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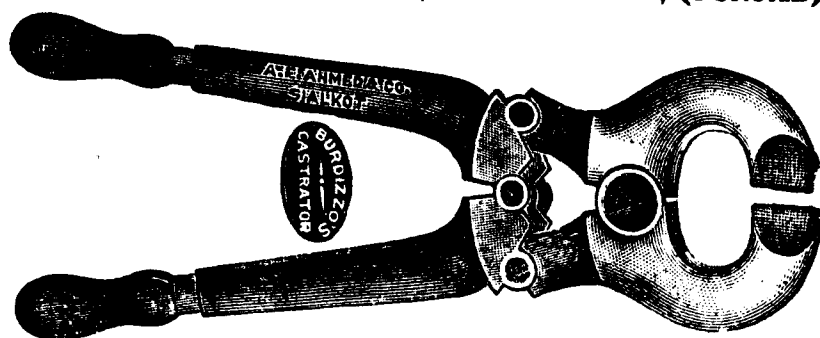
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The Indian Veterinary Journal.

(The Journal of The All-India Veterinary Association)



Staff of the Veterinary College, Madras.

Editor

P. SRINIVASA RAO, G.M.V.C.,

Veterinary Surgeon, Madras.

Office: 26, WALLAJAH ROAD, MOUNT ROAD, MADRAS (S. INDIA)

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NOTICE

The Indian Veterinary Journal

A quarterly record of Veterinary Medicine and Surgery
devoted to the cause of the Veterinary Profession.

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EDITOR:

P. SRINIVASA RAO, G.M.V.C.,
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THE INDIAN VETERINARY JOURNAL

(The Journal of the All-India Veterinary Association)

Vol. VII.]

OCTOBER, 1930.

[No. 2.

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THE

Indian Veterinary Journal

Vol. VII]

OCTOBER, 1930

[No. 2

Editorials.

THE ELEVENTH INTERNATIONAL VETERINARY CONGRESS.

On the 4th of August 1930, a unique congress met in the central hall of the Westminster in London, under the most distinguished patronage of His Majesty King George V of England and that of 'Prince Charming' His Royal Highness, the Prince of Wales. It was not a congress of politicians meeting under the League of Nations to discuss about some eleven points or eighteen points or the tougher question of armaments. It was neither a round table nor a square table conference where the great game of political chess was being played. No, it was not even a congress of any of the richer professions in the world. It was the congress of the meek and modest members of a profession which is scarcely recognised as playing an important part in the economic prosperity of nations all over the world. It was the 11th "International" of that unostentatious profession of Veterinary Science.

All is not well with England just now. Problems at home seem to be more complicated than problems abroad. Unemployment is perhaps assuming its worst phase. Neither the individual nor the State is happy over such hard circumstances. But yet the call of science has had its day. The veterinary profession in England came forward boldly to shoulder upon itself the stupendous task of holding an 'International congress'. Does it need our mead of praise? Hats off to England!

Though the public underestimate its value and the State inadequately recognise its worth, the veterinary profession

has only enhanced its reputation for that patient sacrifice at the altar of science, so that others may thrive and prosper. It is perhaps that inherent virtue that is responsible for the unparalleled success that attended the congress, in spite of the adverse circumstances obtaining in the country.

The total number of delegates attending the congress was somewhere near 1900, representing some 40 nations and 16 dominions, colonies and dependencies of the mighty empire. The professional papers discussed were 28. The lighter side of life was not eschewed from the programme. There were special entertainments committee and ladies committee to look after excursions, banquets and receptions. It was a fitting revival of the 'International congress' after the dismal dispersal sixteen long years ago under the shadow of the Great War. If professor Schmidt said of the 1905 congress that the "Congress appeared to be growing too quickly for its clothes" we wonder what is to be said of the 1930 session! We most heartily congratulate our British colleagues on the magnificent success of the conference.

REVISION OF THE CURRICULUM IN THE MADRAS VETERINARY COLLEGE.

In our last issue we published the orders of the Government on the question of the revision of the curriculum at the Madras Veterinary College. We had also published a list of the subjects proposed to be taught in the different classes from the 1st July, 1930. This revision of the curriculum and the introduction of the *essential* subjects are steps in the right direction and, as a matter of fact, this step was long overdue. We ourselves have been pleading for a number of years for a widening of the veterinary education, so as to enable the veterinarian to take his proper place among the members of the allied professions. We, therefore welcome this as a step in the right direction.

But there are a few points to which pointed attention must be drawn at the outset, so that the revision may be made productive of maximum benefit.

The first and foremost wrong thing, in our opinion, is the retention of the three years' course of study. This is a fatal retention and it is bound to adversely affect the thoroughness

of the students. Even before the introduction of the revised curriculum, we had found that the time available for the teaching of such subjects, as anatomy, physiology and medicine, etc., was inadequate. Now that the syllabus of studies has been considerably increased, how can one, with any fairness, ask the students to master the subjects within the same period of three years or how can a teacher do justice to his subject in so short a time? By way of illustration, we will take the subjects for the second year in the old and new curriculum:

Old curriculum.

1. Anatomy except osteology.
2. Physiology.
3. Hygiene.
4. Shoeing.

New curriculum.

1. Histology and embryology.
2. Physiology including bio-chemistry.
3. Pathology, bacteriology & immunology.
4. Parasitology including protozoology, entomology & helminthology.
5. Pharmacology, including materia medica.
6. Surgical anatomy and shoeing.

Now is it possible for any student to study satisfactorily and thoroughly all the six important subjects in the new curriculum within one year? We do not think so, if any useful purpose is to be served by the study of these subjects. Hence, we feel sure that unless the course is extended to one of four years, the study of the student will be only an 'examination study' and not a 'real study'.

It may be argued that the extension of the course to a period of four years would be against the recommendations of the Royal Commission. With due deference to the Commission, we are bound to say that its recommendations on this point are untenable and cannot for a moment stand the test of close scrutiny. According to the Commission, we are to have for the whole of India only one veterinary college with a four years' course, while the rest of the colleges are to have two years' course of studies. That this recommendation was unsuitable to the country and unacceptable to the Government

is evident from the fact that not only has no Government reduced the course of studies to a period of two years, but that the Madras Government has revised the existing curriculum by the addition of more subjects. Further, when we realise that a primarily industrial country like the United Kingdom has nearly half a dozen veterinary colleges all with a four years' course of studies, now extended to five years, it does not require much imagination and argument to realise that even a dozen up-to-date veterinary colleges teaching up to the highest standard would not be superfluous in a mainly agricultural country like India. We therefore contend that once the necessity for the revision of the curriculum of studies has been conceded by the addition of more subjects and also by the appointment of more professors, the importance of extending the course to least four years becomes vitally urgent. In the year 1928, it was rumoured that a four years' course would be introduced with a revised curriculum, but why the former was not done is not known.

There is also another point to which the Government must direct their immediate attention; and that is the preliminary educational standard of the candidates who want to gain admission to the college. It is an admitted fact that a high educational standard is a desideratum for all scientific courses of study. As such, whenever such material is available, it behoves the Government to avail of such material and use it. This not only enriches the profession but gives a distinctly increased status to it. We are, therefore, surprised to find that during the recent selection of candidates only 14 Intermediates and Graduates in Arts were selected although there were, we understand, as many as 185 applications from such applicants for the 40 available seats in the college. Our surprise was all the more when we were told this restricted selection was in obedience to an order of the Government of Madras. We must candidly admit that we cannot understand the rationale of this order. Does this not go to show that the Government is not adopting measures calculated to advance the best interest of the profession? What is more, one great opportunity to get the veterinary college affiliated to the Madras University is being missed.

It is never too late to mend and we yet hope and trust the Government will reconsider their opinion in the matter.

THE SEVENTH ALL-INDIA VETERINARY CONFERENCE.

We are pleased to invite the attention of readers, especially the members of the All-India Veterinary Association and its numerous branches all over, to the resolutions of the Managing Committee Meeting of the Mysore Veterinary Medical Association, appearing elsewhere in this issue of the *Journal*. We have no hesitation in saying that the announcement made in the first resolution will be most welcome news to the profession in this country. We may, in this connection, remind our readers of the fact that a resolution of the second annual meeting of the Mysore Veterinary Medical Association, was passed on the 29th May last, amidst great enthusiasm to the effect that the Director of Agriculture in Mysore be requested to kindly obtain the sanction of the Government to invite the All-India Veterinary Association to hold its next session of the Conference during the Christmas week at Bangalore and to recommend for liberal contribution of not less than Rs. 1,000 towards the expenses. The present resolution of the Committee informs the members of the profession in India that both of its requests have been graciously granted by the benign Government of H. H. the Maharajah of Mysore and it has been thus enabled to invite the conference to hold its sessions in the ensuing Christmas in Bangalore. This is really a proud achievement for an infant Association—the Mysore Association that has just passed its second year. Since we all know the eager solicitude of the Government of Mysore towards all the beneficial measures inaugurated by its subjects, this far-sighted step in granting the request of the Association did not come to us as a surprise.

There is enough of enthusiasm among the members in Mysore. Their capacity to organise and conduct is well known to all who have been keenly following the activities of the Mysore Association and the Civil Veterinary Department. With the active and hearty co-operation of all the members of the profession in India, this session in Mysore State will surely be a unique success. We heartily appeal to all the provincial branches in British India and Indian States to send many delegates and professional articles to the conference at Bangalore.

The Chairman of the Reception Committee has been a happy selection. Major Simpson, the Superintendent C.V.D., and the President of the Mysore Association, will be an ideal host and the Reception Committee's work under his guidance is a guaranteed success.

A welcome suggestion comes in the third resolution which recommends Col. Arther Olver C.B., C.M.G., F.R.C.V.S., for nomination to the presidentship of the conference. The Colonel is the Expert Adviser in Animal Husbandry to the Government of India and is an authority on the subject of cattle improvement. We have no hesitation that this suggestion will have the hearty support of all the provincial branches. Since the Reception Committee has to elect and announce the president, much in advance, the provincial associations are requested to send their nominations to reach the Secretary, Reception Committee before the 10th November, 1930.

It is the desire of the Reception Committee to publish and distribute the professional articles among the members in advance of the conference, so that the members and delegates may attend it well prepared for discussion. This is a happy and welcome idea which deserves the support of all the members who desire to send papers for the conference, as this system saves the time occupied in reading lengthy papers and the time thus saved can be profitably used for discussions for which members will be ready. Therefore we heartily commend this step for acceptance at the hands of the members. The papers may be sent up to reach the Secretary of the Reception Committee before the 15th November, 1930. After all, the utility of the conference mainly depends upon the exchange of ideas and thoughts between the members on several important professional matters and the number of useful subjects discussed at the conference. Therefore the Reception Committee rightly requests for hearty co-operation and contribution of a number of papers from the members.

Mysore is famous for her proverbial hospitality. It is a State which is well favoured by nature. A visit to the Kunigal Stud, the palace Cattle Farm, the Zoo, the Botanical gardens, the Imperial Dairy Farm, the Veterinary Serum Institute, and the Hosur Cattle Farm is of great interest and of educative value to a student of veterinary science.

All these visits can be done by those attending the conference. Besides the above, there are several other items of interest in Mysore State, to see which, visitors even from abroad go to Mysore State. The famous Gersoppa water falls, the Cauvery falls, the Kannambady dam across the Cauvery (the Sri Krishna Rajendra Sagar), Doria Daulat in Seringapatam, the Royal palaces, the Kolar Gold fields, Belur and Halebid temples, Marikanive lake and Bhadravati iron works are some of the places in the State which richly reward a visitor. Therefore we are sure that many members of the profession will be eager to take up this splendid opportunity to pay a visit to Mysore State and attend the conference in Bangalore. The actual date of the conference will be announced later on.

P. SRINIVASA RAO,
Editor.

[All communications for the conference may be addressed to the Secretary, Reception Committee, the Seventh All-India Veterinary Conference, Mashie Lodge, Lal Bagh Road, Bangalore City.]

Appeal

THE SEVENTH ALL-INDIA VETERINARY CONFERENCE

The Members of the Veterinary profession in India will welcome the news that the young Mysore Veterinary Medical Association, has invited the conference to hold its sessions this year during the Christmas holidays in Bangalore. The All-India Veterinary Association has been pleased to accept this invitation from the premier Indian State. The actual dates of the conference will be announced later on.

A strong Reception Committee with Major R.W. Simpson M.C., G.B.V.C., President of the Mysore Veterinary Medical Association and Superintendent, C. V. D. Mysore as its chairman, has been formed at Bangalore. They have also been fortunate to get a liberal contribution of Rs. 1000/- from the State Government towards the expenses of the conference.

From the resolutions of the Managing Committee published in this issue of the *Indian Veterinary Journal*, it is evident

that the Reception Committee has been rightly desirous of making the conference a thorough success. The committee has suggested the name of the Expert Adviser in Animal Husbandry to the Government of India, Col. Arther Olver C.B., C.M.G., F.R.C.V.S., to the presidentship of the conference. The suggestion will be surely welcomed by all. To enable the Committee to finally elect and declare the President, all the provincial branches are requested to send their nominations to reach the Secretary, Reception Committee, the Seventh All-India Veterinary Conference, Mashie Lodge, Lal Bagh Road, Bangalore, on or before the 10th November, 1930. The members of the profession are also requested to contribute professional papers for reading and discussion at the conference. These papers will be printed and sent to the delegates and others in advance of the conference so that they may read them all before they attend the sessions and come prepared for discussion. This will save time for reading the lengthy papers and the time saved may be well utilised for discussion. Therefore, the contributors of papers are requested to co-operate with the committee in this laudable object and send the papers to reach the secretary of the committee before the 15th November, 1930.

Mysore State is noted for its many places of great interest to the visitors—both veterinary surgeons and others. Many members both from Northern India and the South will no doubt be eager to avail themselves of this opportunity to attend the conference at Bangalore and visit the interesting places there and in the surroundings. The Reception Committee intends arranging excursions to some of these important places such as Kunigal Stud, the Imperial Dairy Farm, the Veterinary Serum Institute etc. On the whole, the conference promises to be of great educative value. To enable the Reception Committee to make the necessary arrangements for the comfortable boarding and lodging, the delegates and visitors are requested to inform the Secretary of the Committee on or before the 15th December, 1930, through their provincial branches or in their absence, direct.

