	215	11.8	0.1
Bitter-Lupine (Lupinus angustifolius)	28.4	14.96	5.52	0.23	0.3	46	6.0	0.092

The copper and methionene figures were supplied by Dr. Serfontein of Onderstepoort. It is clear that the Bitter Lupine is lower in crude protein, phosphate, copper and methionene than the Sweet Lupine is. In both varieties the methionene content is about 20% of the normal required for optimum growth.

Sheep are normally expected to synthesise essential amino acids. Maynard (1950) refers to a case in which the daily methionene intake of a sheep was 0.03 grams and the total excretion 0.23 grams per day. The same author stresses the importance of Vitamin A and copper in normal fermentation and consequently ruminal function. The entire absence of Vitamin A and an adequate supply of edible roughage, especially for young sheep, resulted in cessation of normal ruminal function. The bacterial flora of the rumen would suffer further depression on lupine seed only on account of the low available carbohydrate and borderline copper content. Burley (1954) determined the copper content of a wool sample taken from an affected sheep and found that it contained 30 micromoles per gram. The normal is given as 70 and in cases of a copper deficiency the reading is 20 micromoles per gram.

Although the Sweet lupine is free fom the alkaloid and higher than the Bitter lupine in nutritive value, an attempt to use nothing but a single plant in the feeding of sheep has led to a deficiency syndrome which according to the literature, can be relieved by the supplementation of Methionene, Toeopherol or Choline.

Experiments are in progress to investigate these problems.

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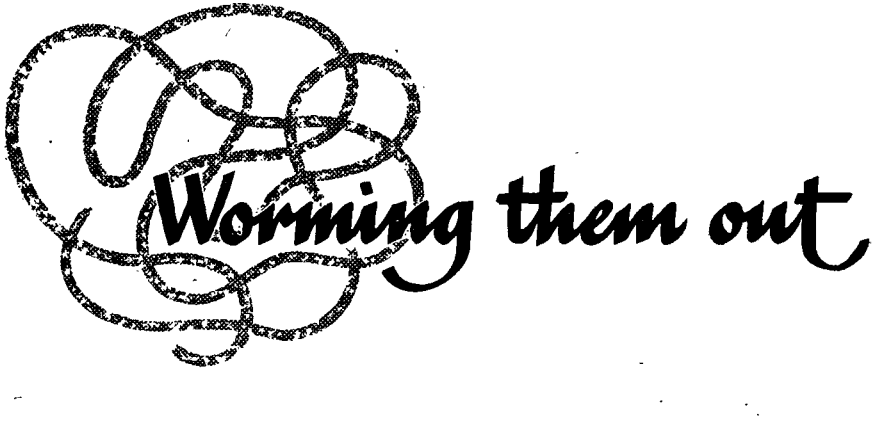

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FOOD REQUIREMENTS OF FOWLS

J. D. W. A. COLES,
Onderstepoort.

INTRODUCTION

From time to time, South African poultrymen animatedly discuss the question of food consumption and particularly its bearing on the cost of egg production. During the arguments one often hears of phenomenal appetites and some maintain that hens invariably eat more mash than grain and even ratios of 3 to 1 are occasionally mentioned. In consequence, it is claimed that the fowls get too much protein, the mortality rate is increased and the cost of feeding is unnecessarily high. The Department of Agriculture and the South African Bureau of Standards are in the end almost invariably taken to task for insisting on laying mashes containing 20% of expensive protein.

A few years ago, it was calculated that the average White Leghorn at Onderstepoort ate somewhat less than 3.9 ounces a day of mash and grain combined. This figure naturally included all food wasted or consumed by rats and mice.

In the presence of so many conflicting opinions, based predominantly on suppositions, it was felt that it would be interesting to see exactly what food was eaten by the Onderstepoort flock pedigreed Single Comb White Leghorns from 1 July, 1951, to 30 June, 1954. This short article presents the figures.

THE ONDERSTEPOORT FLOCK

Replacement stock is hatched in August and September every year. The chickens run on range from about 6 weeks until sexual maturity at the age of 4 to 6 months. They are vaccinated every November, before laying commences, against fowl pox and Newcastle disease (Komarov vaccine).

For the first two months, the chickens are fed green food and a chicken mash mixed in th laboratory and conforming to the specifications of the South African Bureau of Standards. After two months they are fed laying meal freely throughout the day, and in the morning they receive green food, which is usually adequate in amount and quality, and in the evening they get all the crushed maize that they will eat.

The adult fowls are housed under very ordinary conditions on the intensive system, and 110 pullets and 8 cockerels go to a unit and are allowed 400 square feet of floor space. All the birds are trapnested.

During the period under review, the laying meal was obtained from three different firms, all entitled to use the special mark of the Bureau of Standards.

MASH AND GRAIN CONSUMED

The total weight of mash eaten by the adults was 408,750 pounds and of crushed maize 518,800 pounds and the daily average number of fowls was just on 3,600. The average bird thus consumed about 3.75 ounces of mash and grain a day, a figure corresponding roughly with that ascertained on the previous occasion. With maize fed as grain, and with one-half of the laying mash comprised of maize meal and the other half mainly of wheaten bran, lucerne meal, maize germ meal, ground nut oil cake meal and high grade fishmeal, no other figure would have been expected.

The total diet contained about 14.3% crude protein ; considering the laying capabilities of the stock, at least 15% was expected.

EGG PRODUCTION AND MORTALITY FIGURES

At least 88% of the pullets hatched went into the flock houses every year. The hen-housed averaged production (first 365 days of laying) was just on 200 eggs.

Of 4,240 pullets leg-banded and put into the flock houses during the 3 years, 423 died during the first 12 months in them. As none were culled, the loss thus amounted to 10%. This figure is considered to be capable of reduction, as much evidence exists to show that 2 pullets in every 100 ultimately die of specific inflammatory conditions of the respiratory and reproductive systems as a direct result of vaccination against Newcastle disease. The mortality rate, including as it does all losses due to accidents and cannibalism, must be regarded as very favourable..

SUMMARY

1. The Onderstepoort flock of Single Comb White Leghorns is fed on grain, green food and a 20% crude protein laying meal. Half the laying mash is composed of maize meal and the other half mainly of wheaten bran, lucerne meal, maize germ meal, ground nut oil cake meal and excellent fishmeal. The grain is maize. The green food is usually lucerne or barley and every bird gets about half an ounce a day.
2. Of mash and grain combined, every fowl consumes about 3.75 ounces daily.
3. Rather more grain than laying mash is eaten, and the total diet contains about 14.3% crude protein.
4. From the beginning of July, 1951, to the end of June, 1954, the hen-housed averaged production of eggs during the first 365 days of laying was just on 200.
5. During the same period, 4,240 pullets were leg-banded and put in the flock houses, and in spite of having been vaccinated before hand against Newcastle disease, only 10% were lost during each pullet year.
6. There was no evidence, whatsoever, to suggest that a 20% crude protein laying meal was injurious or uneconomical.

Jl. S.A.V.M.A. 25(4), 1954.

HEPATITIS CONTAGIOSA CANIS (RUBARTH)

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Onderstepoort.

SUMMARY

Infectious canine hepatitis is reported for the first time in the Union.

The literature is briefly discussed.

The symptoms, post-mortem findings and microscopical changes of thirteen cases are described. The disease occurs sporadically in the Union and affects mainly young dogs. It is characterized by a sudden onset, loss of appetite, elevated temperature, pharyngitis, tonsillitis, sometimes icterus, vomition and diarrhoea and runs a short clinical course. At autopsy, enlargement of the liver with centrolobular necrosis and haemorrhages, swelling and reddening of the lymph glands and hyperaemia of the stomach and intestines with, at times, haemorrhagic effusion into the latter, are usually noticed.

INTRODUCTION

During the past decade Hepatitis contagiosa canis or infectious canine hepatitis (i.c.h.) has been established as a distinct disease of dogs. Despite its recent recognition it is clear that this disease has existed unrecognized in the Union for a number of years. As early as 1941 the first case was observed in the Union by de Boom who diagnosed it as an infection with fox encephalitis virus. However, at that time the disease had not been recognized as a separate entity in dogs and difficulty was experienced in arriving at an accurate diagnosis. Numerous reports describing the distinctive clinical and pathological features of the disease have appeared in the literature since that time and it was soon realized that certain reports of mortality amongst dogs in the Union corresponded very closely to reports of this disease cited in the literature.

During the past three years the author has had an opportunity to examine tissues from thirteen positive cases. Either formalin fixed specimens or dead animals were submitted for examination. These cases have originated from the following areas:— Johannesburg (5), Pretoria (4), Pietermaritzburg (1), Cape Town (1), Estcourt(1) and Pretoria North (1). It should be pointed out, however, that the small number of cases encountered is no index of the frequency of occurrence of the disease since it has probably been confused with canine distemper and its secondary complications throughout the years. The disease is not so prevalent as

canine distemper, but is certainly more widespread than is generally realized. Rubarth suggests that in many instances this disease is not fatal and. for this reason, its occurrence may not be recognized.

REVIEW OF LITERATURE

In 1928, Green, in North America, described a disease occurring in silver foxes and transmitted it experimentally by means of bacteria-free filtrates of infected fox brains. In 1930 he proved that the disease was caused by a filterable virus which produced pronounced and constant changes in the brain and spinal cord. To it he gave the name Enzootic fox encephalitis. Subsequent studies led to the discovery by Green and co-workers (1933) of the presence of specific intranuclear inclusion bodies which are found constantly in the vascular endothelial cells and hepatic epithelial cells of natural and experimental cases and upon which a histopathological diagnosis may be made readily. In 1934 Green and Shillinger showed that dogs may be infected experimentally with the virus of fox encephalitis. Their experiments led them to believe that the disease might occur naturally in this species.