Draft resolutions intended to be moved at the conference should reach the Secretary of the Committee on or before the 20th December, 1930, with a summary of argument in support of them.

For further particulars, bulletins will be issued later on. Once again, members of the profession are requested to contribute papers, attend the conference in large numbers and otherwise heartily co-operate with the Reception Committee to make the conference a success.

Muttra.

25-9-30.

(Sd.) S. M. RAZA HUSSAIN,

*Gen. Secretary,**All India Veterinary Association.*

Obituary.

LATE RAI SAHEB DEBAKAR DEY.

It is with profound grief that we have to record the sad demise of Rai Saheb Debakar Dey, which sad event took place on the 5th August 1930, at about 1 A.M. at his Calcutta residence. He was about 52 years of age at the time of his death, which should be considered as rather pre-mature even under our Tropical sun.

The Rai Saheb was a self-made man in every sense of that term. Just five years ago we had the pleasure of presenting to our readers a short biography of Mr. Dey in our October issue of 1925. We never dreamt then that his end was so near. Since then, he had been to England at his own cost for a course of Post Graduate studies. A familiar figure will be sadly missed at the Bengal Veterinary College. He was a good teacher, an amiable friend and an ideal host. His patronage we had in plenty in the form of scientific articles and encouraging letters over what he thought as our courageous stand for the rights of the profession in India. His enthusiasm might well have been copied by men far younger in years. Our grief is too deep for words. We offer our sympathy to his son Mr. Dwijendra Nath Dey and to the members of the bereaved family.

Notes

Emasculatation of scrub bulls, rams and other male animals with the Burdizzo castrator is very much appreciated by the animal owners in this country as far superior to mulling and other methods of castration. This fact is clear from the annual reports on the working of the veterinary departments both in British India and the Indian States. But the heavy cost of the instrument together with the chronic financial stringency in State funds, especially where veterinary departments are concerned, does not permit the purchase and distribution of this instrument in large numbers to meet the demand.

To meet the situation, the progressive State of Mysore has adopted a method which deserves the attention of all the persons interested in the improvement of cattle. We find the following interesting passage in its administration report of the C.V.D. for the year 1928-29. "The staff while on tour castrated 23,943 animals against 31,008 of the previous year...

"During the year, the District Boards of Kolar and Mysore purchased through the department, a set of Burdizzo castrators for the supply to the village Panchayats at concession rates, and some of the prominent and intelligent raiyats in certain villages were trained by the local veterinary inspectors, in the art of castrating. An extension of this work in the rural areas during the coming years, will lead to the reduction in the number of undesirable bulls—an important step towards the improvement of our cattle".

Entrusting a non-veterinary surgeon however prominent and intelligent raiyat he may be, with the task of emasculating bulls and other male animals even with the aid of the safest instrument of a Burdizzo castrator will no doubt be considered in some quarters, as encouraging a quack to the use of scientific instruments. But, however, this experiment will be watched with keen interest and a detail reference on the working of this system will be waited for with eagerness in the next annual report of the veterinary department, so

that if it has worked in Mysore without any risk or untoward sequel, the several panchayats, the rural reconstruction centres and co-operative agricultural unions all over the country may go in for this instrument for similar use in their respective areas, as in Mysore. Therefore we hope the superintendent C.V.D. Mysore will give a detail report as to how this experiment has been working in that State.

While reviewing the administration report of the C.V.D. Bengal for 1928-29, we mentioned in our last issue, that so far, Bengal is the first province in India to sanction the employment of a whole time propaganda officer to educate the public on veterinary matters. We hope an officer has been appointed by now with the necessary staff and equipment. India is a land mainly of villages with no easy communication with the greater part of the interior of the country. Therefore a single officer with the motor van will not be able to produce appreciable results. What is required is a number of lanterns with good number of slides on useful subjects to be supplied to the touring staff of the department. The special officer who may be an expert in propaganda work may visit big market places, cattle fairs, horse shows and such other congregations as will attract a great number of owners of animals and deliver lantern lectures, hold exhibitions and use cinema films. He may now and then train up a batch of veterinary assistant surgeons on itinerating and hospital duties in this branch of work, but the real work lies with the great body of the veterinary assistant surgeons who will move about in the interior of the country.

Propaganda work has not been undertaken so far on a scientific basis by any of the C. V. D's. in India, but it is done in a half hazard way. The public health department which came into existence as such, only recently, has provided each taluk if not the smaller area, with a Health Inspector and almost all the Health Inspectors are provided with magic lanterns and slides to lecture with public health matters. The agricultural department also has got a good number of lanterns and slides stocked ready for issue to the demonstrators on the latter's requisition. In addition to

these lanterns and slides they have also a number of exhibits packed ready for despatch to the places where exhibitions and shows are held. The veterinary departments in India will do well to follow this useful example of the agricultural and health departments.

* * * * *

In the presidency of Madras the agricultural department has in addition, four units of motor vans with necessary slides and other propaganda materials to tour and do the propaganda work in the different parts of the Madras presidency. Even though these vans cannot reach the interior and remote villages whose number is not negligible, still this is a step towards progress. In 1927, it was rumoured that sanction was accorded for the purchase of six sets of lantern and for the preparation of necessary slides for the Madras C. V. D. It was also said that, that was only a beginning and each year will see the addition of many such sets. But now we hear that the veterinary assistant surgeons in Madras presidency are asked to make use of the agricultural department vans whenever they happen to tour in their jurisdiction and to submit a report as to the results achieved. Better methods than this could not have been devised to make the veterinary propaganda work a thorough failure.

* * * * *

The touring veterinary assistant surgeon is primarily meant for attending to the outbreaks of cattle diseases in his jurisdiction. This itself will take away almost all his time. Unless he is free from this ever pressing and urgent duty he will not be able to keep company with the agricultural demonstrators in the motor van. The veterinary demonstration is most urgent, especially in areas where cattle diseases have been virulent. In such places and at the time of actual need, the agricultural vans will not be available for the use of the T.V.A.S. as the former will follow a definite programme arranged by his departmental officers. It is simply sickening to see that veterinary department is made to hang upon other departments for its existence and work. It is time for the heads of the veterinary departments to demand a separate and independent existence even in propaganda work which is a very important item towards the progress of the

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department. It is no exaggeration to say that so far no proper attention has been paid to this branch of work either by the public or by the veterinary directors of the C. V. D's.

* * * * *

We have heard with extreme pleasure that recently an order has been issued by the Director of Veterinary Services, Madras, that his subordinates in charge of hospitals must maintain a sort of professional 'note book' to note down clinical cases of interest and that it should be inspected by the D. V. O's, during their periodical inspections to assess the amount of professional interest taken by the individuals.

* * * * *

That this is a wholesome rule none can deny. But what we should have thought is, that this is being done without any such tip from the head of the department. Any how we welcome it and we hope our colleagues in other provinces will also follow this good suggestion. With such a record as that it must be possible to send us more articles! We gloat over the prospect!

Original Articles.

A CONTRIBUTION TO THE EPIZOOTIOLOGY OF AVIAN COCCIDIOSIS.

BY

D. C. MATHESON, F. R. C. V. S., D. V. S. M. (VICT.)

*Professor of Pathology and Bacteriology,
Royal (Dick) Veterinary College, Edinburgh.*

In the course of his investigations into the diseases of poultry, the present writer set himself four questions viz. :—

- (1) What are the prevailing diseases of poultry?
- (2) Why are they prevalent?
- (3) What can be done to reduce their prevalence?
- (4) What can be done to prevent their occurrence?

The object of the present article is to contribute some original data towards the solution of some of these questions.

(1) What are the prevailing diseases of fowls? In dealing with disease among fowls the present writer (Matheson. 1)

has already published information—based on the records of his laboratory over a period of thirteen years—on the prevailing diseases of British fowls: more recently he has made a further survey with special reference to coccidiosis, which survey shows that coccidiosis accounted for 7.5 per cent. of the 1426 fowls (including chickens) subjected to post-mortem examination in the laboratory during a period of sixteen years. Cases among fowls of the pullet age and over accounted for 0.7 per cent. while chickens accounted for 6.7 per cent. During the sixteen years under survey, forty-seven outbreaks of the disease were investigated. Nine outbreaks occurred among fowls of the pullet age or over while thirty eight occurred among chickens. We have found the disease in chickens from seven to fourteen days old though it is commoner in somewhat older chickens. We have also found chickens infected simultaneously with coccidia and the germ of bacillary white diarrhoea (*Salmonella Pullora*) and with coccidia and the gape-worm (*Syngamus trachealis*). Coccidiosis is one of the most important prevailing diseases among British chickens: the disease is moreover widespread in the chicken raising countries of the world.

(2) Why is the disease prevalent?

Among other reasons, chickens which survive an outbreak may become carriers as pullets or as adult birds and be a source of infection to the succeeding generation; and it becomes of importance to have an idea as to what percentage of such survivors are likely to harbour the parasite. In this connection the following facts may be cited: two flocks of good standing which had been affected with coccidiosis as chickens were examined by us the following year for the purpose of detecting the birds which still passed coccidia with their droppings. The following results were obtained:

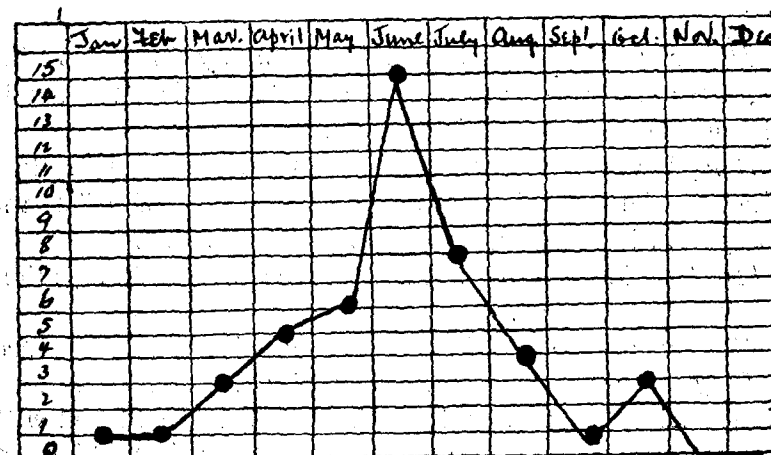
Flocks Examined.	Coccidia present	Percentage.
Flock No. 1. 119.	4.	3.3%.
Flock No. 2. 975.	59.	6%.

Thus an examination of the faeces of 1094 fowls surviving from flocks affected with coccidiosis as chickens showed 5.7 per cent. to be carriers of coccidia.

(3). What can be done to reduce its prevalence?

A factor in this connection is to know when to expect the disease and upon this point a survey of our records affords valuable information because they extend over a period of sixteen years. With regard to the seasonal distribution of the disease in Great Britain, while an occasional outbreak may occur in January or February, the disease becomes more manifest in March, the number of outbreaks rising steadily thereafter until a maximum is reached in June after which month a steady decline occurs until October, when the chart shows a rise in the number of recorded outbreaks (See fig. 1).

Seasonal Incidence of Coccidiosis in Great Britain
(Based on Outbreaks Investigated during a Period of Sixteen Years.)
Number of outbreaks —●—●—



(4) What can be done to prevent its occurrence?

The questions of the reduction of the prevalence, and the prevention of avian coccidiosis have been discussed recently by the present writer (Matheson 2). in a paper contributed to the proceedings of the Fourth World's Poultry Congress and those interested may be referred to the publication indicated.

REFERENCES.

- Matheson, D. C., 1927, Preventable Losses from Poultry Diseases., Proceedings Third World's Poultry Congress, Ottawa, Canada,
Matheson, D. C., 1930., Avian Coccidiosis, Proceedings Fourth World's Poultry Congress, London.

HERNIA IN FOALS

BY

MAHAMMAD DAVOOD,

Veterinary Officer, Government Stud Farm, Kunigal.

(Read at the Mysore Veterinary Medical Association, Bangalore, 1930.)

The most common form of hernia generally met with in foals is the umbilical form. Different methods of treatment are adopted and sometimes nature helps in its recovery, which takes its own time.

But the following three cases were successfully treated by me by the help of a self made truss described below:—

Subject.—Bay, stud-bred, filly; age one year 2 months and 10 days.

History.—The case was noticed on my inspecting the lines, after my transfer to this place. On enquiry, I was told that the swelling existed from birth.

Symptoms.—(1) Physical—On examination, the swelling at the umbilicus was found to be about the size of a fist and on palpation it was soft, fluctuating and reducible.

(2) Functional—The animal showed slight indigestion, faeces being irregular.

Etiology.—The swelling was congenital in its nature.

Diagnosis.—The fluctuating swelling with the characteristic reducibility excluded itself from its being confused with an abscess, a tumour, a haematoma, or an aneurism. The exploratory puncture exhibiting the bowel contents confirmed its being diagnosed as the umbilical hernia.

Prognosis.—It was favourable as there existed hardly any functional trouble and as the hernia was reducible.

Treatment.—10-12-28. The filly was given only bran mash morning and evening.

11-12-28, 7 A. M. A smart purgative was given.

(1) R

Hydrargyri Subchloridi	gr 15
Pulvis Aloes	dr 3½
Pulvis Ginger	dr 1
Lini Semina Contusa	
Treacle	q. s.
M. ft. bolus.	

Sig.—To be given at once.

(2) An enema consisting of soap and warm water was given in the evening.

(3) Walking exercise was also given for 30 minutes.

12-12-28. The following blister was rubbed over the margins of the hernial ring for 15 minutes, the hair of the part having been clipped short.

R

Hydrarg Iodidi Rubri 1 part.

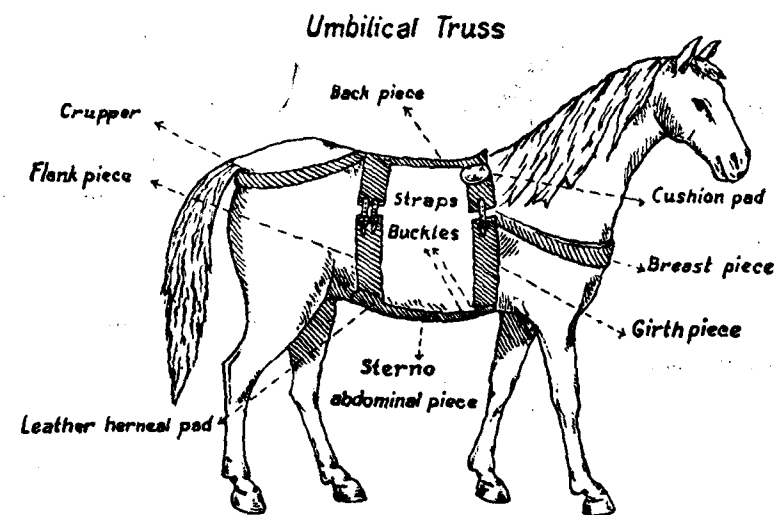
Paraffin Molle 8 parts.

M. ft. Unguentum

Sig.—To be rubbed over the part briskly.

Drawn By Mohammed Daood Veterinary Officer

Gout Stud Farm Kunigal Mysore State

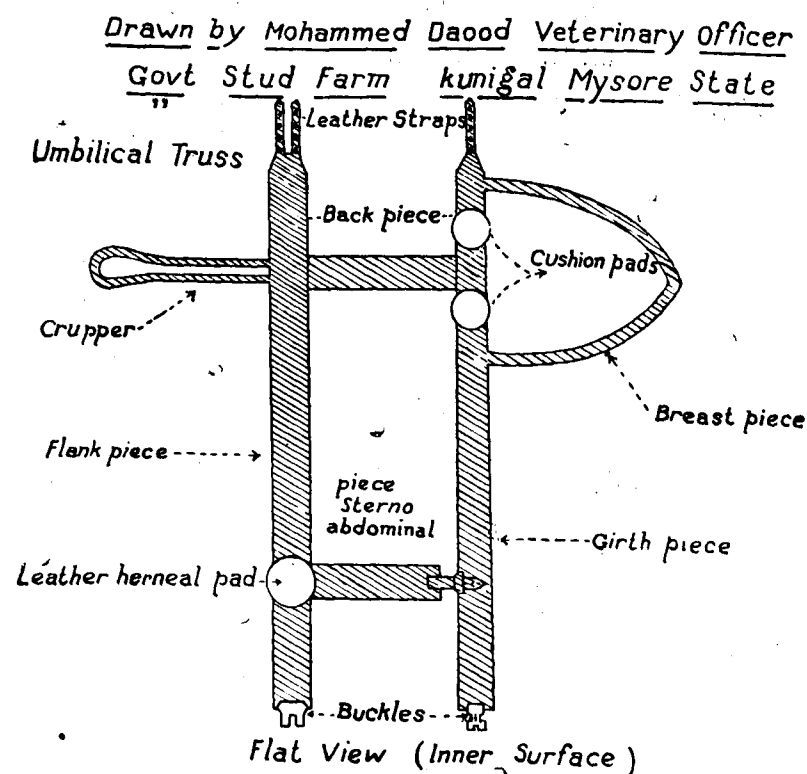


Side View (outer surface)

(2) The self made truss was next applied over, as described below.

A nawar or tape about 4" broad was used for the purpose. A piece of the nawar went round the chest of the animal in place of girth with buckles and straps as shown in the adjoining figure. Two cushion pads were stitched to it on either side at the withers. Another such piece went round the flanks to cover over the hernial ring. These two were adjusted in their places and a third one was stitched running right along

the back, stitched on its either end to the two said above. A fourth piece ran under the abdomen, stitched on its one end at the umbilicus to the flank piece and made adjustable by means of buckles and strap to the girth piece. Two round pieces of leather with a diameter of about $4\frac{1}{2}$ " with a pad of tow in between them were stitched to the flank piece at the point of the hernial ring. Another piece came round the breast, being stitched on one end and made adjustable on the other to the girth piece on its either side. A narrow



nawar was stitched to the flank piece at the loins to serve as a crupper. Thus the whole thing was so made as to adjust itself in order to keep the round leather pad in its place over the hernial ring after the contents were reduced. It was kept on for a fortnight with the occasional removing and replacing after a little massage of the part under it and a little application of methylated spirit to ward off galls. After a fortnight a second blistering was done in the same manner as the first and the truss was applied similarly. After the second fort-

night a third such blistering was done with the subsequent application of the truss to continue for about three months; and the animal was discharged cured on 28-3-30.

Concluding remarks:—The hernia was cured due to the constant pressure of the truss on the one hand and the timely swellings of the inflammatory margins of the hernial ring on the other.

Case No. 2:—Date of admission—12-12-29.

Subject:—Bay, Stud-bred, filly, age 6 months and 4 days.

Etiology, symptomology, diagnosis and prognosis were all quite similar to those of the 1st case; and hence require no repetition.

Treatment:—Treatment adopted was the same as in the first case, with a difference that the truss used here was rather smaller in size than the other. The animal was discharged cured after 2 months and 9 days, on 21st Feb. 1930.

Case No. 3:—Date of admission—13-4-30.

This was rather peculiar with regard to its etiology.

Subject:—Bay, Stud-bred, colt, age just born.

History and etiology:—The colt was born on 13th April, 1930, and the umbilical cord was broken short very near to the abdominal wall. Hæmorrhage continued in stream. With much difficulty the cord after being antiseptically cleaned was ligatured by means of sterile silk thread and was bandaged daily after dressing it with Tinct. Iodine and Boro-Iodoform. On the third day the thread fell down as there was hardly any place for it and the wound became infected so much that an abscess was formed discharging plenty of pus sanguineous in nature. Temperature rose to 105.2° F. Respiration was 85 and pulse 98 per minute. Diarrhoea set in, prostration came on, joints were slightly swollen and gait was stiff. The case was then diagnosed to be one of 'Navil ill.' The following treatment was adopted:—

(1) The sloughing tissues were pared away and the abscess was thoroughly irrigated with sterile warm water and then with Chinosol lotion 1 in 1000. The part was dried well and a dressing consisting of Tinct. Iodine 1 part and Glycerine 4 parts was applied, dusted over with Boro-Iodoform and was bandaged.

(2) Internally the following was prescribed :—

R

Quinine sulph	...	gr. 4
Salol	...	gr. 5
Creta Preparata Aramaticus	...	gr. 10
Bismuth Subnitras	...	gr. 10
Thearica	...	q. s.

m. ft. electuary.

Sig :—To be smeared over the tongue thrice a day.

The following prophylactic measures were observed.

1. The case was segregated along with the mother.
2. A separate attendant was appointed for it.
3. All discharges and soiled materials were burnt.
4. The vacated stall was thoroughly disinfected.

In two days the temperature went down to 102.6°

Pulse and respiration retarded.

For the subsequent 10 days the following was prescribed along with the daily dressing of the wound :—

Pulvis camphor	...	gr. 6
Pot. Iodide	...	gr. 5
Soda salicylas	...	gr. 5
Thearica	...	q. s.

m. ft. electuary.

Sig :—To be smeared over the tongue thrice a day.

The wound healed up in about 20 days, the skin became intact; the foal was almost healthy; but there was unthriftiness. The foregoing troubles gave rise to umbilical hernia.

Treatment :—As in the first and second case by means of a small truss, the animal was discharged cured on 18-5-30.

General Articles.

THE IMPORTANCE OF ACCURATE KNOWLEDGE OF MICRO-PARASITES IN THE CONTROL OF CONTAGIOUS DISEASES IN ANIMALS.*

BY

V. R. PHADKE, G. B. V. C., J.P.,

Assistant Principal, Bombay Veterinary College.

Parasitic bacteria are usually found in and on the body of animals and plants. They live as a rule, in harmony with their hosts, their presence is often unnoticed, and they lead, more or less, a saprophytic life; but, under certain conditions, these micro-organisms become highly invasive and develop pathogenecity against their hosts. This pathogenecity is variable. The conditions which are responsible for the pathogenecity of an organism are largely dependent on the lowered vitality of the animal in general; hog-cholera or swine-fever furnishes such an example. Contagious diseases are caused by specific micro-organisms which invade the living body of man or animal; they depend for their activity on the ability of the invading organisms to multiply in the infected host and to withstand all adverse conditions in the mechanism of natural resistance. The contagiousness of the disease depends on the ability of the invading organisms to escape in sufficient numbers as to be able to infect new hosts and to overcome the usual defensive mechanism of the animal body which they encounter.

In order to control contagious diseases it is necessary that measures adopted should be capable of successful application in preventing the infection and its spread. For this, one must have definite knowledge as to the exact behaviour of the pathogenic organism concerned.

Before definitely incriminating a certain micro-organism with a particular contagious disease, one should establish its causal relationship with that disease, and Koch's postulates

* Read at the Bombay Vety. Graduates' Meeting in April, 1930.

furnish a reliable method. These postulates consist in the following:—

1. The causative organism must be demonstrated to be constantly present in the disease.
2. The organism isolated from lesions must be capable of cultivation outside the body; and when re-introduced into a normal animal it should give rise to the same diseased processes, and
3. The causal organism should be recovered from the infected animal.

To establish the identity of a micro-organism recovered from an infected animal its morphological and biological characters must be studied. Some pathogenic micro-parasites form spores outside the animal body, as for example, the anthrax bacillus. The sporulation of the anthrax bacillus depends on the temperature and its access to air. That is why it is insisted that an anthrax carcass should never be cut through but should be buried deep under the earth; otherwise, the bacilli in the blood shed from the body of an infected carcass readily sporulate and become a constant source of infection. Once a pasture gets infected with the blood of an anthrax animal, the spores persist on the grazing ground. The anthrax spores might either be ingested by healthy animals while grazing or find their way through abraded surfaces of the skin, or be washed off during the rains to contaminate the nearest water supply; thus, the infection is maintained.

The manner in which the micro-parasites gain entrance into the animal body and the way in which infection gets carried from one individual to another enable us to devise means to check the spread of the disease.

The method of transmission of infection from one animal to another and its prevention may be summarised as follows:—

1. Infection may be carried by air through the agency of infected dust or droplets of infected material as in tuberculosis and in contagious pleuro-pneumonia. This mode of infection is very common in over-crowded cow-sheds and stables. In the open, where sun-light is plentiful, the danger is negligible. The spread of infection can be prevented or minimised by the suitable stable accommodation and the strict isolation of the infected animals.

2. Infection which occurs through the agency of soil, as in tetanus, malignant oedema, anthrax and black quarter, can be prevented by isolation and segregation of animals from infected grazing grounds.

3. Water-borne infections, apart from anthrax, do not play any important part in the causation of bacterial diseases in animals.

4. Contaminated food is a source of great danger in contagious diseases of animals: the ingestion of milk from tubercular animals or from animals suffering from Malta-fever, gives rise to tuberculosis or Malta-fever in animals fed on infected milk. These could be prevented if care be taken to thoroughly boil the milk. Heat at the boiling temperature kills all non-sporulating pathogenic organisms.

5. Infected animals may transmit the contagion (1) by direct contact, as in glanders, or (2) indirectly by the mechanical transfer of the contagion through flies, feeding troughs, stable gear, etc.

Therefore, strict precautions as to the isolation, segregation and destruction of infected animals (if necessary) should be insisted upon if successful results are to be achieved in the prevention and spread of infection among animals. For the successful prevention and control of contagious diseases in animals, the first requisite is the thorough knowledge of the viability of the pathogenic micro-organisms both within and outside the animal body, and their exact location.

It is equally necessary to have a correct knowledge of the antiseptic value of different germicides employed for the destruction of micro-parasites outside the animal body.

And lastly, in dealing with contagious diseases of animals from an administrative point of view, it is necessary to have a clear conception as to the geographical distribution of the disease, its seasonal incidence, the causative organism of the disease, its virulence, its incubation period and its mode of spread.

Apart from these, modern conceptions regarding immunity and serum-therapy have been entirely based on a knowledge of the behaviour of the micro-parasites, within the animal body and the subsequent response which results

in the formation of various anti-bodies which are detrimental to the life of the micro-parasites within. Based on these factors specific sera and vaccines are prepared and administered for prophylactic and therapeutic use against various contagious diseases; as for example, anti-serum and vaccine in anthrax.

NOTES ON THE PATHOLOGICAL LESIONS OBSERVED IN DOMESTIC ANIMALS EXPERIMENTALLY INFECTED WITH PLAGUE

BY

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The susceptibility or otherwise of domestic animals to plague is a subject of considerable interest. From the earliest history of plague it has been recorded that domestic animals such as dogs, sheep and pigs have succumbed in large numbers during epidemics of human plague. For example, during the epidemic of plague in China in 1894, there has been a very heavy mortality among pigs.

I may, here, call your attention to the fact that in most text books on veterinary diseases there is no mention of domestic animals namely, equines, cattle and sheep of having died of human plague, in nature. It may, therefore, be possible that during epidemics of human plague there might have been epizootics of hæmorrhagic septicaemia.

The object of this paper is to show that domesticated animals namely, sheep and cattle, could be infected with plague under experimental conditions.

Between the years 1928 and 1930, no less than 27 sheep and 3 calves have been experimentally infected with virulent cultures of plague at the Haffkine Institute for the production of immune sera. From the records there has been no less than 6 deaths from plague within four weeks of an intravenous injection; of the remaining 21 sheep, 18 have died of plague or of plague marasmus within two to six months. Of the two calves, undergoing immunisation, one died of plague following on its 13th weekly injection. The post-mortem lesions noted

* Read at the Bombay Vety. Graduates' Meeting in April, 1930.

are very similar to those I have observed in a bullock which had recently died during the course of immunisation.

The resemblance of lesions in these two calves and the 24 sheep are similar to those met with in hæmorrhagic septicaemia in cattle and sheep; it would appear that the mortality rate following on experimental infection with plague in these animals is not so high as is generally met with in hæmorrhagic septicaemia; further, experimental plague runs a much more prolonged course than an infection with hæmorrhagic septicaemia.

To illustrate this close resemblance in the pathological lesions seen in these two cases, I shall describe the history of the bullock that had died, while under my care, recently.

The History of the animal:—The bullock was received here from Northern India during the first week of January, 1930. It weighed 500 pounds and was aged. It seemed apparently healthy.

A week after its arrival, diurnal temperature was taken and nothing abnormal was noticed. It was then taken for immunisation. It received intravenous injections of plague vaccine, in five doses, ranging from 20 to 100 c.c. at weekly intervals.