As early as 1930, Cowdry and Scott found in their laboratory dogs a disease which produced liver necrosis and intranuclear inclusions in the hepatic cells. In 1937 De Monbreun, reported a condition in a puppy associated with hepatic cell inclusions. He was able to transmit the disease, but assumed that it was canine distemper. In 1947, Rubarth of Sweden published the first comprehensive description of an acute, often fatal, disease of dogs, manifesting itself by distinctive and specific pathological changes in the liver, lymphoid tissue and endothelial tissues which he named Hepatitis contagiosa canis. He furnished proof of the infectious and contagious nature of the disease, and identified the causative agent as a filterable virus. In 1949, Siedentopf and Carlson showed by serum virus neutralization tests that the viruses of infectious canine hepatitis and fox encephalitis are identical.

Following the work of Rubarth, infectious canine hepatitis has been reported in the United States of America by Storm and Riser (1947), in Australia by Whittem and Blood (1949) and in Great Britain by Innes (1949). The presence of the disease has since been reported from Belgium, Switzerland, Canada, Germany, Italy and Brazil.

CLINICAL PICTURE

Our knowledge of the clinical symptoms and pathological anatomical changes of i.c.h. is limited. In the majority of cases this disease was not recognized so that incomplete observations were made. The acute course of the disease and the fact that young dogs were mainly affected, usually resulted in a tentative diagnosis of either complicated distemper, non- specific hepatitis

or poisoning. Only after a histological examination could an accurate diagnosis be made.

Predominantly young dogs of different breeds and either sex were affected. Of the thirteen cases examined, nine were under one year of age, two were over two years and in two cases the age was not stated. Rubarth showed that of 180 cases where the age of the animal was known, 149 dogs (82.8%) were one year or under and only 31 (17.2%) were two years or over.

The duration of the disease was variable. Some dogs collapsed suddenly within 24 hours of the onset of symptoms. In other cases it was reported that symptoms were shown for five days prior to death. In general, the duration of illness had been from two to four days. In one particular instance a dog, treated for biliary fever three weeks previously, was found on examination at the clinic to be suffering from severe anaemia. This anaemia persisted for almost three weeks in spite of treatment. During the last four days the temperature suddenly became raised and diarrhoea and icterus developed. Sudden collapse and death followed and the case was regarded as one of chronic biliary fever complicated by distemper. In such protracted cases it is difficult to determine whether the course of the disease had not been complicated by some other factor.

The temperature was usually elevated and commonly reached 105° to 106°F. Toward the end the temperature dropped and finally became sub-normal. In peracute cases (dying within 24 hours of the onset of symptoms) no symptoms other than listlessness, injected conjunctivae, tonsillitis and pharyngitis were apparent. In the more protracted cases the animals showed apathy, loss of appetite, intermittent vomition and diarrhoea which was often blood stained. Palpation of the abdominal region evoked signs of slight tenderness in that region. From the second day onwards the mucous membranes usually became anaemic or icteric and in some cases petechial haemorrhages were noticed on the conjunctivae and gingivae. In a few animals injected conjunctivae and lachrymation were observed. The submaxillary lymph glands were frequently enlarged. Jaundice was noticed in five cases and in one particular case, the skin had an intense yellow discolouration and showed numerous petechial haemorrhages.

The heart's action was accelerated, as also the respiration, and the pulse was weak.

Nervous symptoms were not noticed in this series. Rubarth presented evidence of involvement of the central nervous system in a few cases with tonic or clonic spasms of the extremities or paresis in the hind-quarters. He also noticed blindness and on a few occasions, especially in dogs that apparently had recovered, a unilateral diffuse opaque central cloudiness of the cornea. This usually disappeared within a few days.

Except for a slight increase in the number of leucocytes, especially lymphocytes, no appreciable changes were noticed in blood smears. McSherry and Smith (1953), reported a leucopaenia due to neutropaenia and lymphopaenia in dogs on the second day following experimental infection. After the sixth day a leucocytosis with lymphocytosis — immature lymphocytes being particularly numerous — developed. Poppensiek (1952), reported a marked prolongation in bleeding time in dogs suffering from i.c.h. The bleeding time (1-2 min. normally) varied from 3 to 45 minutes.

Craige, as cited by Pay (1950), reported profound depression and coma in affected animals. This probably is the result of a hypoglycaemia due to liver insufficiency. Response to the intravenous injection of glucose is spectacular but temporary.

In this country all cases diagnosed with certainty have terminated fatally, there being no record of a single recovery.

According to Parry and Larin (1951), four forms of the disease are recognized.

The Fatal Fulminating Form:

The animal dies within 12-48 hours without showing any particular symptoms. The temperature is raised to 105°–106°F. the pulse rapid and soft and the mucous membranes pale. Dogs between 3 to 9 months of age are most commonly involved.

The Severe Non-fatal Form:

The temperature is raised to 105°–106°F and there is little evidence of ill health. The tonsils are often enlarged and congested. Should affected animals survive for 24 hours recovery is the usual outcome though symptoms of malaise with inappetence may persist for 10 days.

The Mild Form:

The temperature may be elevated to 103°F. Keratoconjunctivitis associated with a diffuse central opacity of the cornea involving one or both eyes, may develop. This opacity persists for 2-4 days, but may subside within 24 hours.

The Inapparent Form:

These cases can only be detected by means of serological tests.

Only isolated cases have been encountered. Unlike distemper, i.c.h. spreads slowly because infection is transmitted by contact of the susceptible dog with either body secretions of the clinically affected dog, or urine of the recovered carrier. Poppensiek and Baker (1951), recovered the virus of i.c.h. from the urine of experimentally infected dogs for periods after infection of from 3 to at least 161 days. It appears, therefore, that infected urine is an important factor in dissemination.

POST-MORTEM FINDINGS

In the majority of cases the conjunctival and buccal mucous membranes were pale, especially if effusion of blood had taken place into the gastro-intestinal tract. Not infrequently small haemorrhages were noticed. In five cases the mucous membranes were icteric. In two animals extensive generalized icterus was observed with intense yellow discolouration of the skin accompanied by numerous petechial haemorrhages, seen also in the subcutaneous tissues. The superficial lymph glands were often enlarged, moist and reddish in colour. Enlargement and reddening of the tonsils was observed in a few animals.

A small amount of a clear, thin fluid usually was present in the abdominal cavity. In cases showing generalized icterus the pleura and peritoneum were yellow in colour. Sometimes small haemorrhages were present in these membranes.

Almost invariably the liver was enlarged and the colour varied from yellowish-brown to a dark red. On some occasions the organ either was studded with small greyish foci (centrolobular necrosis) or dark red foci (centrolobular haemorrhages). These centrolobular regressive changes surrounded by the intact parts of the lobules imparted almost a granular appearance to the liver. Despite the obviously high blood content, the cut surface remained dry in some cases. In one animal the liver lobes were adherent, due to fibrinous deposits, and the wall of the gall-bladder showed oedema and subserous haemorhages.

The spleen usually was enlarged. The lungs invariably showed hyperaemia and oedema. Sub-epicardial and sub-endocardial haemorrhages were often present.

In most animals subserosal and submucosal haemorrhages were noticed in the stomach and intestines and the contents were frequently haemorrhagic.

The changes described above are in close agreement with Rubarth's findings. In a large percentage of his cases the ascitic fluid was blood stained and fibrinous precipitations occurred between the intestinal loops and liver lobes. An almost regular finding in puppies was oedema of the thymus with diffuse haemorrhages. Haemorrhages in the central part of the brain were observed. Oedema of the gall-bladder, which, according to the literature, seems to be almost pathognomonic of i.c.h., attracted interest in one of our cases only.

HISTOLOGY

The most striking and constant histological changes occurred in the liver, which usually was congested. Bulging of most of the sinusoids with blood, especially in the central parts of the lobules, caused some disorganization in the regular arrangement of the cells. Fibrinous exudation into the sinusoids was present almost con-

stantly. The hepatic cells showed varying degrees of degeneration with well marked necrosis around the central veins (fig. 1). In most of the necrobiotic areas slight accumulations of lymphocytes, neutrophiles and histiocytes were seen, chiefly the first named. Hyaline degeneration of the cytoplasm was not uncommon and in some cells the cytoplasm was contracted to a globular mass which showed a fine thread-like structure. In the periphery of the lobules the cytoplasm usually showed slight fatty infiltration and in those parts single liver cells often were noticed undergoing necrobiosis. In one particular case the liver cells showed extensive diffuse fatty infiltration. Bile pigmentation of the cells was present in most cases and in one extensive bile stasis occurred.

The nuclei were not damaged as early as the cytoplasm. It was not unusual to find apparently normal nuclei with the cytoplasm showing advanced degenerative changes. The majority of nuclei degenerated and disappeared especially in the central necrotic parts, while others produced typical inclusions. The nuclei appeared to be swollen and showed margination of the chromatin which was either present as fine granules or irregular fragments. The nucleoli were swollen and irregular in size, one to two being present in most nuclei whereas in many they were absent. Acidophilic intranuclear inclusion bodies (fig. 2) were present in many hepatic nuclei. These bodies stained pink with eosin, were homogeneous and variable in size. The nuclei usually contained one or more of these bodies which probably became confluent to form larger bodies with a distinct halo. In some fine "prickles" were noticed radiating from the inclusion to the nuclear membrane. In some instances the inclusions attained the size of the nuclei, in which case the latter usually were irregularly shrunken. The vascular endothelial cells and the Kupfer cells were swollen and similar inclusions could be demonstrated. In one case only, inclusion bodies could be demonstrated with difficulty.

Spleen: This organ was usually congested and sometimes focal haemorrhages occurred. The malpighian bodies were distinct, but the cellular content appeared to be reduced markedly in some and karyorrhexis of the lymphoid cells occurred (fig. 3). The reticulum cells were prominent. Many showed karyorrhexis and typical intranuclear inclusions could be demonstrated in them as well as in the vascular endothelium and cells of the Schweigger-Seidel sheaths.

Kidney: Most commonly congestion, hyaline degeneration of the tubules or nephrosis and signs of albuminuria were noticed. Occasional inclusion bodies were constantly present in the glomerular endothelial cells (fig. 4).

Lymph gland: Usually hyperaemia and haemorrhages of variable extent were seen in the lymph glands. Erythrophagocytosis was noticed in the vicinity of the haemorrhagic areas. The cellular content of the cortical lymphoid nodules frequently was

diminished and karyorrhexis of the cells occurred. Occasional inclusion bodies could be demonstrated in the reticulum cells. In the more advanced cases extensive haemorrhage occurred in the cortical and medullary sinuses with almost complete displacement of lymphoid tissue by red blood cells.

Lung: Hyperaemia and oedema.

Brain: Hyperaemia. Occasional inclusion bodies could be demonstrated in the vascular endothelial cells.

Intestines: Most commonly hyperaemia, submucosal and subserosal haemorrhages were present. In one case focal necrobiosis of the glandular epithelial cells was noticed. Little, if any, cellular infiltration was present.

DIAGNOSIS

(a) **Clinically.** It would seem, from examination of the literature on the problem, that there is a great variation in the clinicopathological complex and the diagnosis of this disease, based on clinical symptoms alone, is difficult. From a clinical point of view, canine distemper seems to be the most difficult to differentiate from i.c.h. However, the acuteness of the disease associated with a high temperature, lethargy, tonsillitis and swollen submaxillary lymph glands should make the practitioner suspect i.c.h., especially when there is a history of previous immunization against distemper. In addition to this, absence of bronchopneumonia in the majority of cases and opacity of the cornea in some recovered cases are diagnostic features pointing to i.c.h.

(b) **Smears.** A rapid diagnosis of i.c.h. can be made in fatal cases from impression smears of the liver. Stained with Giemsa the intranuclear inclusions are readily demonstrated in the hepatic cells. After alcohol fixation the inclusions stain basophilically.

(c) **Histologically.** All the cases in this series have been diagnosed on the histological demonstration of the intranuclear inclusion bodies in the hepatic epithelial cells, Kupfer cells of the liver, reticulum cells of the spleen and lymph glands and in the vascular endothelium. Although the histological changes in the organs showed some variation in individual cases, these changes are still in keeping with Rubarth's findings beyond any doubt. The pathological lesions, particularly the nature and distribution of the inclusion bodies, are characteristic of i.c.h.

(d) **The Intra-ocular Test.** This diagnostic test was carried out by a colleague, according to a method described by Evans and co-workers in 1943 and 1950 respectively. An approximately 10% liver suspension of a suspected case was made in saline. To this was added 500 units each of penicillin and streptomycin. After centrifugation, 0.25 c.c. of the supernatant fluid was injected into the anterior chamber of the eye of a puppy. By the fifth

day after injection the cornea was intensely bluish-grey in colour and the temperature raised to 105.8°F. The animal was killed at this stage. Typical inclusion bodies were demonstrated in the endothelial cells lining the inner surface of the cornea in smears and sections. Occasional inclusion bodies were also present in the liver cells and glomerular endothelium of the kidneys.

DIFFERENTIAL DIAGNOSIS

Rubarth compares i.c.h. with diseases having a similar post-mortem picture, e.g. anaphylactic shock, leptospirosis, right-sided heart failure and chronic local suppurations, e.g. pyometra. Although the gross pathological changes may closely resemble those of i.c.h., intranuclear inclusions are absent in these conditions.

TREATMENT

There is no specific treatment.

ACKNOWLEDGMENTS

The author wishes to express his thanks to the different private practitioners, viz.: Dr. Boswell and partners of Johannesburg, Dr. Tarr and partners of Pietermaritzbug, Dr. Basson of Cape Town, Dr. O'Brien of Pretoria and Dr. Every of Estcourt, for the material and information they supplied. He also wishes to thank Dr. D. A. Haig of the Virus section, Onderstepoort, for carrying out the intra-ocular test. The Director of Veterinary Services granted permission for the publication of this article.

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INDIGENOUS UNGULATES AS A POSSIBLE SOURCE OF NEW DOMESTICATED ANIMALS

By

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Proposals to try and establish domesticated breeds of animals from indigenous wild ruminants have been made at various times, and the matter is much to the fore at present. Not only are the Director of Nature Conservation of the Transvaal and the Director of Wild Life Conservation in Natal busy with experiments with the Eland (*Taurotragus oryx*), the former at the Provincial Game Farm at Panfontein, near Bloemhof, and the latter at the Kamberg Nature Reserve, but a society of farmers has been established in the Low Veld with the special object of domesticating the African Buffalo (*Syncerus caffer*).

One of the earliest proposals to domesticate various kinds of indigenous wild animals, among them the Eland and the African Buffalo, was that of Methuen (1848). More than a century ago he wrote as follows:— "The first animal which I shall notice, which seems to have been endued with these essential qualities, is the eland of South Africa. It is probably the largest of the antelopes, termed bovine from their massive and muscular conformation. The height of the male at the withers is frequently nineteen hands, or six feet, rather exceeding the stature of our tallest dray horses. Its limbs are very stout, and its strength great; its disposition has been proved to be singularly mild and docile, even in the first generation captured while young. Experience shows that this is a character rarely to be looked for in the progeny of wild parents, and since the animals breed freely in captivity, it is fair to believe that from them might be derived a particularly quiet and useful domesticated race. . . ."

Of the African Buffalo Methuen (1848) says the following :— "From the buffalo of South Africa it is possible that a domesticated breed might be derived, but, even in that condition, like its Indian namesake, it would probably be a vindictive and dangerous brute. . . . It is impossible to say how the nature of the animal might change in successive generations, or whether the person who reduced it to submission would be repaid for his trouble; till the attempt be made, the matter must remain doubtful."

The various kinds of wild antelopes found in South Africa today are the climax to a long period of evolution. How far back antelopes occur in our strata is not known, but various species of extinct antelopes belonging to existing genera have been found in Southern Africa. Among them we find such species as

Connochaetes antiquus (Broom, 1913), *Connochaetes grandis* (Cooke & Wells, 1951), *Cobus venterae* (Broom, 1913) and *Hippotragus problematicus* (Cook, 1947). Although no definite age can as yet be assigned to the deposits concerned, it would seem that some at least are of Pleistocene age (Cooke & Wells, 1951).

As our indigenous species of antelopes have evolved in South Africa concomitantly with the environment, it must be deduced that the existing species show the maximum degree of adaptation to the various kinds of environments in which they occur. It is obvious, therefore, that they must be better adapted to their respective natural environments than any breeds of domesticated cattle imported from other countries.

Since South Africa was first settled by Europeans about three centuries ago, the only indigenous domesticated bovine animal produced in the country, apart from the inferior breeds of the natives, is the Afrikander breed of cattle. Whatever the original ancestor of this breed may have been (Bosman, 1924; Curson and Epstein, 1934), the Afrikander breed is a product of Africa (Reinecke, 1931). In South Africa it has been much improved since the Great Trek, and it thrives under the most varying conditions of rainfall, climate, altitude and pasture (Reinecke, 1924). Its adaptability to the South African veld is much greater and better than that of any imported breed of cattle.

Methuen wrote as follows in 1848:— "Several attempts were made to gain a cross between the elands and domesticated cattle, but no results ever ensued from the union." Almost a century later, namely in February of the year 1932, Mr. R. Helme, M.A. of Westminster in the O.F.S., announced the birth of an eland-cattle hybrid. The sire was an Eland bull obtained from the National Zoological Gardens, Pretoria, and the dam a grade Friesland cow. Mr. Helme named the hybrid a Catteland and soon after announced the birth of a second calf.

In the year 1933 the two cattelands (a male and a female) bred by Mr. Helme were on exhibition for about two months in the National Zoological Gardens, Pretoria, and they were then sent to the Director of Veterinary Services, Onderstepoort, for study.

The Director of Veterinary Services (du Toit, 1935) reported that "the supposed crosses between an Eland bull and Fries grade cows have both proved to be fertile. The crossbred female calved down to a Red Poll bull, while the crossbred bull sired three calves. The crossbred cow is now in calf to her half-brother. The ease with which these supposed crosses have bred back to cattle and bred together — as also agglutination tests results — seem to throw considerable doubt on the authenticity of their breeding."

In his report for the year ending 31st August, 1936 (du Toit, 1936), the Director of Veterinary Services writes as follows:— "Serological and other blood tests made with blood from the

supposed hybrid between an Eland bull and a grade Fries cow have shown conclusively that these animals are not hybrids. Although the two Eland bulls repeatedly served Afrikander cows with which they were running during the past year, fertilization did not take place. This fact, together with further information obtained from various sources, permits the conclusion that the possibility of hybridization is exceedingly doubtful. This question will soon be definitely settled when the results of the comparative chromosome study of cattle and the Eland are available." Unfortuately, however, the results of the chromosome study do not seem to have been published.

Two species of Eland with various subspecies have been described from different parts of Africa. The subspecies found in the Union of South Africa is *Taurotragus oryx oryx*. The so-called Giant Derby Eland (*T. derbianus gigas*) comes from the Egyptian Sudan, but in spite of its name there seems to be little difference in size between it and the South African Eland. The Giant Derby Eland generally has much longer horns.

Hagedoorn (1922, 1950) has bred the Black Rat (*Epimys rattus* syn. *Rattus rattus*) for several generations in cages without ever being able to get one tame; the same holds good for the "Alexandrine species (*E. alexandrinus* and *E. tectorum*)" *E. alexandrinus* is the North African House-rat and *E. tectorum* the N. African Tree-rat (Hagedoorn, 1922).