After each injection, four-hourly temperature was recorded. Following on the first two injections of 20 and 30 c.c., there was no appreciable disturbance in temperature or in the general condition. From the third injection onwards, the temperature rose to 104° within four hours of inoculation and it came down within 24 hours to normal. At the fifth injection of 100 c.c. of vaccine, there were no reactionary signs. Therefore, the intravenous injections with live cultures were commenced. In all, it received five weekly injections of 5 to 33 agar slopes of the culture. Following on each injection, the temperature rose to 104° within four hours of injection and came to normal within 24 hours.

At the fifth injection, given on 6-4-30, the temperature rose to 105° and till the 10th evening the temperature varied between 105° and 106·6°. During this febrile period, the animal was dull and off its feed. It only drank small quantities of water. On 8-4-30, it showed signs of cough and cough electuary was administered. On the 9th evening the animal showed signs of groaning while breathing. Steam

inhalation was given. On the 10th morning it showed definite signs of pneumonia. Respirations were between 40 and 50 per minute. Pulse 80 and temperature 106°. The animal was sitting and standing off and on. White sticky discharge from nostrils was noticed. Steam inhalation was continued and chest was fomented with a blanket, wrung out of hot water. Animal showed no signs of improvement and died at 2 a.m., on 11-4-30.

Post-mortem was conducted at 10. 15 a.m., on 11-4-30

I. Naked eye appearances.

1. Distension of the abdomen.
2. Evidence of rigor mortis.
3. Mucous membranes and eyes injected.
4. Frothy discharge from the mouth and nostrils.

On opening the carcass,

A. Region of the neck.—

1. Mouth, tongue and oesophagus apparently normal.
2. No enlargement of precapsular and precrural glands.
3. Congestion of larynx and trachea with froth.
4. Subcutaneous congestion and intra-muscular haemorrhages.

B. Abdominal cavity.—

1. Peritoneal fluid large in amount and of yellow colour.
2. No appreciable change noticed in the mesenteric glands, intestines and stomach.
3. Congestion of kidneys, liver and spleen.

C. Thoracic cavity.—

1. Thoracic walls presented haemorrhages on their inner surface.
2. Sero-sanguinous pleural effusion in large amount.
3. Lungs: *Left lung* with signs of broncho-pneumonia. Its anterior lobe covering the heart presented patches of consolidation.
Right lung anterior lobe presented signs of broncho-pneumonia.

4. Bronchii inflamed and contained froth.
5. Bronchial and mediastinal glands congested and enlarged.
6. Pericardial effusion of yellow colour in a moderate quantity.
7. Presence of haemorrhages in the pericardium and epicardium.
8. Heart presented no appreciable change.

II. Microscopical Examination.

Smears were made of spleen, liver, lungs and heart blood and were stained by carbol-thionin-blue. Bipolar organisms were only seen in the lung smear in large numbers.

III. Cultural Examination.

Heart blood cultured into broth and on agar:

In broth, turbidity was seen showing growth; sub-cultures from it on agar gave rise to typical colonies of *Bacillus pestis*. On agar, typical colonies of *B. pestis* were obtained.

Discussion.

As hæmorrhagic septicæmia in cattle runs a rapid and fatal course, many of the chronic lesions are usually lost; the usual post-mortem appearances in these cases are:

1. Subcutaneous congestion.
2. Intra-muscular haemorrhages.
3. Gelatinous oedema.
4. Enlargement of the mediastinal and bronchial lymphatic glands.
5. Intense congestion of stomach and intestines.
6. Pericardial effusion.
7. Pleural effusion.
8. Lungs deeply congested and broncho-pneumonic in character.
9. Evidence of endocarditis.
10. Haemorrhagic patches on thoracic walls, epicardium and pericardium.

Pneumonic plague in man also runs a rapid and fatal course; the usual post-mortem appearances are:

1. Subcutaneous congestion.
2. Intra-muscular haemorrhages.
3. Enlargement of mediastinal and bronchial lymphatic glands.
4. Congestion of internal organs.
5. Pericardial effusion.
6. Myocarditis and endocarditis.
7. Pleural effusion.
8. Pneumonia.

In rodents plague is also an acute disease running a rapid and fatal course. In experimentally infected rats, guinea-pigs and rabbits, the post-mortem appearances are:

1. Subcutaneous congestion with intra-muscular haemorrhages.
2. Gelatinous oedema at the site of injection extending over a greater part of the abdomen.
3. Enlargement of the lymphatic glands.
4. Congestion of the abdominal organs.
5. Pericardial and pleural effusions.
6. Lungs usually congested.

In the domestic animals hitherto experimented upon, at the Haffkine Institute, namely, sheep, calves and bullocks, and which have succumbed during the course of immunisation, either from plague or from plague marasmus, similar lesions to those I have above recorded are noticeable.

Thus, it will be seen that there is a close resemblance in the lesions produced by *B. bovissepticus* and *B. pestis*.

Conclusions.

1. Experimental infection in sheep, calves and bullocks with virulent cultures of plague injected intravenously produces lesions very similar to those observed in cattle and sheep suffering from hæmorrhagic septicæmia.
2. From the pathological lesions and the presence of bipolar organisms in the infected animals the identity of the causal organisms cannot be established.

3. No diagnosis of plague can be made in an animal unless serological and immunological tests are carried out.

Lastly, I may add that I am very much indebted to my chief, Dr. Naidu for allowing me to read this paper as it refers to research work undertaken by him at the Haffkine Institute.

ENZOOTIC HÆMORRHAGIC SEPTICÆMIA IN BOVINES

BY

R. S. NARAYANAN, G. M. V. C.,

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The cause that led to the attempt of this paper was the plea often advanced by veterinarians in the East where both hæmorrhagic septicæmia and rinderpest are common, for a more careful diagnosis. In this the writer is endeavouring to offer some of his own observations and experiences with hæmorrhagic septicæmia encountered in Malaya and India.

History (in Malaya):—The disease is not a new one to Malaya. Dr. Carrougeau reported it fully in the year 1902. The enzootic type of the disease was first recorded in Kedah in the year 1917, by Mr. J. J. Fleury, the State Veterinary Surgeon. In Indo-China the disease frequently occurs in enzootic form. The disease is regularly reported from Southern Siam under the familiar name of 'Barbone.' The scourge is known locally as 'Sakit kambong bangka dagu' as against 'Sakit Hawar' (Hawar: Cholera) for rinderpest. It is an important disease because of its rapid course and high mortality. During the years 1925 and 1927, enzootics of the disease occurred in Perak; in 1919 a small outbreak occurred in Bachang (Malacca) and it is possible that hæmorrhagic septicæmia exists in other parts of Malaya also.

Occurrence:—Outbreaks of this disease occur very suddenly and the first thing to attract one's attention is the fact that several cattle apparently normal on the previous evening are found dead early next morning. From the observations during the past outbreaks, it is concluded that the disease originates from buffaloes which are more susceptible to this disease.

The following daily returns from Mukin Naga shows that the disease prevails mostly amongst buffaloes :—

Date.	Buffaloes.	Cattle.
21—4—1930.	2	...
22—4—'30.	11	4
23—4—'30.	7	...
24—4—'30.	11	1 calf
25—4—'30.	3	1 calf
26—4—'30.	4	1
27—4—'30.	6	3
28—4—'30.	8	...

This confirms the observations of Mr. Wallace in Perak, Dr. Jacotot in Indo-China and Siamese veterinarians. The disease breaks out mostly in localities where large numbers of buffaloes are kept and amongst buffaloes near the jungle. Locally it is called Hutam glam, which means a disease of animals grazing and living in marshy pastures, in dry stubble fields and rarely in animals fed on premises.

It occurs sporadically or enzootically but it is not known to assume an epizootic form. It is more prevalent in some years than in others. In the State of Perak (South) the last enzootic occurred in the year 1928 and previous to that in the year 1925. In Rampur State (India), I witnessed an outbreak in the year 1925 and the one previous to that, I was told, was in the year 1920. In Kedah since the first recorded outbreak in the year 1917, outbreaks have occurred in the years 1919, 1920 and 1924. Returns from Siam show a much greater incidence of the disease.

Etiology:—The outbreak in any locality appears to be spontaneous and it does not appear to have been introduced from elsewhere. The organism, an original saprophyte, is said to occur in nature in the soil or in dead organic matter. (This disease is designated in Pahang as 'Sakit sampah' from samph land-MacGregor). How a saprophyte under normal conditions suddenly manifests pathogenic characteristics and how the relative virulence diminishes after some time are not definitely known. The occurrence of the original independent

infection in virulent form is explained by Hutyra and Marek thus :—

'In the majority of cases after having become accustomed to the organism of a certain animal, they attain an increased virulence for animals of this particular species and therefore infect the animals more easily even without the influence of predisposing causes.

'The relative virulence may even increase for a time in the course of further generations or may become constant. More frequently however, it diminishes again after a certain time after leaving the affected animal and may change again to saprophytes'.

'Barbone' bacilli are generally conceded by American veterinarians as often being naturally harmless inhabitants of the bodies of healthy animals and only become pathogenic when the body resistance is lowered by overwork, debility, prolonged dry season, seasonal changes and diet. Thus hæmorrhagic septicaemia is prone to occur in those animals harbouring intestinal parasites. This possibility readily accounts for the occurrence of 'transport disease' in animals during transit.

Boullinger in 1877, observed that hæmorrhagic septicaemia can appear successively or simultaneously in wild animals, buffaloes and oxen. During the 1925 outbreak in Rampur State, the writer observed a number of wild pigs being affected with the disease during the outbreak, and in two pigs he had the opportunity to confirm the disease by microscopical examination. People also remarked that wild pigs were first affected and then buffaloes during the outbreak in 1920, in that State.

Our attention to the history of the recent outbreak in Kedah was drawn by finding 13 carcasses of buffaloes in a State grazing area. It was apparent that most of the animals had died a few days before any disease was reported. It is the usual practice with the Malaya farmers to turn their animals into Hutam glam jungle, after the harvest and bring them back for the following ploughing season only. When the disease broke out among the animals in the hutam glam, and after the death of a few animals the owners had taken

home, we received sporadic cases in different localities in that mukim (area) amongst the remaining animals. There was no reliable information as to the outbreak being introduced from outside. The mukim (area) in which the disease was first noticed lies far away from the Siamese border and was in animals kept for a long time there.

Seasonal distribution:—The disease appears in indigenous cattle on wet undrained land in the summer monsoon (July-September months) and particularly after a prolonged dry season. It appears in a virulent enzootic form, but outbreaks after the 'Christmas rains' are not uncommon in North India. Smaller outbreaks are reported throughout the year from Southern Siam but the majority of outbreaks are in July-September months.

A humid atmosphere associated with a high temperature and marshy ground appear to favour the occurrence of outbreaks (Jacotot).

Pathogenicity:—The disease is essentially an acute one. Buffaloes appear to have the greatest susceptibility.

In contradistinction to the common characteristics of the tribe 'Pasteurilla' differences in virulence are most marked. The buffalo strain appears to exert its pathogenic action in buffaloes and an increase in virulence is still more apparent in young stock of the same species.

During the Rampur State outbreak in 1925, out of about 200 head of cattle consisting of an equal number of buffaloes and bovines in the State dairy, not a single bovine contracted the disease although it ran every risk of becoming infected.

In the recent Kedah outbreak though bovines were simultaneously affected along with buffaloes, over 80% of the latter succumbed to the disease.

In the 1925 outbreak in Ulu Pileh (near Ipoh) 35 buffaloes got the disease and 41 cattle on the premises did not contract the disease (Wallace).

In the mukim Bukit Tinggi (Kedah) the disease first appeared in a bovine and subsequently three more calves (bovines) contracted the disease and died. The disease did not appear amongst the buffaloes in that mukim. Further, in localities with more cattle population the disease was found less severe as evident from the clinical symptoms manifested and comparatively prolonged the course of the disease. The

apparent difference in the pathogenicity may be due to the organism becoming attenuated after a passage thro' cattle or to a different strain of causative organism.

Natural infection:—The outbreak may occur simultaneously in different localities. The precise manner in which the organism exists and finds its entry into the susceptible host still remains to be worked out fully. The disease is not directly contagious from case to case, but apparently exists in the pasture as is evident from the subsidence of the disease when the buffaloes were withdrawn from the (infected) pasture and confined to premises. Further, the nontendency of an easy extension of the disease also points to the non-infectivity of the apparently healthy animal from one in the incubation stage.

It is understood that the natural infection results in most cases through the digestive tract from the fact that pasture plays the role in the primary infection.

Incubation period:—On Kampong Pulau Kaa'im strict quarantine was enforced on 2-4-'30. From 2-4-'30 to 3-4-'30 four buffaloes died; and on 4-4-'30 another buffalo died and no fresh cases occurred after 5-4-'30. In other words the disease completely subsided 3 days after the animals were withdrawn from the infected pasture. During the 1925 outbreak in Rampur State no fresh cases occurred among the State dairy buffaloes 3 days after the animals were confined to sheds. Thus, the incubation period of 2 to 3 days is supported by the clinical findings.

Symptoms.

Pectoral form:—Haemorrhagic septicæmia as observed in the Malayan outbreaks, occurs in the pulmonary form clinically. The affection is characterised by febrile manifestations, difficult respiration and especially by an oedematous swelling of the throat.

The earliest symptoms are lameness, high fever and muscular tremors followed by sudden cessation of rumination, increased pulse and respiration; dilated nostrils and slight discharge from the mouth and nostrils. As the disease progresses stertorous breathing with little rib movement is seen and the visible mucous membranes are brick-red in colour, and the conjunctiva are blood shot,

Later the discharge from the nostrils and mouth becomes viscid and deglutition becomes impossible. (There was bloodish nasal discharge in one of the buffaloes in Pulau Kaaim outbreak). Mouth is open, tongue is firm to the touch and is kept protruding; the animal stands persistently. Though a fluctuating swelling is not always noticeable the protrusion of the tongue and difficult deglutition in almost all cases indicate oedema of the throat. Faeces is normal except in cases of over 8 hours' duration of sickness. Death is due apparently to dyspnoea.

Young animals manifest convulsive movements and the meningeal (nervous) symptoms in the peracute form and death generally occurs very rapidly and in fact, symptoms of illness are often unnoticed.

Intestinal form:—(Observations in Rampur State outbreak). This form is associated with the pectoral symptoms but the respiratory distress is not predominant in the early stages.

The animal remains recumbent and has a tendency to sit on haunches in the early stages. The face presents a 'puffed up' appearance with frequent grinding of teeth with oedema of the submaxillary region and throat. At first, there is constipation and the faeces is glazed but subsequently persistent and shooting diarrhoea sets in and the faeces contains flakes of mucus. Later, profuse lachrymation and respiratory distress are well marked and death occurs from exhaustion.

P. M. Lesions:—The organism appears to cause changes in serous membranes in general, lungs, heart and abomasum.

The abdominal cavity presents a picture of generalised congestion the blood vessels being markedly injected. There is an increase of fluid in the peritoneal cavity. The abomasum is brick-red in colour and particularly round about the pylorus and frequently there is a similar colouration in the duodum.

In peracute cases one finds acute inflammation of the gall-bladder with blood-red contents. The liver and the intestinal lymphatic glands are enlarged.

Other lesions are acute inflammation of the pleura and accumulation of straw coloured fluid in the cavity; the upper air passages are hyperaemic, lymphatic glands in the throat region and mediastinal glands are enlarged. Lungs oede-

matous and different areas show mottled appearance because of the oedematous infiltration; extravasation under the pericardium and throughout the muscle tissue, particularly at the base of the heart; extravasation under the endocardium was more or less a constant lesion.

The tongue and facial muscles are infiltrated with yellow fluid.

From the P. M. findings, it is apparent, that the pectoral form and intestinal form do not occur independently but are always in association and with oedema of some other region also.

The 1930 Kedah outbreak:—The writer had an opportunity for a close study of the disease and all the animals which came under observation manifested more or less similar clinical symptoms and post-mortem lesions.

The following are the clinics on cases observed:—*Kampong Pulau Kaaim, 2-4-'30.*

No. 1. Buffalo calf, aged about 6 months,

Sickness was noticed early morning, sudden onset; temperature 105.2° F; complete arrest of rumination; respiratory distress; stertorous breathing; head and ears drooping; listless attitude; half closed eyes; calf remained recumbent, head extended, mouth open and nostrils dilated.

Visible mucous membranes slightly purplish; catarrh of the nasal mucous membrane with copious discharge which was at first clear and later viscid, withholding of breath before expiration; mouth hot and respiration laboured; faeces firm. Died at about 1.30 p.m. after convulsions.

Blood smears from heart 'positive' for H. S.

Post-mortem lesions.—Slight extravasation in all the internal organs and throughout the muscular tissue of the heart; upper air passages slightly hyperaemic; yellowish fluid in the pericardial sac.

Mucous membrane of abomasum hyperaemic only about the pylorus; small intestines with small haemorrhagic spots and the large intestines to a lesser extent.

Spleen normal; liver slightly enlarged and the gall bladder with blood-red contents with acute inflammation.

No. 2. Buffalo, aged 1 year and 8 months.

Visible mucous membranes brick-red in colour (particularly the conjunctiva); copious discharge from the nostrils and mouth; temperature 106.2° F; respiration 20; pulse 70; urination frequent; tongue enlarged and protruding and slightly reddish-brown in colour. Throat doughy to the touch. Respiration quick and shallow in the early stages and later stertorous and laboured breathing. The animal died at about 4 p.m.

Post-mortem lesions.—Upper air passages hyperaemic; lungs oedematous and contained about 2 pints of yellowish fluid; straw coloured fluid in the pleural and peritoneal cavities; inflammation of the pleura; lymphatic glands of the throat, bronchus and mediastinum were studded with haemorrhages; extravasation throughout the muscular tissue of the heart, especially at the base; numerous patches of extravasation under the peritoneum.

Abomasum.—Entire mucous membrane brick-red in colour with dirty white contents, fluid in nature; intestinal lymphatics enlarged.

Kidneys-soft.

Spleen- normal in size and colour.

Liver- slightly enlarged and with areas of hepatization. Blood smears taken during the different stages of the disease were 'negative' for H. S., but blood smears taken from the heart after death were 'positive'.

No. 3. Buffalo, aged about 3 years.

Similar to the above but less severe and the animal died at about 7 p. m. Blood smears from the heart were 'positive' for H. S.,

No. 4. (7-4-30).

Cow, aged about 3 years, was found dead near Kampong Pulau Kaa'im. Post-mortem lesions were similar and smears from the heart 'positive' for H. S., and the bacilli looked swollen but not abundant.

No. 5. (12-4-30). Kampong Gelong Ramai.

Bull calf, aged about 6 months. Owner reported to the veterinary assistant that the calf was apparently normal till the previous evening and found the animal dead early next

morning. Blood smears from the heart 'positive' for H. S., and the bacilli looked swollen and abundant.

Mukim Sanglang:

On 16-4-'30, District Officer, Jitra reported thus—Dapat report phenghulu Sanglang kata 3 kerbau satu lembu mati s'malam!

I proceeded to the locality and found 4 animals in 3 different premises about 200 yards apart. The history was as usual.

The animals were in quite good condition.

Post-mortem lesions similar to the ones found in the Pulau Kaa'im cases and the smears from the heart were 'positive' for H. S.

When I was about to return home at about 5 p. m., a report reached me that a cow on a different kampong (Padang Kerbau Blaga) about a mile from the above said kampong, died at about 4 p. m. after an illness from 12 noon that day. The clinical symptoms as told by the owner were indicative of the pectoral form of the disease. I post-mortemed the animal and found similar lesions as in other cases and the smears from the heart were 'positive' for H. S., and the bacilli swollen and abundant.

No. 3. 21-4-'30.

A she-buffalo, aged about 8 years. Temperature 104° F. muscular tremors; usual clinical symptoms; persistent standing; in the subcutaneous tissue of the abdominal region there was a quantity of material which could be detected as a fluctuating mass. The animal fell down and died at about 1 p. m.

Mukim Titigajah: (18-6-'30).

No. 1. A buffalo, aged about 3 years, was found sick late in the previous evening and found dead early morning.

Post-mortem lesions typical for haemorrhagic septicaemia. *Bacillus bubalisepticus* fairly numerous in the blood smears from the ear and heart after the death of the animal.

Mukim Naga, Kampong Telok Glam, 20-6-'30.

A yearling buffalo calf was reported sick in the afternoon and died that night. The Phenghulu reported that there

was swelling in the region of the throat and submaxillary region.

On 21-6-'30, I visited the locality and found another yearling buffalo calf showing the typical clinical symptoms and a temperature of 104° F. With a view to confirm the clinical diagnosis by animal inoculation, I again proceeded to the locality with a healthy rabbit kept under observation for over two months. On reaching the premises, I found another buffalo calf, aged about 6 months, showing severe symptoms with stertorous breathing and a temperature of 105° F. With the necessary precautions I took 4 c. c. of blood from the jugular of the six months old buffalo calf and inoculated into the rabbit intraperitoneally. The rabbit died of convulsions 14 hours after inoculation. The bi-polar staining organisms were abundant in blood smears and peritoneal fluid of the rabbit. It may also be mentioned here that the blood smears from the buffalo calf taken at the height of the disease were not definitely 'positive' for hæmorrhagic septicæmia. The buffalo calf from whom the blood was drawn for animal inoculation, died at about 10 p. m., on the day following.

Course:—The thoracic type of the disease (usually designated barbone or buffalo plague) encountered in Kedah (and Malaya in general) did follow precisely the same course and the affected animal died in from 8-15 hours (in one case, a buffalo on kampong Pasir (Kedah), 36 hours, after the development of the usual symptoms) and death was from dyspnoea. In the earlier cases, invariably peracute in type, death had occurred before symptoms had time to develop.

In the intestinal form the duration of the disease was from 2-5 days and death resulted from exhaustion.

Mortality:—None of the affected animals during the recent outbreak recovered. Mr. Wallace reported 1 case of recovery (after 4 days) out of 40, affected during the 1928 outbreak in Perak (south). The following is a table of mortalities of fairly extensive outbreaks for the years:—

	1917	1919	1920	1930
	Affect. Deaths.	Affect. Deaths.	Affect. Deaths.	Affect. Deaths.
Kedah.	145 145	66 66	60 53	136 136.

	Affect.	Deaths.
Siam (South): 1st Aug. 31st Aug. 1927.	60	60
20th July to 15th Aug. '28.	45	45
2nd July to 29th July '29.	41	39
24th Aug. to 15th Sep. '29.	26	26

Diagnosis:—As indicated by the name of the disease one expects to find the causal organism in the blood stream but a smear taken from the peripheral blood may be often 'negative'. Blood smears from the heart of the animals dead of the disease invariably revealed the causal organism but in a few cases the bacilli were not present in appreciable numbers. Hæmorrhagic septicæmia bacilli isolated from buffaloes mostly represented a short ovoid form with rounded ends and slightly less than one micron (full virulent bacilli are usually smaller—Hutyra and Marek). Those isolated from cattle were invariably longer and swollen (reduced virulence?).

The prominent features of the disease are readily recognised by.—

1. A spontaneous appearance without any evidence of its introduction.
2. Being generally confined to buffaloes.
3. No disease being encountered in stall-fed animals.
4. The rapid course and high mortality.
5. The fact that it does not appear to spread from animal to animal.
6. Is definitely localised and does not spread over extensive areas.

Differential diagnosis:—

Anthrax:—The rapidity with which the symptoms develop and the severity of the infection may cause confusion between hæmorrhagic septicæmia and anthrax. In anthrax the blood of cattle is extensively invaded by the bacilli a short time before death, so constantly in fact, that if they are not found at the time of death in a suspicious case, one may be almost certain that anthrax is not the cause of death. This could further be determined by an autopsy.

Rinderpest :—The knowledge of numerous observations on hæmorrhagic septicæmia that have been made during recent years, will make the diagnosis easy. Mr. Fleury recollecting the outbreaks of rinderpest he had seen, remarked to the writer that the similarity between the diseases is superficial and that there should be little confusion between them.

Rinderpest spreads from village to village; it is not definitely localised; it occurs in dry or wet weather (usually in cold season); it does not occur spontaneously and usually runs its course. Important lesions are found mostly in the alimentary tract with inflammatory changes.

This does not of course remove the possibility of a combined infection and has on occasions occurred in India.

Control :—The disease being fatal in character attention must be directed towards preventing and checking outbreaks.

The possibility of the infection remaining in a byre is not yet determined. In March 1926, Major Allen (in India) endeavoured to obliterate the disease from his depot by razing all old dairy standings and burning down cattle sheds and erecting fresh ones on unused plots and these measures proved of little avail and fresh cases occurred during the following April, May and July.

The possibility of the infective material being voided by the sick animals in urine, fæces etc., in a stall which may persist and infect the healthy stock is not supported by the findings during the previous outbreak. When the animals were withdrawn from the infected pasture the disease suddenly subsided. Since the bacillus is a facultative saprophyte known to exist in certain soils, removal of animals to fresh pastures is indicated.

2. **Protective Inoculation** :—Anti-hæmorrhagic septicæmia serum was found very effective for cutting short outbreaks.

The following table shows mortalities in different kampongs before and after inoculation with Muktesar immune serum ;

	Budi		Pasir.		Parit Latih.	
	Buff.	Cattle.	Buff.	Cattle.	Buff.	Cattle.
21 4 '30.	...	...	1	...	...	...
22 4 '30.	2	1	1	...	3	...
23 4 '30.	2	...	1	...	4	...
24 4 '30.	2	...	4	...	Inoculated contacts	

Inoculated in the afternoon of 24 4 '30.

27 4 '30.	1 @	4	1 @
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Inoculated in the afternoon of 27-4-'30.

28 4 '30.	Nil	6 @	Nil
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Note. @ Were injected as they were showing temperature over 103° F. Muktesar immune serum in doses of 25-30 c. c. for a grown up Malayan buffalo, 15-18 c. c. for a grown up bovine or a calf according to size.

In a communication to the Government, Mr. Fleury, S. V. S., wrote thus.—

'In Kampong Sanglang 100 animals were inoculated and of these six subsequently died. I assign these 6 failures to insufficiency of dose. (The maximum dose used was only 90 c. c. R. S. N.)

'In mukim Naga 321 were inoculated and 2 of these subsequently died. In this mukim the protection afforded by inoculation and the deaths amongst the animals uninoculated so impressed the owners that we were requested to inoculate more animals than we could cope with.

'In mukim Titigajah 28 buffaloes were inoculated, all of which were successful.'

Result of innoculation with immune serum in the last Perak outbreak :—

'In a herd of 35 inoculated buffaloes, two contracted the disease within 2 days of inoculation and in another herd of 112 inoculated buffaloes one died within 2 days of inoculation. No further deaths occurred in either group. (Wallace).

Treatment.

1. **Serum therapy**.—Serum therapy in the writer's experience while in India, did produce satisfactory results. Two

buffaloes received 100 c. c. of immune serum intravenously and creosote one dram in rice gruel, had the desired result.

6. *Chaemotherapy*.—Camphor in olive oil (as a diffusible heart stimulant, 10 c. c. containing 36 grains) and Iodine 30 grains, Pot. Iodide 30 grains in distilled water 100 c. c.), the former given subcutaneously and the latter intravenously produced favourable results in three out of five animals.

The above treatment was always supplemented with good nursing and feed.

Haemorrhagic septicaemia in Siam.—The disease is very prevalent in Siam, particularly in the low lying and swampy places. Originally it was considered as being enzootic only in the canalised zone around Bangkok and in the North Eastern area. Now it is known to exist throughout the kingdom. It was also considered as being mainly a disease of buffaloes, but a great number of cattle die annually from the disease, and elephants occasionally become affected. Further investigation may prove that other species are also involved.

The mortality is high. Animals in a herd succumb in quick succession and the percentage of death approximates one hundred. Recoveries are seldom met with.

It prevails throughout the year, but outbreaks are more numerous at the beginning of the rainy season. This coincides with the commencement of agricultural activity when the cattle and buffaloes are confined to smaller grazing areas with a scarcity of food. It is thought that insufficient sustenance and the work of ploughing reduce the resistance or predispose them to infection.

In 1925, experiments were conducted in Bangkok with the object of providing a vaccine and serum as preventives. Investigation was also carried out into the curative properties of certain medicaments.

It was found that a 48 hours broth culture of bacilli treated for 30 minutes at a temperature of 65° C. and carbolised (Holmes method), produced a satisfactory immunity. The vaccine is tested periodically. Control buffaloes receive 0.1 c. c. of a virulent culture, and vaccinated ones a similar injection. Controls die within 36 hours. Vaccinated ones remain healthy. Serum prepared by gradual hyperimmunisation was equally effective in doses of 20 c. c.