In his crossbreeding experiments Hagedoorn (1950) obtained some " complicated hybrids by crossing *rattus* to hybrids between *alexandrinus* and *tectorum*." " From these hybrids a large second generation was raised, which was extremely variable. Many novel characters were found in those rats, such as waltzing, yellow colour, silvering, white tail-tips. A strain of yellow rats was raised for some generations in cages, and by a process of partly unconscious selection, by the fact that some pairs were easier to breed in relatively small cages than others and were more easily tamed, we finally produced a strain of tame yellow rats, a real domestic animal."

The same happened in California, when Hagedoorn tried breeding " the Javanese and the Sumatra field rats (*Epimys diardii*) in cages (1950)". In neither case did he succeed in taming the animals. After four generations of cage breeding they were as wild and intractable as before. But he also " raised some hybrids between the two strains." These hybrids were as wild as the rest, but " they produced a very variable second generation (1950)".

Although Hagedoorn's paper (1922) describes crossbreeding experiments between seven *species* of rats, it should be noted that some of the rats used by him are not considered to be distinct species by all authors. Thus Ellerman (1941) considers *Epimys tectorum* to be a synonym of the subspecies *Rattus rattus frugivorous* and also uses the subspecific names *Rattus rattus alexandrinus* and *Rattus rattus diardi*.

From his experiments with rodents Hagedoorn (1950) makes the following deduction:— "It is perfectly possible for anyone working in a zoological garden to hybridize some wild species, and then, by a process of selection between the animals of the second and subsequent generations, to produce domestic animals from the lot."

This important experimental work points to the fact that the domestication of the Eland will have to start with hybridizing the South African Eland (*T. oryx oryx*) with another kind of Eland. As the Giant Derby Eland (*T. derbianus gigas*) has long horns, it may not be a desirable animal to use; whether its long horns will be dominant in a hybrid with another kind of Eland can only be established by crossing the animals.

The starting-point may also be a hybrid between the Eland and some other antelope such as the Kudu (*Strepsiceros strepsiceros*). Such hybrids showing characters of both parents were produced in the years 1931 and 1932 by Don Francisco da Camara, Governor of the district of Panda in Portuguese East Africa (Helme, 1934).

Let us now examine another possibility of domestication by starting with the African Buffalo (*Syncerus Caffer*).

About twenty years ago an African Buffalo bull (*S. caffer*) was exhibited together with an Indian Buffalo cow (*Bubalus bubalis*) in the National Zoological Gardens. The animals were kept together for several years, and although the bull served the cow regularly no progeny ever resulted from the union.

Mr. H. E. Hornby, formerly Director of Veterinary Services in Tanganyika, writes as follows in a letter dated 13th October, 1951:— "In Tanganyika the Veterinary department introduced a number of water buffaloes from India, and before they died out several years later from trypanosomiasis, I endeavoured to cross a healthy Indian Buffalo bull with a mature African Buffalo cow. They were herded together for more than a year; the cow came into season regularly and was as regularly served by the bull. In the end both became fly-struck, and the Indian bull died. In this case there was no mating barrier, so I attributed the failure to conceive to maladjustment of the sex-chromosome mechanism." Mr. Hornby's experience is, therefore, the same as that of the National Zoological Gardens.

Attempts to hybridize the African Buffalo with cattle have also been made at Onderstepoort. The Director of Veterinary Services reports as follows (du Toit, 1937):— "For 4½ years an attempt was made to cross the African Buffalo with cattle without any success. The experiment has been discontinued. Cross-breeding experiments between Eland and cattle were also unsuccessful."

Mr. R. Hook of Nanyuki, in Kenya Colony, also found that

although African Buffalo bulls frequently served ordinary cows, no progeny was ever obtained. (In litt. 12.x.1951).

In the United States of America hybrids between the Bison (*Bison bison*) and cattle were known as far back as 1750 (Garretson, 1934). Col. C. J. Jones (Buffalo Jones) assigned the name "Catalo" to the hybrid in 1888 (Garretson, 1927, 1934). Female catalos are as a rule fertile (Garretson, 1927), but it is not known whether the same applies to the bulls. Garretson points out (1934) that very few male calves of the first cross are born alive. The most desirable hybrid is produced by crossing the Bison bull with a domestic cow.

Martinho (1927) points out that in the district of Quelimane there are several kinds of wild animals that are useful to man, namely the African Elephant, the African Buffalo and the Eland. Their immunity to trypanosomiasis and perhaps to other diseases, which render the breeding of domestic kinds very difficult if not impossible in vast zones, could be made use of with good effect.

Martinho advocates the domestication of some of the wild species of mammals in Portuguese East Africa because this would contribute to the progress of agriculture in Colonial development.

In the light of existing information, it seems doubtful whether the African Buffalo can be hybridized with cattle. But in this case a suitable starting-point may perhaps be obtained by hybridizing our subspecies of African Buffalo, *Syncerus caffer caffer*, with *S. c. aequinoctialis* from the White Nile region. Another possible beginning will be to try hybridization between the American Bison (*Bison bison*) and the African Buffalo (*S. caffer caffer*).

It is known that various kinds of wild South African ungulates are immune to such fatal diseases of domesticated animals as nagana, snotsiekte and horse sickness. In an attempt to overcome losses from horse sickness, the Zeederberg Bros. tried to use the Transvaal Zebra (*Equus burchellii transvaalensis*) in their coaches in the Transvaal. According to H. Stephens (1893) Messrs. Zeederberg purchased eight half-grown Transvaal Zebras in about October, 1892. The animals were kept at Pietersburg, and in November, 1892, four of them were being trained for harness. They were used together with mules, and although the first reports were favourable, the attempt was eventually abandoned.

An attempt to use zebras as draft animals has also been made in Zululand. The animal concerned was presumably the Zulu Burchell's Zebra (*Equus burchellii wahlbergi*). The magistrate of Ubombo in Zululand reported as follows on this experiment in 1921: — "Dunn's team consisted of eight zebras, two of which are fully grown animals, two about three parts, and the remainder only half grown. The wagon used was of the light donkey class, and having a capacity of 1½ to 2 tons, the load weighed approximately 1½ tons. On one occasion the wagon started at the bottom of a steep incline, with a bad turn half way. The ground was wet

and in some places slippery. It was a fair test of willingness and power, particularly the former, as it was commenced with a " cold collar ". The zebras pulled in a determined and concerted manner, and in my opinion accomplished as much as eight ordinary mules would have done."

" In the sandy country, where it is one continuous pull, they seemed to be only able to do treks of two miles with half loads, and appeared to suffer more from hunger than physical exhaustion. After a feed they would resume the journey without hesitation. Had they been fed on mealies, which they eat readily, I am convinced they could have done longer treks. With regard to their staying capacity, I may mention that, on remarking once to a Dutch farmer that it seemed singular so little use was made of the zebra when they were in numbers in the high veld, he informed me that it was due to this lack of staying power, and that a pair he once owned knocked up after a 30 miles journey."

" On a hard, level road Dunn's team travelled at the rate of 3 miles an hour."

" The conclusions arrived at on the evidence furnished by this team, exclusive of the supreme quality of immunity from disease, are as follows:— They respond quickly to the whip when pulling, they are not given to plunging, but crouch down and pull steadily; they keep their condition without corn-feeding, and they appear more intelligent than mules or donkeys. Against those qualities may be quoted the lack of stamina, which was disclosed when working in the sandy veld, but this I think was mainly due to want of corn-feeding, for it seems barely possible for it to be a characteristic failing of the species, as they are of muscular build, although light-boned."

The cattle industry in South Africa, and indeed in Africa, will be revolutionized if a suitable domesticated animal with the following qualities can be produced from indigenous wild ungulates:— (a) retention of the degree of adaptation of the parent stock to the environment, and (b) a satisfactory degree of immunity to at least some of the serious indigenous diseases with which the breeders of imported stock have to contend.

If a new breed can be produced from wild ungulates, it does not necessarily follow that it will have the same degree of adaptation to its environment as the wild parent stock from which it came. Nor does it necessarily follow that it will retain the parent stock's immunity to various kinds of diseases. But the matter is of such great importance that the time, effort and money that would have to be devoted to the study of the project would be fully justified.

It is generally assumed that African ungulates are highly resistant to diseases. For this reason it has been suggested that at least some of the species be domesticated and raised in areas not suited for breeding domestic animals. Field observations and laboratory investigations during the last six decades have shown that this assumption is only partially correct. Summaries on the

incidence and significance of these diseases have been published by Knuth and du Toit (1921), Thomas and Neitz (1933), de Kock (1938, 1946), and du Toit (1947). These studies have shown that the disease problem is extremely important, and that it should receive careful consideration. This is stressed so that those entrusted with the domestication of game will understand why those whose duty it is to look after the health of domestic and wild animals are reluctant to become highly enthusiastic about the proposed scheme. It is felt that a great deal of research work is essential to make this scheme successful.

The bacterial, viral and protozoal diseases so far encountered in antelopes can be arbitrarily placed in three groups. In the first group are included anthrax (Henning, 1932, 1949; de Villiers, 1943), tuberculosis (Viljoen, Curson and Fourie, 1928; Paine and Martinaglia, 1928; Martinaglia, 1930; Thorburn and Thomas, 1940), rinderpest (Hutcheon, 1896; Mettam, 1936; Carmichael, 1938; Lowe, 1942; Thomas and Reid, 1944), heartwater (Neitz, 1935, 1937, 1944), which may be responsible for high mortality in domestic and wild animals. The second group comprises diseases such as snotsiekte (Mettam, 1923), foot and mouth disease (du Toit, 1932; Rossiter and Albertyn, 1947), nagana (Bruce, 1895; Knuth and du Toit, 1921; Mitchell, 1914; Neitz, 1931, 1932; Kluge, 1945; du Toit, 1954), East Coast fever (Lewis, 1943); Corridor disease (a form of theileriosis, (Neitz, Adelaar and Kluge, 1953), which cause high mortality in domestic animals and rarely if ever death in wild ungulates. In the third group are placed diseases which are specific for certain wild ungulates, but not transmissible to domestic animals. Lichtenheld (1911) described a fatal case of theileriosis in an Eland (*Taurotragus* sp.) in Tanganyika. Martinaglia (1930) encountered a fatal case of babesiosis in a Sable Antelope (*Ozanna grandicornis*) and Neitz and Thomas (1948) give an account of cytauxzoonosis in a Grey Duiker (*Sylvicapra grimmia*) which died after several days of illness. It is interesting to note that the latter two animals died in captivity.

It is beyond the scope of this paper to enumerate all wild animals that are known to be susceptible to diseases transmissible to domestic animals. However, observations have shown that the African Buffalo is susceptible to rinderpest, Rift Valley fever, East Coast fever and Corridor disease. The Eland is susceptible to rinderpest. There is every reason to believe that both these wild ruminants are susceptible to anthrax, tuberculosis and foot and mouth disease, even though no cases have yet been encountered in them.

It has been suggested that the African Buffalo and the Eland should be raised in areas not suited for breeding domestic stock. With few exceptions such areas can be defined as regions where the environmental conditions are favourable for arthropod vectors, particularly ticks, to maintain themselves. In other words these

ruminants are to be introduced into a potential East Coast fever, Corridor disease and Rift Valley fever area. Complete isolation of these animals by means of an adequate fence surrounded by a buffer zone would ensure complete protection for domestic animals. But the erection of such a fence would be far too costly, and hence the wandering habits of buffaloes cannot be restricted. Contact with domestic and wild animals will occur, and the danger of introducing diseases becomes possible.

Immunization as a prophylactic measure can be readily applied in case of bacterial and viral diseases. But in the case of protozoal infections no suitable vaccines are available. The infection is maintained by either the mammalian host or the arthropod vector or by both.

From the veterinary point of view, therefore, it would not be desirable to start hybridizing experiments with the African Buffalo with a view to producing a new kind of domesticated animal.

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LUNG SICKNESS AND HORSE SICKNESS
DR. W. G. ATHERSTONE.

The following notes have been made from the writings of the late Dr. W. G. Atherstone of Grahamstown, and were sent to Dr. J. R. Frean, State Veterinarian, Potchefstroom, by Dr. Atherstone's granddaughter. It is interesting to read of these observations made more than 100 years ago. — Editor.

" In 1852 there was a very serious outbreak of lung sickness amongst the Albany cattle and of horse sickness amongst the horses. My father and I undertook a thorough investigation of the latter disease, also of tick fever. We eventually satisfied ourselves that the cause of the heavy mortality amongst the horses must be some poisonous emanation from decaying vegetable matter — gas or organic, like the organic particles given off by flowers, only known by the sense of smell and propagated by increase from animal to animal. To test the accuracy of our deductions I proposed firstly, to collect the *air* in glass jars over valleys and places where sheep and cattle contracted the fatal disease — (lung sickness I presume M.M.) and to submit it to microscopic and chemical examination, as also the exhaled air from their lungs. Secondly to prove by straining or sifting the air breathed (by respirators) whether immunity from horse sickness would not be secured. But my microscope was not powerful enough in those days for the first test. However, I proved the second test many years later, with my son, Walter, by taking our horses through the infected districts, where every horse died. We did this for several weeks, using flannel nosebags at night only, the horses grazing during the daytime. Not one of our horses suffered and they lived for years afterwards. I told Sir Walter Currie and the C.M.R. officers of this discovery, and they followed our example successfully, as did the officers in the Zulu war, with perfectly satisfactory results. Fortunately, I had published my discovery in the Grahamstown 'Journal', a most unusual thing for me to do. The only other case in which I recollect doing so, was in the ether discovery when I also published an account (in the Grahamstown 'Journal' in 1847), of my amputation of Fred Carlisle's leg. (The first time such an operation with anaesthetic had been successfully performed in South Africa, M.M.)

" But to return to the article on horse sickness, etc.

" Robertson has had much experience in horse sickness, having lost four hundred at one time. He says it is *not* contagious. He told me the Paarde Kop is so called because the farmers send their horses there during the horse sickness season. Not a single horse has died there. Horses also appear to be immune in the sandy 'dunes' where there is no water. This disease attacks only

horses, no other domestic animal seems to be susceptible to it. Why? Is their's a peculiar anatomical structure differing from mules and donkeys? It is not communicable from one horse to another. Is it a miasma or malaria from the soil, or water, or atmosphere of the locality; probably a vegetable ferment acting on the bronchial tubes and lungs, and only at certain seasons of the year when vegetation is luxuriant and the heat so great as to wither it? On high mountain pastures the disease is unknown, yet in the plains of the Free State it is very severe, I imagine because of the horizontal strata of shale not admitting of drainage from the clay sub-soil, except by the dongas and ditches.

"The symptoms of this fatal disease are as follows:— The animal first appears dull and loses his appetite. In a couple of days or even less, a slight cough develops, the pulse quickens accompanied by a slight exudation from the nostrils which soon increases to a frothy, yellowish fluid — pits appear over the eyes, the lids become swollen. The secretions or excretions are not affected, the disease being confined to the mucous membranes of the air tubes and lungs alone, and their secretions are innocuous. The carcase does not contaminate the soil, as is the case with anthrax or red water, etc.

PREVENTIVE MEASURES

"Stable and feed the horse on *dry* forage and grain. Do not let him go out in the dew of morning or evening, but if compelled to do so by duty, a flannel respirator should be used whilst in low or damp localities. In the heat of the day it is safe to let the horse out if not knee-haltered or allowed to eat damp grass. *Elevation above* the local site of the disease, (*not* above sea level) confers immunity from the disease. Horses feeding on rank grass are specially liable to the disease where the shaly layers of the valleys which are scooped out by the weathering, and contain patches of luxuriant vegetation which rapidly withers under a scorching sun, and give out the vegetable ferment which affects the nostrils and lungs of the horse.

"But why are not sheep, goats, cattle and donkeys affected? Does the same germ affect them in a different manner and is given a different name? In the dry veld of the Karroo, especially where the Ecca trap rock prevails, horse-sickness is unknown.

"Death is from asphyxia — drowning in actual fact. The heart, being a double action pump of suction and also a force pump, so that when the serum of the blood is poured into its bag, as it is into the submucous tissues of the air tubes, lungs and bowls, as well as the pericardium, from the tension of the imperfectly aerated or oxygenized blood in the (Indistinct) veins, its action is impeded as a suction pump and it cannot fill its cavities so as to force the blood through the system. The result of this tension of the blood in the venous capillaries is to cause transudation of serum into the

cavities of the chest, the pleura, peritoneum and the cellular tissues under the skin. Hence the oedema about the head and chest, and the rapid death of the unfortunate animal. Its lungs, when cut into, rapidly become pink from absorption of O, from the air, the blood being black and tarry. There is serum fluid in all the cavities, caused by this pressure or tension of the systematic venous circulation, from the heart's inability to such the unaerated blood into the auricles to be again forced by the ventricles, through the system.

"How can this exosmosis from the distended capillaries be averted? Clearly only by decarbonizing, i.e. oxidizing the blood. This can only be effected during the earlier stages, and by *inhalation* through the nostrils and air tubes — or by destroying the microbes already inhaled which have caused the tendency to carbonize the blood in the lung capillaries. In the earliest stages use respirators over the nose, saturated with eucalyptus, and clear out the bowels with soda sulph: and magnesia sulp: and nitrate. In the later stage the animal should inhale fumes of sulphur frequently, and Condy's Fluid should be administered internally. Eucalyptus oil and tar may be painted over and inside the nostrils. All secretions and excretions being stopped, the action of the skin must be increased by hot stimulants applications, grooming well every two hours.

"Horse sickness is a ferment or poisonous emanation from withered vegetation, as infinitesimal as is the aroma of flowers, known only by their impression on the sense of smell, yet subtle and powerful enough to cause headache, nausea, and poisonous effects, mechanical or chemical — neither germs nor spores acting through the mucous membrance on the blood corpuscles, but on the nerves. I have known the scent of mint induce painful erythema and sickness — I doubt whether odours are due to material bodies invisible to the highest powers of the microscope. Who can measure a smell? Yet, when strong, we can almost *feel* it, so dense is it. Scents, not microbes, volatile vegetable spores, yet altering the blood and inducing fevers, irritation and disease, yet preventable by filtration, as I urged in the terrible epidemic of horse sickness in 1852/53, in Namaqualand. Salting does not prove the disease to be infectious. To the sight alone changes the blood and secretions, produces yawning, salivation by reflex action on the sympathetic nerves, acting through the eye or nose or ear on the pneumo-gastric ganglion, and in this way affecting the heart and circulation and the spinal secretions and organs of sense, or pain. No microbes are needed to explain the effects of sudden changes of colour of the skin of a chameleon or of human hair from mental causes, fright, grief, rage or suffering.

"In 1853, after the last Kaffir war, my attention was first directed to the peculiar facts of horse sickness. The flats and valleys teemed with vultures gorging on the carcases. Foals were

found drinking from their dying mothers, yet these small animals lived and grew strong. Why? Was it like the baby suckling at its Mother's breast when the poor woman in a dying condition from confluent smallpox was admitted into Fort Selwyn during the epidemic? The infant, like the foal, never contracted the disease but grew up strong and healthy, having imbibed immunity through its mother's milk. But the, to me, most important fact in connection with horse sickness was that *frost killed the malaria and stopped the disease.*

"From data I have collected I find that the heavy mortality amongst the calves on several of the farms in the Grahamstown area, is attributed to the fact that the farmers affected let their calves out before the dew is off the grass in the valleys. Cattle should go to the mountain ranges in winter and sheep be sent there in summer. Pure oxygen alone will not sustain animal life, for long, but if an electric spark is passed through it, the air becomes fit for animals to breathe. Thunder storms clear the air and re-vitalize the oxygen, thus rendering it fit for the animal to breath."