The dosage of vaccine employed is 10 c. c. for mature cattle and buffaloes and 50 c. c. for elephants.

The immunity is not considered as lasting longer than one year. Annual vaccination of herds in infected areas is necessary over a period of time.

A solution of Iodine (Iodine 1, Pot. Iodide 2, water 300) injected into sick animals in doses of 150 c. c. to 300 c. c. in the early stages of the disease is distinctly beneficial and several recoveries can be anticipated. If used when the disease is well established death cannot be prevented.

The symptoms of H. S. in Siam are the same as elsewhere—rise in temperature, oedematous swelling of the throat, lachrymation and dribbling of saliva. The animal's breathing becomes progressively more difficult until it becomes stertorous. The tongue is swollen and protruding. Death takes place in 12-24 hours.

Confusion may arise between this disease and anthrax. The blood of cases of sudden death should be examined microscopically.

Veterinarians in this country are of opinion that the disease is on the increase in Malaya. It might be pointed out that Malaya is continuously importing cattle from Siam, a heavily infected country. In order to protect this territory against haemorrhagic septicaemia, the Siamese veterinarians have instituted the following formality.—

1. A dealer wishing to trade in cattle has to sign an undertaking of a stringent nature before permission will be granted to him to become a cattle trader.
2. All applications for permission to trade are submitted to the Veterinary Department.
3. Before exportation the animals will be submitted to a veterinarian for an inspection and the dealer must produce a certificate from the headman of the village, and from the Nai-Amphur of the district, certifying that the disease does not exist either in the village or in the district in which the village is situated for over one month.
4. If the Veterinary Officer on inspection is satisfied that the animals are to all appearances free from disease he

will grant a certificate permitting the exportation, which certificate must accompany the animals.

5. All buffaloes for export are vaccinated.

6. From the issue of the certificate and after inspection the officials brand the animals with a letter, denoting the province from which the animals have been drawn.

Though Siam vaccinates all cattle before export there is always the possibility of the breakdown in immunity in an occasional animal.

Acknowledgments:—The notes one 'Hæmorrhagic Septicæmia in Siam' is from the pen of Mr. R. P. Jones M.R.C.V.S., Veterinary Adviser to the Royal Siamese Government, and I gratefully acknowledge my indebtedness to him for them. I also take this opportunity to thank Mr. J. J. Fleury, M.R.C.V.S., for his many valuable suggestions.

REFERENCES :—

1. W. R. Wallace. Acute Enzootic Hæmorrhagic Septicæmia of buffalo.—A paper presented to a meeting of F.E.V.M.A. Malacca, March, 1929. *Veterinary Record* Vol. 9, No. 34, Aug. 24, 1929.
2. H. Allen. Hæmorrhagic Septicæmia of cattle in India, its etiology and prevention. *Veterinary Record* Vol. 9, No. 10, March 9, 1929.
3. Dr. Jacotot. *Archiv. d'institute Pasteur d'Indo-Chine*, 1927, Nos. 5 and 6.
4. Hutyra & Marek. *Special Pathology and Therapeutics of the diseases of domestic animals*. Third Edition.

DANGER IN HANDLING ANTHRAX SMEARS AND ITS PACKINGS IN A LAB.*

BY

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I do not know how far the following is seriously taken notice of while doing the routine work of a laboratory.

In the laboratory which is attached to the Bombay Veterinary College and Lady Sakerbai Pettit Hospital, speci-

* Read at the Bombay Veterinary Graduates' meeting, April 1930.

mens of blood, pus, tissues etc., are received for Patho-Bacteriological examination from all parts of Bombay Presidency, excluding Sind and Native States. As such, anthrax smears are also received for confirmation.

Though anthrax has not to my knowledge taken an enzootic form, it is not uncommon for us to receive smears of suspected cases from particular districts of this Presidency. (south).

On one occasion it struck me how far I am in danger of handling anthrax smears though many I had handled before.

Of the two smears I received, one was stained with M.B., 1 of aqueous solution and confirmed positive for anthrax microscopically. The other smear was the subject of my experiment. I dropped a few drops of N. Saline over the smear and rubbed a sterile platinum loop mixing the saline with the smear and making a solution of the blood and quickly transplanted a loopful into two agar slants and one broth tube and left them in the incubator. This time with extra care I destroyed the smear, from which I took the material.

Next day, to my surprise, I found an abundant growth in the tubes and lost no time to examine all the three. Smears were made from all the 3 and after fixing and staining examined them microscopically and anthrax bacilli were found and to my great surprise, not one extraneous organism was in these cultures.

I immediately reported this to my chief (Mr. Phadke) who directed me to carry on with the same cultures on guinea pigs for confirmation.

Next day the 48 hours growth of agar was taken and with a light touch of the sterile platinum loop lifted a little material and transferred to 2 c.c. of N. saline. 1 c.c. of this was drawn in a syringe and was injected subcutaneously in a male guinea pig.

On the 36th hour the guinea pig died, the local and general symptoms after the inoculation were exactly like those mentioned by Dr. A. Besson in his book 'Practical Bacteriology, Microbiology and Serum Therapy.'

After death a post-mortem examination was done on the guinea pig and the sero-gelatinous material at the seat of injection was transferred to a few agar slopes and broth and

smears were examined microscopically. The post-mortem lesions were positive of anthrax, smears and cultures were also positive.

Our laboratory thus acquired an anthrax stock culture which was badly wanted.

I do not know how far this is new to men working in the laboratories but surely must be surprising to field workers.

"HINTS ON AVIARY" FOR PARTRIDGES, PHEASANTS AND OTHER GAME BIRDS AND NOTES ON THEIR FEEDING MANAGEMENT

BY

D. S. LAUD, G.B.V.C., F.Z.S.,

Superintendent, Zoological Collection, Victoria Gardens, Bombay.

The best place to keep the partridges or game birds is "garden aviary" In such a building they seem very contented and happy, live long and frequently breed and give very little trouble; daily attention to the feeding and a weekly cleaning being all that is absolutely essential.

Such an aviary should consist of two portions, a perfectly sheltered house, where birds can be secured from hot sun, rain and wind; and an out-door enclosure of wire-netting in which they can bask and exercise at pleasure.

The best way of making such an aviary, where facilities exist is to partition off one end of the verandah on the ground-floor not exposed to wind and rain or other inclemencies of weather, and outside to erect a masonry platform of the same height as the verandah floor, say 3 ft. high on which should be placed an iron structure sold as plant-house. This should be netted over with a wire netting of gauze say about one inch in mesh so that birds can go in and out as they please, and enjoy the shelter of the verandah when the weather is objectionable out of doors. The flight should be turfed and planted with shrubs which are best in pots.

For perches, natural branches of trees or bamboos are the best.

In the verandah the floor should be provided with thickly sprinkled sand or dry earth, as the partridges are ground birds and enjoy dust baths.

The size of the aviary will depend according to the number of birds but a small aviary may be provided, the flight consisting of wire-netting, on an average say 12 ft X 8 ft X 6 ft.

Grit should be provided in the aviary, such as coarse sand or fine gravel, which should be given separately, in a wooden box, if the aviary is not bedded with sand or earth.

Lime is essential for hen-birds when laying, for which plaster rubbish from old houses will be useful.

Plentiful supply of water in shallow pans should be provided on the turf in the flight and in the verandah on a sod or turf. The water should be renewed both in the afternoon and in the morning.

Food :—

Partridges may be fed on Bajri alone :—

Or on the mixture of the following food stuff :—

Bajri. (Bul-rush millet—*Pennisetum typhoideum*.)

Jowari, (Greal, millet or *Sorghum vulgare*.)

Rice. (*Oryza Sativa* not thrashed.)

Indian corn. (Makka or Zea-Maize.)

An enamelled Iron feeding dish with flanged edges will serve the purpose.

Food and water vessels should be kept away from the perch to avoid fouling.

In this garden, along with other game birds, partridges get also green food consisting of chopped green vegetables of

Mola vegetable (green leaves only) *Raphanus sativus* or raddish,

Menthi vegetable (Fenu Greek-*Trigenella Foenum-graecum*),

Onions,

Boiled eggs—crushed.

These are all mixed and given at 10 A.M. The grain is given in the morning only once a day—say at 7 A.M.

In the absence of the above-mentioned green vegetables green food such as various salad vegetables may be given with onions and eggs, to which the birds may be gradually accustomed.

Clinical Articles.

ILIAC THROMBOSIS IN A HORSE.

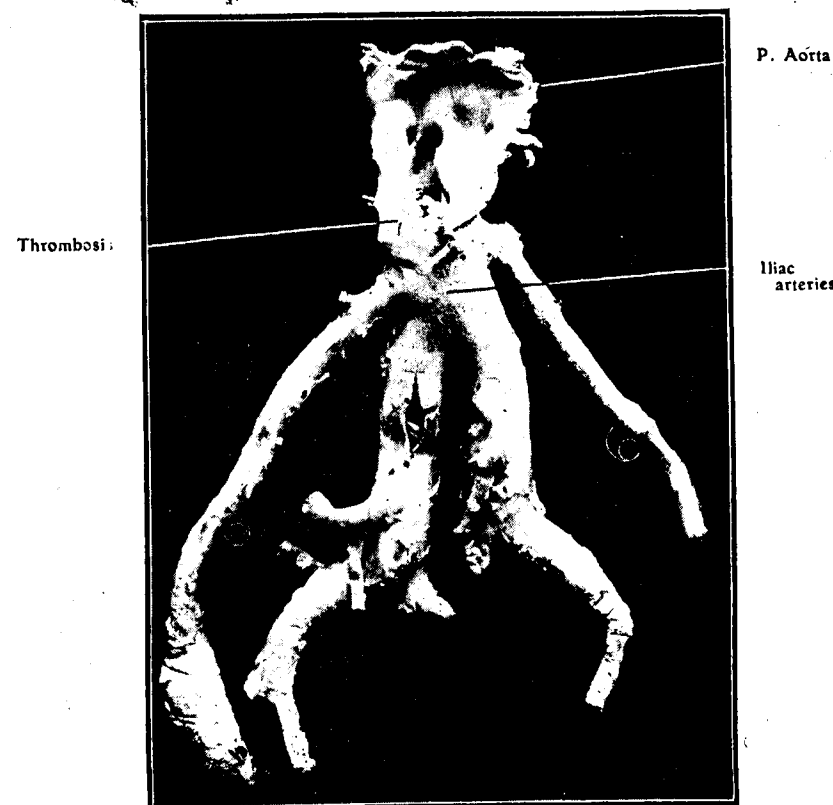
BY

R. SWAMINATHA AYYAR, B.A., G.M.V.C., P.G.,

*Veterinary Assistant Surgeon, Ootacamund.**Subject:*—A Brown thorough-bred Gelding, age 6 years.*History and Symptoms:*—The animal was a racer but, at the very first race, it sprained its near fore tendons. It was, therefore, scrapped off the racing field. With a view to making it a hunter, it was brought to Ootacamund about April 1929. Early in May 1929, the near fore tendons were fired and blistered (the operation was done standing under

local anaesthesia) and about the beginning of July 1929, the animal was slowly put to work. It was coming on very satisfactorily when, on the 6th Sept. 1929, while going along the road, a motor car dashed past it, and very close to it, at a terrific speed. The horse got frightened and kicked out very violently with its near hind. Nothing unusual was immediately noticed and the owner, who was then on the animal's back, continued to ride. After going for about a mile, the horse was noticed to be lame on the near hind and it

was, therefore, brought back to the stables. I examined the animal two hours after and found it only slightly lame with shivering of the gluteal muscles and tenderness over the stifle. Rest and fomentations were advised. In the course of a week, the animal went sound and was put to work.



On the 24th September 1929, I had an urgent message that the horse was dead lame. I saw the animal within quarter of an hour of the receipt of message and, to my surprise, I found the animal quite sound moving about freely in his stall. On enquiry, I learnt that the animal went out as usual being ridden by the syce when, about a furlong from the stables, it trembled on its off hind and refused to move even a bit.

It was, therefore, brought back with great difficulty and put into his stables. Ten minutes after, he was noticed to be

alright. I had the animal brought out and trotted. It started quite sound but soon began to go lame on the off hind which was being dragged along. On resting, the limb began to tremble and all the gluteal muscles, were quivering. In the course of 10 minutes, the limb became normal. No pain or tenderness was noticed anywhere on palpation. No definite opinion was given and the case was watched. I feared that it might be developing "Shivering" but as the symptoms were not definite, I preferred to observe the animal for a few days.

Ten days after, the horse was examined again when the symptoms were more pronounced. The horse started sound, went lame on off hind after a few minutes exercise, the muscles quivered and the leg was raised off the ground and kept flexed in the air shivering all the time. On feeling the limb, it was found to be quite cold and dry. There was an anxious expression of the animal which clearly showed that it was having some acute pain.

Diagnosis :--Thrombosis of the Iliac arteries.

Rectal examination confirmed the diagnosis: while the posterior aorta was comprehensible, the Iliac branches were not. Also the pulsations in the latter were not quite strong.

Treatment being out of the question, the destruction of the animal was advised. This was carried out on 1-12-1929.

Post-mortem revealed extensive thrombosis involving all the branches of the Iliac arteries. Even the left Iliac was thrombosed and it was a surprise that, while alive the animal did not show any lameness on the near hind. The photograph overleaf will clearly show the extent of the thrombosis of all the Iliac arteries.

Note :--What was the cause of this thrombosis? Could it possibly be traced to the violent kicking at the passing motor car on the 6th September 1929?

PARA-TYPHOID "B" AS THE CAUSE OF INFECTIOUS JAUNDICE.

BY

R. SWAMINATHA AYYAR, B.A., G.M.V.C., P.G.,

Veterinary Assistant Surgeon, Ootacamund.

A Fox-Hound pup aged three months, one of a litter of four pups, was found to be off color on 20-11-'29. It refused its usual feed of meat, rice and vegetables, and was a bit dull and listless. The temperature was normal. A dose of Castor-oil was given by the owner and the pup was put on milk diet. Even this was not drunk. The next day a dose of carminative mixture was given and the case watched.