In a small note book I found the following entry :—

"1871. The stripes of the Zebra and even of the donkey are perpetuated for three generations after a *single covering* of the mare; more faintly in each foal until the markings vanish altogether. It is the female and *not* the male that transmits colouration and beauty, plumage and shining coat. This fact is borne out in the mingling of white and coloured people, the colour is strongest along the female line.

A SIMPLIFIED OPERATION FOR THE PREPARATION OF ABOMASAL POUCHES IN CALVES

J. F. W. GROSSKOPF,
Pretoria.

Although the preparation of stomach pouches in animals such as the dog is a standard procedure in physiological laboratories, the operation presents peculiar difficulties in the ruminant owing to the looseness of the mucosa and the presence of the folds. In a recent publication, Hill and Gregory (1951), described six different methods of preparing such pouches in goats. These included the Pavlov and Heidenhain types and modifications thereon. As all these procedures are extremely complicated it was decided to evolve a more simplified method.

PRE-OPERATIVE TREATMENT AND ANAESTHESIA

The calf is kept without food and water for 24 hours prior to the operation. The operation site is prepared in the usual way. 10-15 mgm. of Atropine may be given subcutaneously to a young calf to avoid excessive salivation.

Chloral hydrate is used as anaesthetic, the dose being 10 Gm. per 100 lbs. bodyweight as a 10% solution in sterile saline given intravenously at the rate of about 10 cc. per minute. The dose may be increased if the desired level of anaesthesia is not reached.

OPERATIVE TECHNIQUE

A laparotomy is performed by making an incision about two inches posterior to the last rib and parallel to it. The incision being about five to six inches long and its ventral angle about three inches to the right of the linea alba. The abomasum is now withdrawn and the line of attachment of the greater omentum to the greater curvature of the abomasum located. At a point opposite the greatest diameter of the abomasum an opening is torn through the greater omentum, big enough to admit two fingers in order to have access to the visceral surface of the abomasum. The abomasum is flattened out to remove all ingesta from that region.

Interrupted through and through stitches are now put through both layers of the unopened abomasal wall starting at the attachment of the greater omentum about two inches anterior to the newly formed omental orifice.* Care should be taken not to include the bloodvessels (A. et V. gastroepiploica sinistra) or the nerve (right ventral branch of the N. Vagus), running in the greater

* In this way the mucosal surfaces are brought into apposition.

omentum along the edge of the abomasum, in the stitch. No. 1 silk (or another permanent suture material) attached to an atraumatic needle is used. The stitches are made about $\frac{1}{4}$ to $\frac{3}{8}$ inches long, each stitch overlapping the previous one slightly so as to avoid any fistulae developing between the main stomach and the pouch. The suture line should be semicircular ending about five inches posterior to the starting point on the same edge of the abomasum. (Fig. I.) Care should be taken not to include any ingesta between

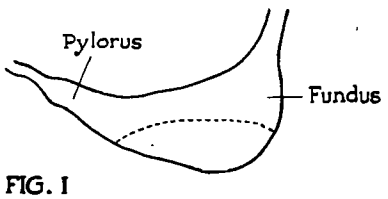

FIG. I

Diagram showing suture line on abomasum.

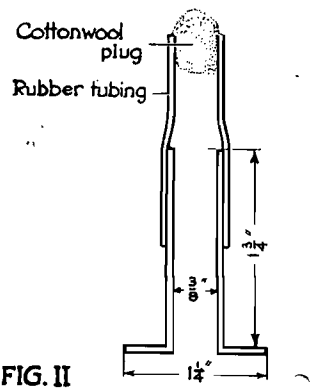

FIG. II

Longitudinal section through fistula tube.

the two layers stitched together. A passage of at least two inches in diameter should be left for the ingesta to pass through the main part of the abomasum. Inclusion of nerve branches running on the surface of the abomasal serosa by the stitches should be avoided.

A bakelite fistula tube (Fig. II) plugged with cotton-wool, to avoid contamination by ingesta, is now inserted into the pouch by means of two purse-string silk sutures and brought out through a stab wound in the abdominal wall about 1 inch anterior to the laparotomy wound.

The laparotomy wound is sutured in the usual way. The plug must be removed from the fistula or else the pressure of the accumulated gastric juice in the pouch may cause rupture of the pouch or leakage around the fistula tube.

RESULTS AND CONCLUSIONS

The calf recovers from the anaesthetic about 6-8 hours after the operation and may be fed a normal milk diet without any ill effects immediately after recovery. In uncomplicated cases no further treatment is necessary and as early as the fourth day normal gastric juice without any sign of contamination with ingesta, can be collected.

A calf operated on in this way showed no ill effects from the operation by the second day. It grew out just as well as its companions and six weeks later, before it was killed, still appeared as healthy as any normal calf. On post mortem a localized chronic peritonitis was found around the fistula, the abomasal pouch being attached to the peritoneum. The stitches in the abomasum were still present and covered with a thin layer of connective tissue. On opening the abomasum, it was found that the two mucosal surfaces had completely grown together along the suture line. (Fig. III.) This is contrary to the general belief that such surfaces will not unite. A completely isolated abomasal pouch had thus been formed.

Fig. III

Suture line (indicated by arrows) viewed from inside of pouch six weeks after operation.

Being well supplied by branches of the ventral branch of the Omaso-abomasal artery and vein and by branches of the right ventral branch of the Vagus nerve it is believed that the secretion by this type of pouch is a true sample of the calf's gastric juices. Samples were actually compared to samples collected from calves operated on in some of the ways previously mentioned. The effect of different stimuli on the PH value, and pepsin and rennin quality was found to be similar.

It is therefore concluded that by this simplified method of operation functional pouches can be produced suitable for experimental work.

SUMMARY

A method for the preparation of abomasal pouches in calves without opening the abomasum is described.

ACKNOWLEDGMENTS

The author wishes to thank the Director of Veterinary Services for granting the facilities for the experimental work and Professors R. Clark and M. W. Henning for their guidance and encouragement.

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SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

The 49th Annual Congress was held at Onderstepoort from August 24th to 26th, 1954.

The following members attended the Congress during the three days:— Drs. R. A. Alexander, T. F. Adelaar, J. H. R. Bisschop, R. Clark, J. D. Coles, H. P. A. de Boom, M. de Lange, R. duToit, H. O. Flanagan, P. J. Fourie, H. Graf, D. A. Haig, M. W. Henning, P. G. Howell B. C. Jansen, J. M. le Roux, B. M. McIntosh, W. D. Malherbe, W. O. Neitz, J. W. Pols, E. M. Robinson, K. Schulz, J. D. Smit, A. J. Snyders, N. C. Starke, G. D. Sutton, G. C. van Drimmelen, J. S. van Heerden, S. W. J. van Rensburg, K. E. Weiss, J. F. W. Grosskopf, J. G. Louw, J. Groenewald, W. S. Allderman, J. A. Badenhorst, R. T. Bangay, N. Barrie, J. G. Bekker, C. W. A. Belonje, M. Bergh, G. P. Bishop, L. C. Blomefield, J. G. Boswell, H. N. Botha, J. M. Brown, M. H. V. Brown, W. H. B. Buhr, P. H. Bunton, A. S. Canham, I. S. Canham, J. B. Condy, Major L. L. Daly, Drs. O. T. de Villiers, S. W. de Villiers, W. J. B. de Villiers, G. J. de Wet, Capt. J. L. Dickson, Drs. A. M. Diesel, J. L. Doré, R. Every, W. D. Fitzsimmons, M. M. Greathead, J. Grobler, J. J. Hamman, L. L. Hansmeyer, Margaret Hearn, C. F. B. Hofmeyr, P. P. Hugo, J. H. Huyser, D. H. G. Irwin, P. G. Joubert, A. C. Kirkpatrick, E. B. Kluge, J. P. Kriel, J. L. Kruger, A. B. la Grange, M. C. Lambrechts, E. Langen, E. O. le Riche, P. L. le Roux, D. J. Louw, A. J. Louw, Jac Louw, T. A. T. Louw, I. S. McFarlane, W. M. McHardy, G. McIntyre, D. L. McWhirter, C. v. E. Maré, C. Maree, G. Martinaglia, J. H. Mason, C. M. T. Meldal-Johnsen, J. J. Oberholster, S. V. O'Brien, J. J. Oosthuizen, D. E. Osbourn, G. Pfaff, M. S. Reichert, R. K. Reinecke, A. I. Robertson, W. H. G. Schatz, P. S. Snyman, S. A. R. Stëphan, Prof. D. G. Steyn, Drs. J. L. Stewart, D. G. Steyn, H. P. Steyn, L. Stonier, A. D. Thomas, J. G. Townsend, D. E. Truter, R. Tustin, W. P. van Aardt, G. F. van der Merwe, A. van Heerden, Col. C. J. van Heerden, I. van Schalkwyk, T. Veenstra, F. J. Veldman, U. S. von Backstrom, D. C. L. Wacher, G. Watt, T. C. W. Wessels, J. G. Williams, P. B. Winterbach and J. Zwarenstein.

Local Health Authorities were represented by the following members :— Dr. B. M. Horwitz (Cape Town), Dr. L. W. van den Heever (Germiston), Dr. C. C. Wessels (Durban), Drs. W. J. Wheeler and P. L. Uys (Pretoria), Dr. A. J. Louw (Bloemfontein) and Dr. E. J. Pullinger (Johannesburg). The following visitors attended the Congress:— Drs. K. C. Smithburn and Weinbrun, N. J. G. da Camara from neighbouring territories.

Tuesday, August 24:

8.30 a.m. The President welcomed visitors from neighbouring territories. The attention of members was drawn to the fact that the Presidential chain of office, now completed, was available for inspection.

The President welcomed Dr. M. S. du Toit, who proceeded to open the Congress. Dr. Alexander thanked Dr. du Toit.

Obituaries: During the year a colleague, Dr. V. Cooper, had died. The meeting stood as a mark of respect.

Presidential Address: Dr. Diesel then delivered his address.

Notification of Election of Council for 1954-55: The following office-bearers were elected:—

President: Dr. A. M. Diesel.
Vice-President: Dr. G. Pfaff.
Honorary Secretary: Dr. K. E. Weiss.
Honorary Treasurer: Dr. G. D. Sutton.

Council Members 1954-1956: Drs. A. D. Thomas, S. W. J. van Rensburg, R. Clark and P. S. Snyman.

Sitting Members 1953-1955: Drs. R. A. Alexander, M. H. V. Brown, M. de Lange and M. C. Robinson.

Editor: E. M. Robinson.

Election of New Members: The following new members were recommended for acceptance by Council: Drs. J. S. Dovey, M. A. Gibson, H. F. Wallace, W. E. J. Warnes, M. McCreanor, J. E. Dorrington, R. D. Bigalke, P. D. de Wet, J. L. du Plessis, J. M. Erasmus, J. L. Kruger, E. Langen, P. J. Schutte, H. F. Strydom, J. Jackson, L. P. Colly, C. E. Claus, D. J. Thornton, H. R. Thorogood, J. Falconer, D. D. McMillan and H. G. Belschner of Australia. Their acceptance for membership was proposed by Dr. B. C. Jansen and seconded by Dr. R. du Toit. They were unanimously elected, and were welcomed by the President.

Dr. Hofmeyr then addressed the Meeting on the proposed erection of Memorial plaques to deceased colleagues and asked for contributions on lists to be circulated.

Opening of Trade Exhibit: The President welcomed the representatives of the exhibiting firms. The vice-president of the Medical Exhibitors Association replied suitably. Dr. Alexander suggested that the President et al should meet the exhibitors to discuss the implications of the new Medical, Dental and Pharmacy Act.

Messages of Good Wishes for a Successful Congress were received from Drs. Tarr, Paine, Solomon, Littlejohn, Wacher, Dent, Frean and Steel, also from the Minister of Agriculture, the Honourable Mr. le Roux, the Director of Veterinary Services, Lourenço Marques, Mr. Zaidel, President of the Pharmaceutical Society, Mr. Ivan Barkhuizen, Mr. J. H. Moolman, Chairman of S.A. Wool Board, Mr. G. J. Rossouw, President of S.A. Agricultural Union and Dr. E. H. Cluver, director of S.A. Institute for Medical Research.

Apologies: Apologies for non attendance were read from the following members: Drs. C. H. Flight, S. G. Turner, J. Bosch, J. G. Keppel, A. F. Tarr, B. T. Paine, R. A. Solomon, A. Littlejohn, P. P. C. Wacher, G. C. Dent, J. R. Frean, L. G. Steele and N. F. Viljoen.

The rest of the day and Wednesday, August 25, were spent in the reading and discussion of papers. During the day the President welcomed Drs. Martinaglia, McWhirter, Stewart and Condy, also Mr. P. L. le Roux of London, and Drs. K. C. Smithburn and Weinbrun of the S.A.I.M.R.

Thursday, August 26:

After a demonstration of caesarian section in a cow by Drs. Boswell and Hempstead the business meeting of members was held at 11.10 a.m. The President welcomed Dr. D. G. Steyn of the Medical Faculty, Pretoria, and congratulated him on winning the Havenga prize.

1. *Minutes of the previous Business Meeting,* 1953: Had been published in the Journal and were taken as read. Proposed by Dr. McHardy, seconded by Dr. v/d Heever.
2. *Arising out of these Minutes*:
   (a) *Presidential Chain of Office*: This had been completed and the President was wearing the chain.
   (b) *Jubilee Celebrations,* 1955: The President informed the meeting that an organizing committee had been appointed. Members were asked for suggestions, but no discussion took place.
   (c) *Resolution Natal Branch*: Re licensing of Veterinarians by the Jockey Club of S.A. In Council's opinion licensing of Veterinarians was in the best interests of the Profession. No further discussion ensued.
   (d) *Resolution*: Dr. D. G. Steyn on Antibiotics in Animal Feeds: Dr. Steyn was invited to give further information to Council, but indicated that he did not intend pursuing the matter further.

3. *Members and Matters Pertaining to Membership*:
   (a) *New Members*: The names of new members were read and accepted on the first day of the Congress.
   (b) *Resignations*: The resignations of Dr. A. V. May, Dr. Barnard and Dr. Hindmarsh were accepted with regret. Proposed by Dr. Malherbe, seconded by Dr. Thomas.
   (c) *Life Members*: The following members qualified for life membership during the year and were congratulated by the President: Drs. M. Bergh, O. T. de Villiers, J. P. Frean, W. Jones, C. v. E. Maré and P. S. Snyman.

4. *Financial Report*:

Copies of the Balance Sheet were distributed to all members at the meeting by the Honorary Treasurer, who pointed out that the Balance Sheet and Auditor's Report had been scrutinized by Council, and the Association was in a healthy financial position.

   (a) *Group Endowment Insurance Scheme*: Dr. Sutton appealed to members who used this scheme to drop it and make other arrangements. There was very little financial gain in the scheme for the Association, but an enormous amount of work. Actual figures were given to substantiate his remarks. Dr. Malherbe supported the Honorary Treasurer. On the proposal of Dr. McHardy, seconded by Dr. Malherbe, the meeting unanimously agreed that the above-mentioned scheme be abolished.
   (b) *Subscriptions Outstanding*: Dr. McHardy enquired if members could not be induced to bring their subscriptions up to date. The Honorary Treasurer pointed out that only two members were outstanding for three years or more. He thought that it was a sound position for an Association of this size.
   (c) *Additions and Alterations to Constitution*: The President mentioned that notice of motion for alterations to the constitution had been circularized. The Honorary Treasurer pointed out that the change to make the subscription year correspond to the financial year was to assist the auditors. The second addition of requiring two signatures on a cheque was to meet bank requirements.

The additions and alterations as circularized were proposed by Dr. Sutton and seconded by Dr. Coles. Theye were unanimously accepted by the meeting. The Constitution was to be amended accordingly.

Dr. Bisschop enquired whether Council could not deal with resignations since there is no necessity for the General Meeting to accept them. Dr. Sutton pointed out that this matter had been discussed at the last Council Meeting, where it became clear that this method had been determined with the idea of protecting members from possible victimization.

Dr. Adelaar said that there would be no question of victimization.

ThePresident informed Prof. Bisschop that notice of motion of a change of Constitution will have to be given before the next Annual Business Meeting. Prof. Bisschop gave notice of his intention to this effect.

   (d) *Removal of Name of Member from Membership List*: Proposed by Dr. Sutton, seconded by Major L. Daly, and unanimously accepted that name of Dr. J. D. Daly be removed from membership list. He had left for Burma and could not be traced and was three years in arrears with his subscription.

5. *Reports of Standing Committees*:
   (a) *Editorial Committee*: Dr. Robinson again emphasized the difficulty in getting material for the Journal. The committee could be said to be living from hand to mouth. It was the Committee's great hope that private practitioners would contribute more. The Editor realized

that there was little time for the private practitioner to devote to publishing of papers and, moreover, he did no have access to the literature. However, he made an earnest plea that instead of papers, the private practitioner could put up something in the form of case reports. Last year the Editor made an appeal for suitable papers for the Congress as early as February. He was gratified with the response, though it was not as big as he had hoped. He wished the response from private practitioners could be better.

Dr. Frean's letter to the Editor made a suggestion that we publish extracts on drugs and their use, as the American Journals do.

(b) *General Purposes Committee*: Dr. Clark informed the meeting that this committee had no report to make.

(c) *Standing Committees*: The President informed the meeting that the members of the Standing Committees were named at the last Council Meeting. They were substantially the same as last year, except that Dr. de Lange was on the Finance Committee in place of Dr. Malherbe. Library Committee: Dr. Adelaar (convener), Dr. Coles, Dr. Sutton and a cadet member nominated by the students.

6. *General*:

(a) *Proposal by Dr. Hofmeyr re Memorial Plaques*: After much discussion on the manner in which to commemorate certain deseased colleagues, the meeting decided that this was a non-S.A.V.M.A. matter and should rather be dealt with by Faculty.

(b) *Trade Representatives*: Major L. Daly proposed that an up-to-date list of veterinarians be given to the Trade Representatives who have gone to such a great deal of trouble to arrange their exhibits.

Dr. Sutton pointed out that the firms received such lists of S.A.V.M.A. members on request and paid £1 1s. 0d. to the S.A.V.M.A. Benevolent Fund.

(c) *Plea for Veterinarians to take a more active part in Advising on Breeding Programmes*: Dr. McFarlane reiterated an appeal to all veterinarians to be more closely asociated with all aspects of the breeding of cattle in South Africa by becoming members of Show Committees in their areas. Dr. Coles supported Dr. McFarlane in his appeal. The President thanked both members for their suggestions.

(d) *Publication of Minutes of Council Meetings*: Dr. McHardy suggested that the publication of minutes of Council meeting in the Journal be dropped and that the minutes be sent to members individually.

The President pointed out that confidential metters were sometimes discussed by Council which could not be published or circularized.