On the 22nd November 1929, another pup took ill with the same symptoms and was similarly treated. As the animals did not appear to be improving, I was called in on the 23rd November to see them. On examination, I found the animals very poor in general health and the first mentioned pup showing signs of jaundice. Worms were suspected to be the cause and both the pups were given a dose of oil of Chenopodium with Castor-oil. Only two or three worms were passed by each pup. On the 24th, the puppies were distinctly bad. They refused every food given to them and the whole of their bodies and visible mucous membranes became deep yellow. On the 25th, enteritis started, the pups began to pass blood per rectum and both of them died the same night.

Post-mortem revealed extensive enteritis and extremely congested Liver. In the meanwhile, the other two remaining pups of the litter also took ill on the 24th, with the same symptoms. As there were not evidences of heavy worm infection, these pups were not treated for worms but were given repeated small doses of mag. sulph and sodi-sulph with stimulants. The treatment was of no avail. The membranes became coloured deep yellow and as in the other two cases, began to pass blood per rectum. Both the pups died on the 27th.

With a view to finding out the cause of the ailment, one of the carcasses was taken on the 27th November '30, to the

Pasteur Institute, Coonoor, for Post-mortem examination. The following report of the Director will be found interesting.

"The result of the Post-mortem and Cultural examination of urine, etc., of the Fox-hound pup brought by you on 27-11-'29 is as follows:—

No spirillum found in urine or in liver extract. Examined by dark ground illumination. Heart blood gave a pure culture of a gram negative mobile bacillus giving the following sugar reactions:—

Glucose.	Lactose.	Sacch.	Mannite.	Dulcite.	L. Milk.
+	—	—	+	+	
(Acid & Gas)			(Acid & Gas)	(Acid & Gas)	Acid going alkaline.

Organism agglutinates with Para "B" serum 1-640. The microscope examination of the brain of the pup is negative for Rabies.

Animal inoculation with the urine from the bladder of the Fox-hound pup; Result:—The guinea pig kept good health up to 10th December '29, when it was killed and urine examined by dark ground illumination. No spirillum found."

Discussion:—Para "B" belongs to the Gartner or Meat poisoning group of organisms and according to Stitt, "some cases of infectious jaundice have been attributed to paratyphoid infection." In the above cases, it is quite possible that the puppies while roaming in the extensive compound of 'the Kennels' might have eaten some decayed meat or most probably a decomposed rat and got themselves infected.

Conclusion:—My grateful thanks are due to Maj. K.R.K. Iyengar, I.M.S., the director of the Pasteur Institute, Coonoor, who very kindly undertook the investigation.

"A CASE OF PROLAPSUS UTERI IN A BLACK BUCK" (INDIAN ANTELOPE)

BY

D. S. LAUD, G. B. V. C., F. Z. S.,

Superintendent, Zoological Collection, Victoria Gardens,
Bombay.

Tech. Name:—"Antelope Cervicapra".

Vernacular:—"Haran".

On 14—2—1926, a female antelope gave birth to a young one in the Garden Zoo. At the time of delivery, there was difficult labour; the foetus was half out of the pelvic cavity, and the mother had to be given assistance so as to effect a safe delivery. The mother and the kid, after this, were lively and well and used to roam about in the paddock.

On 17—2—1926, in the morning the mother was seen with a small portion of the uterus prolapsed. The part was washed with warm Condyl's fluid, reduced and smeared over with the following ointment:—

R

Alum Exic	...	dr. 1
Pulv. Camph	...	dr. 1
Plumbi. Acet	...	dr. ½
Ext. Belladonna	...	dr. 1
Glycerine	...	oz. 1

M. ft. unguentum.

Warm fomentations were applied to the loins.

In the evening of the same day, the part was again found prolapsed and there was little straining. As the antelope is very shy, delicate and gets flurried when approached, it was decided to keep her quiet and to handle as little as possible; and for this reason she was, with the kid, enclosed in the paddock. Fomentations were applied to the loins and the prolapsed part was washed with warm Condyl's fluid, smeared over with the alum ointment and reduced into the cavity. To keep the part "in situ" two cross Catgut sutures were put on, joining the walls of the vulva externally, and a subcutaneous injection of 15 minims of Liq. Morphine Hydrochlor into the region of right thigh was given.

Subsequent treatment for about three days consisted of warm fomentations to the loins, washing the part with Condyl's fluid and the application of the ointment.

The animal was alright in a week.

A LACTATING BULL*

BY

M. C. PATEED, G. B. V. C.,

Veterinary Assistant Surgeon, Belgaum.

On 21st December 1929, a diffused brownish coloured Deccany bull about 8 years old, of a normal size, was brought into the hospital. The bull belonged to Mr. Shattu Babaji of Tavarawadi, a village in Chandgad Mahal where the main crop is rice. It was purchased by him a year before on the



1.—Testis. 2.—2, 2, 2,—Teats, four.
3.—Udder. 4.—Sheath.

assumption that it was a bullock and he worked it in his field to the time it was brought to the hospital.

The owner pointing his finger to the enlarged space in front of the scrotum expressed his desire to have it emasculated.

* Read at the Bombay Veterinary Graduates' meeting in April 1930.

lated thinking that the animal was not properly mulled because it used to fight with other animals.

I threw the animal, examined it, and noticed the following:—

The testis presenting in its spot was a rudimentary one having no glands in it, but a soft fibrous tissue. It measured $1\frac{1}{2}$ " in length and $1\frac{1}{2}$ inches in diameter at the base. I was amazed at the large teats it had. I examined the teats one by one. To my surprise they were all of one size and shape measuring $\frac{3}{4}$ of an inch and symmetrically situated round the bulging out space in their middle. Strange to say, from all the teats I could squeeze milky fluid. From the one fluid was of a thick consistancy, in the other it was of normal appearance of milk. More and more fluid came from the teats the more I handled them. I felt the enlargement, and it was a glandular tissue in one mass, but a little harder than that of a mammary gland and softer than that of testicular glands. I concluded that it was mammary gland not fully developed.

All were convinced that the secretion from the teats was of the nature of milk.

In a standing position the udder appeared in an irregular shape, but when the animal was thrown down and the limbs secured it looked conical giving it the appearance roughly of a single big testicle. The bull had penis of a normal length and used to draw it out and urinate but I learnt that it never made any attempts to cover a cow but simply was of a fighting nature. The rudimentary scrotum was just behind the undeveloped udder. The bull had a thick neck and was of fairly round build. It was strong enough to do the plough work.

The photograph of the bull overleaf shows the exact nature of the details mentioned above.

A NOTE ON THE TREATMENT OF STRINGHALT IN CATTLE

BY

B. RAMIAH, G.M.V.C.,

*Veterinary Assistant Surgeon, i/c Veterinary Dispensary,
Parvathipuram,*

The animal is cast and secured in the ordinary way with the affected limb upwards and well extended. The site selected for the injection is the groove or depression which lies immediately behind the patella and which is well marked in this position. The needle is pushed straight down in this groove as near the joint as possible. During this operation the animal frequently gives a violent jerk by flexing the limb which when not prevented may result in the breaking of the needle. The needle in this position can be pushed deep to its neck. Sometimes it strikes the bone underneath when the position should be adjusted. Having done this 5 to 10 c.c. of Tr. Iodine mitis is injected according to the size and general condition of the animal. The needle is then withdrawn, the fluid diffused and the animal let go.

The injection at the right place is followed by severe lameness on the next day. Sometimes the pain is so severe that the animal can hardly move about. This continues for about 6 to 8 days the pain gradually subsiding. During this period attention may be paid to the limb by way of fomentation and anodyne applications. After this the animal walks quite well. In some instances it is completely cured, in others a slight lameness may yet be seen, such cases require a second injection after the complete subsidence of the inflammation and pain caused by the first injection. When the injection is followed by swelling lameness one can be sure of a partial or a complete cure.

A question may arise as to whether the injection should be given into the capsule of the joint. I have found it was not necessary to inject the medicine into the capsule. It may be injected either into or immediately surrounding it. I have seen cures in both cases. When the needle is pushed in the said groove it sometimes goes direct into the capsule

which is indicated by a gush of warm sinovial fluid through the lumen of the needle, and at other times it goes very near it. In either case the medicine may be injected.

With regard to the recurrence of the complaint when once cured it has not been possible to watch the result of a case for long periods owing to animals changing hands and thus escaping further observation. I have however watched an animal for a year and the stringhalt has not reappeared.

As for the untoward results I have seen an animal dead lame even after a month, the animal having gone down very bad in condition causing much anxiety both to me and to the owner. This was combated with good food, tonics, and blisters and it took another month to get it round and the stringhalt disappeared which gave us satisfaction.

When both limbs are affected it is not advisable to treat them at the same time as the resulting lameness which is sometimes very severe interferes much with the animal's movements and the animal while trying to lie down may fall suddenly and a fracture may be the result.

[Readers may refer to the article on this by Mr. K. S. Prakasa Rao, G. M. V. C., which appeared in Vol. II, No. 1, Page 45. of this journal. This being a fairly common complaint among animals in Northern Circars and because the popular belief is that that condition cannot be cured, more extensive work may be done on this.—Ed.]

A CASE OF FIBROMA IN THE FRONTAL SINUS OF A COW.

BY

A. M. MUTHAPPA, G. M. V. C.,

Veterinary Assistant Surgeon, Ammatti, Coorg.

On 19th June 1930, a cross bred Sindhi cow was brought to the dispensary with the history that she was bleeding from both the nostrils for the last one month and that she was running down in condition. She was admitted the same day as an in-patient and I began to treat her with styptics internally. The attendant was instructed to keep the head bandaged and kept wet with cold water. The animal, however, got worse day by day. I found persistent emaciation in

spite of good feeding and the discharge from the nostrils was purulent and tinged with blood. In the beginning of July, very grave symptoms were noticed. One of her eyes showed amaurosis and in a couple of days the vitreous humour lost all its transparency and the cornea looked pearly white in colour. The animal now refused to take straw or grass. She was therefore kept only on gruel. As days passed on respiration became irregular and stertorous. The owner was requested to have her destroyed and she was destroyed.

On post-mortem examination the following changes were noticed:—

- (1) Destruction of the intrinsic muscles of the globe of the right eye.
- (2) Destruction of the upper portion of the right ethmoid bone.
- (3) Nodular growths on the right side of the frontal sinus,

These growths were sent for examination to the Director, Imperial Institute of Veterinary Research, Muktesar, and to the Principal, Madras Veterinary College. The former has reported as follows:—"The histological examination of the growth obtained from the frontal sinus of a cow has revealed a delicate stroma of fine connective tissue densely packed with blood cells. There are in addition a few isolated areas of cartilage. It would appear that the lesion is a haemorrhagic inflammatory one possibly due to injury." The Principal has however definitely reported the condition to be fibromatous.

A CASE OF LEAD-POISONING AMONG PLOUGH BULLOCKS.

BY

A. M. MUTHAPPA, G. M. V. C.,

Veterinary Assistant Surgeon, Ammatti, Coorg.

At about 1-P.M., on the 20th of August 1930, I was called in to attend on a herd of plough bullocks that were showing signs of gastro intestinal disturbance. On reaching the spot, I observed that a few of them had cramped condi-

tion of the muscles of the limbs in addition to purging. The man in charge, gave me to understand that the owner had asked him to give each animal a bottle of linseed oil on the previous day. He further added that it was customary among them to administer each animal a bottle of castor oil soon after the ploughing season was over. The owner had left the place for Bangalore leaving instructions to administer the oil. On being asked to show me the sample of oil, I found that they had substituted "double boiled linseed oil" for the raw one. At once it was suspected that it was a case of plumbism, for the boiled oil generally contains litharge and is used only for the preparation of paints. All the animals were at once given potassium iodide three times daily, each dose being followed in about two hours by sulphate of magnesia and dilute sulphuric acid. The attendant was further instructed to give demulcents, white of eggs, gruel, etc. At the time of writing I hear that though nine heads of cattle have died showing evidences of paralysis, the remaining thirty-one are recovering rapidly.

DISTOKIA (POSTERIOR PRESENTATION).

BY

A. M. MUTHAPPA, G.M.V.C.,

Veterinary Assistant Surgeon, Ammatti, Coorg.

I was called upon to attend on a cow, at about 3 p.m., on the 21st of August 1930. The animal had been labouring for about twenty hours. The cow was constantly throwing herself down and straining hard to expel the foetus.

I secured the cow and passed my oiled hand in, but I could not feel the head or legs, but I could feel the buttocks and also one flank of the calf which had ruptured and the bowels protruding through it. I pushed back the hind quarters of the calf and caught hold of the back legs and applied a cotton rope. When once the legs were secured traction was applied and calf was got out easily. It was of course a dead one. The cow made uneventful recovery.

The peculiarity of the case is (1) the rupture of the flank of the calf and the protrusion of the intestines and this condition must have happened owing to very powerful contraction of the uterus on the foetus, being a case of dry labour.

KAOLIN PURISS IN THE TREATMENT OF RINDERPEST.

BY

M. LAKSHMANA RAJU, G.M.V.C.,

*Veterinary Assistant Surgeon, i/c Veterinary Dispensary,
Tekkali, Madras.*

Cattle Plague or rinderpest is an acute contagious disease of cattle and buffaloes, very commonly met with in this presidency and is characterised by fever and inflammatory lesions of the mucous membranes more particularly of the alimentary tract. As it is so well known to all veterinarians and even to the ryot population it is needless to me to go into details with regard to etiology, symptoms and methods of prevention by S.S. inoculation, but I will confine myself to the treatment of affected cattle with Kaolin Puriss—a drug found useful in my hands.

Various drugs as cresol, acid carbolic, pot permanganas, formalin and hypodermic injection of Tr. Iodine etc., have been tried by me for the past 8 years, but the results are not encouraging.

Kaolin Puriss (Aluminium Silicate) possesses astringent properties like many other drugs as Opium, Catechu, Bismuth subnitras, Pulvis Creta Aromaticus cum opio, etc., but the special action of this drug consists in its power of absorbing bacterial poisons from the alimentary canal and is an efficient agent in rendering such poisons innocuous. In addition to forming an adherent coating to the walls of the intestine thus soothing the mucous membrane, it possesses a useful mechanical action on the intestine. In this manner the elimination of these toxins is readily, quickly and safely accomplished without harm to the system. Purified colloidal kaolin is best for internal use. It is in the form of an extremely fine light neutral powder which is perfectly free from grittiness. The rationale in Kaolin treatment is that the minute particles are capable of enveloping and fixing micro-

organisms, present in the alimentary tract; and contagion in the case of rinderpest must belong to a group of ultra microscopical organisms as the blood and tissue fluids of the affected animals are infective.