After much discussion it was decided as suggested by Dr. Clark, that the matter be left in the hands of Council to provide a satisfactory solution.

(e) *Natal Veterinary Co-op*: Dr. Wacher requested Dr. Thomas for his opinion on co-operative employment in the light of his experiences in Europe. Dr. Thomas replied that he had already voiced his opinions at a Pietermaritzburg Branch meeting. In no single instance are veterinarians employed on a co-operative basis in European or Scandinavian countries. The same type of co-operative employment was present in New Zealand. Dr. Wacher requested Council to act on Dr. Thomas's advice. He felt that this type of employment was dangerous for the profession as it represented a curtailment and limitation of professional abilities. The President said that the whole position could only be changed through the Code of Ethics.

Dr. McFarlane suggested that the meeting was competent to give a directive to Council to put its views to the Veterinary Board and proposed that the meeting "Disapproved of the Employment of

Veterinarians to do Clinical work for Co-operative Societies." Seconded by Dr. Wacher. Votes: 48 for, 2 against.

(f) *Discussion of Hypothethical Ethical Cases*: Dr. McHardy asked that at General Meetings a hypothetical ethical case should be discussed between members for their enilightenment.

(g) *Question about Liaison Committee*: Dr. Wacher drew attention to a statement in the Journal to the effect that a Liaison Committee appointed by Council could not function due to the non-co-operation of the Natal member. Dr. Wacher asked whether this was true.

Dr. Thomas, called to reply, said that this was true because the committee never functioned on any single occasion by written or verbal communication. The Natal member had been appointed to keep the committee informed. . Dr. van Rensburg and Dr. Diesel corroborated Dr. Thomas's remarks. Dr. Wacher thanked the speakers.

7. *Resolutions*:

(a) "That this 49th Meeting of the S.A.V.M.A. considers that the whole question of ante and post mortem inspection of animals slaughtered for human consumption should be review. To this end a conference between the State department and other bodies concerned should be convened and Council so instructed to do all in its power to implement such a meeting."

It was proposed by Dr. Horwitz and seconded by Dr. A. J. Louw. Dr. Horwitz said that in this country there was a danger of control of health of animals falling into the hands of laymen. This trend was contrary to that of the rest of the world.

It was decided on the suggestion of Dr. Watt to leave this matter to the discretion of Council to approach whatever bodies Council considered necessary to bring about such a conference.

Carried unanimously.

(b) "That this 49th Congress of the S.A.V.M.A. notes with approval that certain members have formed a 'Veterinary Public Health Group' and considers that such a Group will fulfil a very useful function in maintaining and furthering the Public Health aspect of the Profession. Council is hereby requested to investigate ways and means to effecting a formal recognition of such a Group within the framework of the S.A.V.M.A."

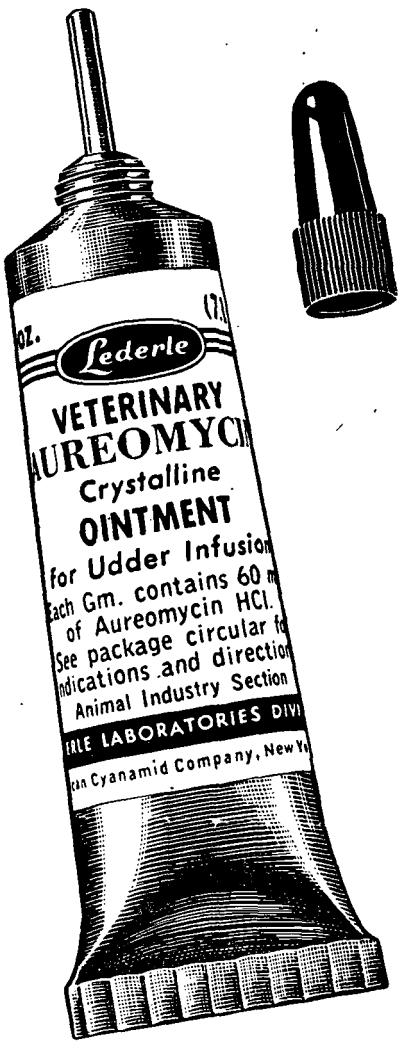
It was proposed by Dr. L. W. van den Heever and seconded by Dr. B. M. Horwitz, and then carried unanimously.

Dr. Pfaff drew attention to the comptent way in which the papers of the Aegenda were drawn up and proposed a hearty vote of thanks to the Committee and especially to Dr. Robinson. Thanks also to the President for so ably conducting the meetings, and the Secretary and Treasurer for their competent running of the Conference.

Dr. Diesel thanked the Director for the use of the buildings during the Congress and the ladies, Mrs. Coles, Mrs. van Rensburg and Mrs. Malherbe, for their assistance, and also to the ladies who provided lunches and teas.

The meeting closed at 12.45 p.m.

for MASTITIS



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COUNCIL MATTERS

A Council meeting was held on August 19, 1954. The following matters were discussed:—

(a) *Code of Ethics*: The committee considered that the activities of the S.P.C.A. and Animal Welfare Societies in a general way in relation to veterinary ethics. It was decided that this was a matter for the Veterinary Board.

(b) *Pretoria Branch of the S.P.C.A.*: The difficulties experienced by the S.P.C.A. (Pretoria) have been gone into and the matter has been placed on a satisfactory basis.

(c) *Jubilee Celebrations of the S.A.V.M.A.*: 1955: The committee is considering the Veterinary and Social programmes which should be arranged during the Jubliee celebrations.

(d) *Notification of election of Council* 1954/55: The Secretary informed Council of the results of the recent Council election:—

President: Dr. A. M. Diesel.

Vice-President: Dr. G. Pfaff.

Honorary Secretary: Dr. K. E. Weiss.

Honorary Treasurer: Dr. G. D. Sutton.

Members 1954/56: Drs. A. D. Thomas, S. W. J. van Rensburg, R. Clark and P. S. Snyman.

Members 1953/55: Drs. R. A. Alexander, M. H. V. Brown, M. de Lange and M. C. Robinson.

Editor: Dr. E. M. Robinson.

Out of a total of 323 voting papers sent out only 123 were returned.

Dr. Alexander congratulated the President on his decision to accept office for another year. Dr. Diesel replied suitably and expressed his appreciation of Dr. Pfaff's election as Vice-President.

4. *Standing Committees* 1954/55:
The following standing committees were appointed:—

(a) *Finance*:
Dr. S. W. J. van Rensburg (Chairman-Convener), Drs. A. D. Thomas, R. A. Alexander, M. de Lange and G. D. Sutton (Hon. Treasurer).

(b) *Editorial*:
Dr. E. M. Robinson (Chairman-Convener), Drs. R. Clark, W. D. Malherbe, L. W. van den Heever, W. J. Wheeler and M. H. V. Brown.

(c) *Library*:
Dr. T. F. Adelaar (Chairman-Convener), Drs. W. D. Malherbe, J. D. Coles, G. D. Sutton and a cadet member nominated by the Hostel Committee.

(d) *General Purposes Committee*:
Dr. R. Clark (Chairman-Convener), Drs. W. D. Malherbe and M. C. Robinson.

(e) *Book Fund*:
Dr. G. D. Sutton (Chairman-Convener), Drs. M. de Lange and A. D. Thomas.

(f) *Resolutions*:

Drs. R. Clark and E. M. Robinson.

5. *New Members*: The following applications were received:—

C. E. Claus, L. F. Colly, J. J. Jackson, D. J. Thornton, H. R. Thorogood, J. E. Dorrington, W. S. Allderman, D. Tabic, M. Rose, R. D. Bigalke, P. D. de Wet, J. L. du Plessis, J. M. Erasmus, J. L. Kruger, E. Langen, P. J. Schutte, H. F. Strydom and A. J. Snyders.

Also Mr. McCreanor proposed by Dr. M. H. V. Brown and seconded by Dr. Pfaff.

Also Drs. J. Falconer and D. D. McMillan duly proposed and seconded.

The names of the latter two applicants were not known at time of Council meeting, but are to be added to list. All were recommended by Council for acceptance by Annual Congress.

6. *Resignations*:

Dr. A. V. May. Acceptance of resignation recommended by Council.

BOOK REVIEW

FARM ANIMALS IN HEALTH AND DISEASE, by W. R. Wooldridge: Crosby Lockwood and Son, London, 1953, pp. 463.

The title of this book is somewhat of a misnomer as it is only in the first chapter that the subject of good health is dealt with, but this in no way detracts from its value. Although the veterinarian could gain much useful information from the book, it is written mainly for the stock breeder. The author of the book should be very well fitted to write it on account of his great and varied experience. Much emphasis is laid on the avoidable stock losses which occur even in well developed countries.

In the initial chapter the importance of the various factors which make for the maintenance of stock in good health are emphasized, mainly proper feeding and keeping the physiological factors in their proper balance. In further chapters the general symptoms of disease are dealt with and some of the causal agents. Chapter three on the cost of ill health is very illuminating and rather startling when it is realized what the cost of diseases of stock really amounts to. Chapter four is devoted to the methods available for the control of stock diseases of all types including parasitic infestations.

The remainder of the book is devoted to descriptions of the various diseases, mainly infectious, which may affect the different species of domesticated animals, including the rabbit. The approach in all cases is very practical and for this reason the book should make an immediate appeal to the stock farmer. A number of diseases affecting stock in South Africa are not dealt with, but to have done so would probably have widened the scope of the book too much. The photos are very good, some excellent, but the line drawings are in some cases not of the same high standard. Taking the book as a whole, it should be a very useful addition to the library of any progressive farmer and there is much in it that should appeal to the veterinarian as well. It can be recommended as a valuable addition to the books which survey diseases of stock in a general way in simple, understandable language.

E.M.R.

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