Treatment.—Although astringents given for the purpose of checking diarrhoea are distinctly harmful, kaolin is specially found to be advantageous in this disease for reasons already mentioned above.

Kaolin Puriss is administered in doses of 2 ozs thoroughly mixed in a pint of warm thin rice gruel (per 600 lbs body weight) three times a day. If diarrhoea is severe and mixed with mucus and blood which is usually found between the 4th and 6th day of fever the dose of kaolin should be doubled. It is perfectly harmless and so large doses may be given without fear of any ill-effects.

Along with the above treatment, I also give in severe cases hypodermic injection of white of the egg (2 eggs will suffice for each time) twice a day during the stage of diarrhoea. Thin warm rice gruel is allowed during the course of the disease. Slightly laxative food is recommended in cases where there is defective action of the bowels. It should not also be forgotten that nursing and suitable diet are of great assistance in aiding recovery.

I have tried the above treatment in about a dozen cases and except two animals (where the treatment was attempted in the last stage) the rest have recovered.

Note.—‘O Sino’ Kaolin may be substituted if Kaolin Puriss is not available.

Other members of the profession will kindly try the above treatment and publish the results through the medium of this journal.

Extract.

Revised curriculum of the Madras Veterinary College.

ANATOMY.

Lectures.

Osteology:—Bones—properties—composition—minute structure—classification—general description—comparative features in the horse and dog.

Syndesmology:—Cartilage—ligaments—synovial membranes—elastic and adipose tissues—articulations—motions in joints—ligaments of articulations—comparative features of articulations in the horse and dog.

Myology:—A general description of the muscles of the body—detailed description of the superficial muscles of the body—their attachments, nerve and blood supply—actions of certain important muscles of the body and the muscles of the fore and hind limbs—general comparative features in the horse and dog.

Splanchnology: (a) *Digestive*—general description of organs connected with digestion—accessory organs of digestion as salivary glands—pancreas—liver—comparative features in horse and dog.

(b) *Respiratory*:—General description—nostrils—nasal chambers—larynx—trachea—thoracic cavity—pleura—bronchi—lungs—diaphragm—comparative features.

(c) *Urinary*:—Description of the kidney—ureter—bladder—comparative features.

(d) *Genital*:—General description of male and female genital organs—male and female urethra—comparative features.

(e) *Ductless glands*:—Spleen—adrenals—thyroid—thymus—pituitary—pineal—comparative features.

Neurology:—Cerebro spinal and sympathetic systems—comparative features.

Angiology:—(a) Circulatory system—pericardium—heart—important and large vessels entering and leaving the heart—general description of the venous system—detailed description of the Jugular, vena azygous, cephalic, subcutaneous, thoracic, vena saphena—blood supply to the organs—comparative features.

(b) *Lymphatic system*:—General description of the course of lymph—distribution of lymphatic glands—detailed course of thoracic duct.

Aesthesiology:—General description of the skin, eye and ear.

ANATOMY.

Practical.

Fore limb:—Dissection of the back—pectoral region—Axillary space—brachial plexus—scapular region—region of arm—fore arm—metacarpal and digital regions.

Hind limb:—Gluteal region—hip and thigh—leg—metatarsal and digital regions.

Thorax:—Thoracic wall—pleura—lungs—diaphragm—phrenic nerves—mediastinum and its contents—heart and large blood vessels—gangliated sympathetic cord—intercostal vessels, muscles and nerves.

Abdomen:—Perineum—abdominal wall—spermatic cord—inguinal canal—penis—scrotum—testis—peritoneum—positions and relations of the viscera—caeliac axis—mesenteric vessels—duodenum—pancreas—spleen—stomach—liver—adrenals—kidneys—ureter—diaphragm—posterior aorta and vena cava—vena azygous—iliac quadrification—external and internal iliacs—fasciae—muscles and nerves of abdominal wall—lumbo sacral plexus.

Pelvis:—Extent of peritoneum—positions and relations of the viscera—fascia—rectum—anus—ureter and bladder—prostate—seminal vesicles—vas deferens—bulbo—urethral gland—pelvic blood vessels and nerves—structure of rectum—bladder and urethra—ovary—uterus—vagina—vulva—mammary glands—lymphatic glands.

Head and neck:—Cranium—removal of brain—spinal cord—membranes—lateral and inferior aspect of neck—face and parotid regions—and temporal pterygo—mandibular regions—mouth—tongue—nasal fossa—pharynx—larynx—muscles of the external ear—eye ball and its muscles.

CHEMISTRY.

A detailed study of the portions below will be covered and the student, will be taught general principles of volumetric analysis.

Chemistry:—Chemical physics—Fundamental properties of matter—Heat—Light—Electricity (Elementary).

Definition—Compounds and elements—mechanical mixture and chemical compound.

Atoms:—Molecules—atomic weight, symbols, formulae and equations.

Fire:—Combustion—oxidation—flame—test for CO₂—production of heat in chemical change.

Air:—Composition—air a mixture—uses of the various gases—action of plants and animals.

Water:—Composition—electrolysis of water—volumetric and gravimetric composition—solution and crystallisation—water of crystallisation—water of condensation—impurities—suspended and dissolved—filtration—decantation—distillation—hard and soft water—permanent and temporary hardness—rain water—sea water—spring water and surface well water.

Earth:—Classification of compounds and elements—oxides—hydr-oxides—alkalies—acids—salts.

Non-metals:—Preparation—properties and test of oxygen—hydrogen—nitrogen—ammonia—nitric acid and carbon dioxide.

Carbon:—Varieties—charcoal—graphite—diamond—coal—distillation of coal—coal gas—manufacture—uses—Bunsen's burner—marsh gas—Davy's safety lamp—carbon monoxide.

The Halogens:—Chlorine—hydrochloric acid—Bromine—iodine—flourine.

Sulphur:—Different varieties—sulphuric acid.

Phosphorus:—Red and yellow.

Silicon.

Metals:—Occurrence—preparations—properties and uses of.

Organic compounds:—Hydrocarbons—paraffins—olefines—etc., homologous series.

Alcohols—aldehydes—acids—ethers—amines—amides in general and the preparations and characteristics of the more common of these and their commoner derivatives.

Fats—oils—soaps—glycerine, etc.

Carbohydrates.—Starch—cellulose—sugars, etc.

Fermentations.—Alcoholic—acetic—lactic—butyric.

Distillation of wood and coal.

Aromatic compounds—Bensene and its chief derivatives.

Glucosides—turpentine—camphor.

Cyanogen compounds.

Alkaloids.

Albumen and albuminoids—urea.

Ultimate analysis of organic compounds.

BOTANY

(1) General Morphology.

A. The vegetative organs—root—stem—leaf.

The root.—forms and modifications of roots.

The stem.—forms and modifications of stems.

Buds and branching.

The leaf.—parts of a leaf—different kinds of leaves.

Venation.—Simple and compound leaves—arrangement of leaves on the stem and in the bud. Modifications.

B. The reproductive organs.—Inflorescences—indefinite and definite:—

The distinctive characters of the following kinds—raceme—corymb—spike—spadix—panicle—umbel—capitulum—cyme—etc. Bracts—Floral symmetry—parts of a flower—thalamus—calyx—corolla—androecium—gynoecium. The structure and development of the ovule—pollination and

fertilisation.

The fruit.—Kinds of fruit—the seed—the embryo—scattering of fruit and seed.

(2) Anatomy:—

Protoplasm—the cell and cell contents—the cell wall and its modifications—cell division—the tissues—epidermal, vascular and fundamental structure of stem and root—mode of thickening in Dicotyledons.

(3) Physiology:—

Composition of plants—essential food substances—water cultures—food material and foods—absorption by roots—substance in the soil necessary for healthful growth—the form in which these are present in the soil—how they enter and the part they play—crop rotation—its purpose and physiological justification—the absorption of nitrogen—growth and its conditions—root pressure—transpiration.

Plant relations.—The external relations of plants—the factors—water—light—the atmosphere—the soil—animals—the growth forms of plants—herb—shrub and tree, parasites, saprophytes.

(4) Classification:—

The principles of classification—distinctive—characters of thallophyta—bryophyta—pteridophyta—spermatophyta—characters of the following natural orders—coniferae—gramineae—liliaceae—ranunculaceae—papaveraceae—cruciferae—rosaceae—leguminosae—umbelliferae—solana-ceae—labitae—scrophulariaceae—compositae.

Ferns—mosses—algae—fungi—bacteria—typical life histories. Practical work in the laboratory includes the dissection of flowers, fruit and seed

ZOOLOGY

A. Description of amoeba—paramoecium noctiluca—trypanosoma—piroplasma—coccidium and haemamoeba—general characters of protozoa.

B. Short account of sponges.

C. Coelenterata—hydra.

D. Vermes—description of structure and life history of liver fluke—tapeworm—trichina—ragworm—earthworm—leech—general characters of platyhelminthes—nematelminthes—annelida.

E. Arthropoda—Main characteristics of the phylum and distinguishing features of its subdivisions—crustacea—myriapoda—insects—arachnida—structure of the cockroach as a type of insects—the metamorphosis of insects—the characters of coleoptera—hymenoptera—diptera—orthoptera, with examples of useful and hurtful forms.

F. General structure and life history of mange mites and ticks.

G. General character of echinodermata.

H. General characters of millusca.

I. Short account of forms intermediate between vertebrata and invertebrata.

K. Pisces.—Description of a skate, general characters of elasmobranchi—teleostei—ganuidei—dinoi.

L. Structure and life history of a frog—urodela and anura.

M. General characters of the reptiles—external features of lizard snake—tortoise—crocodile.

N. General characters of birds with special reference to feathers—wing—leg and respiratory organs.

O. Characters of mammalia and of the following orders—monotremata—marsupialia—edentata—cetacea—ungulata—carnivora—rodentia—insectivora—chiroptera—primates.

P. Evolution—origin of species—theories of heredity.

HANDLING OF ANIMALS

1. How to go up to a horse—how to make a horse move over—how to lift up a foreleg—how to lift up a hind leg—how to hold up a fore leg—how to hold up a hind leg—how to hold a horse—how to lead a horse—how to lead a horse into or out of a stable—how to turn a horse—how to back a horse—how to trot a horse in hand—different methods of securing a horse in the stable.

2. Means of controlling horses—blinds—twitch—muzzle—cradle—side rod—tuing up a fore leg—the trevis—casting by double side line—casting by hobbles—use of cross hobbles—releasing limbs from hobbles and securing—securing on horse back—hobbling mares for covering—lifting up a fallen horse.

3. Means of controlling oxen—bull holder—nose ring—holding by the nose—securing hind limb by aid of tail—figures of 8 knot for hind limb—lifting hind limb by aid of pole—lifting hind limb by aid of tail—use of pole to prevent kicking—the trevis—casting by ropes in Indian method—casting by ropes in the English method—lifting up a fallen bull or cow

4. Names of the points of the horse and how to handle them.

5. Names of the points of the ox and how to handle them.

6. Stable gear and uses.

Stable utensils—bucket—how to water a horse—rack chains—pillar chains—mangers—feeding pans—head and heel ropes—body brush—dandy brush—water brush—curry comb—mane comb—hoof picker—sweat scraper—wisp—rubber—glove—clothing rugs and blanket—quarter sheet—breast cloth—roller—hood—fly fringes—knee caps—hock caps—bandages and bandaging—head collar—halters.

7. Saddles—bridles and harness—varieties of saddles—parts of saddle—saddling a horse—riding bridles—double and single bridles—their parts—martingales—standing and running—driving bridle collar—driving saddle—their parts—how to put the harness together—how to harness a horse—how to put to and take out a horse,

8. Description of horses—colour—breed—sex—age—height—marks.

9. Description of cattle—colour—breed—sex—age—height—marks.

10. Points of the dog—how to secure them for administering medicines and operation purposes.

11. Method of administering medicines to horses—cattle and dogs.

12. Names and uses of the more common instruments and appliances in daily hospital use.

HISTOLOGY

Lectures.

Microscope and its various parts—care and cleanliness in the use of microscope.

Cell and its contents.

Blood and its contents.

Microscopical examination of blood of different animals—various stains employed.

Epithelium—varieties.

Connective tissue „

Heart muscle. „

Plain muscle „

Laboratory methods in the preparation and examination of the tissues.

Blood vessels—structure and differences in each of them.

Alimentary canal—various parts—structure and function of each.

Liver—structure—portal system.

Pancreas.

Kidney—ureter—bladder and urethra.

Trachea—bronchi—lungs.

Ductless glands.

Skin.

Generative system—male and female.

Nervous system.

Sensory organs.

Practical.

Use and handling of different parts of microscope—examination of different extraneous objects likely to be confounded with in the microscope examination—examination of fresh blood from (a) horse—(b) rabbit—and (c) fowl—preparation—staining and examination of blood films from (a) horse (b) rabbit, (c) guinea-pig (d) ox, (e) fowl, (f) dog, (g) sheep and (h) camel.

Examination of a drop of blood with a drop of 1% saline—examination of a drop of blood with tap water.

Study of epithelium—squamous—cubical—columnar—ciliated—stratified and transitional.

Areolar tissue—fibrous tissue—elastic tissue—adipose tissue—rectiform tissue—lymphoid tissue and jelly-like tissue.

Hyaline cartilage—yellow elastic and white fibro-cartilage—reticular cartilage.

Transverse and longitudinal section of bone.

Striated—plain—and cardiac muscle—method of preparing paraffin blocks—fixation and hardening of tissues—dehydration—clearing—infiltration with paraffin—embedding in paraffin—section cutting—preserving—method of staining and mounting. Transverse section of large—medium and small artery—transverse section of vein—section of tongue—submaxillary and parotid salivary glands—oesophagus—vertical section of mucous membrane of cardiac—fundus and pyloric portions of stomach—transverse section of duodenum—jejunum—ileum and large intestines.

Section of the liver—gall bladder—section of pancreas—section of the kidney—ureter—bladder—section of trachea—lung—skin—section of the thyroid—thymus—adrenal and sagittal section of pituitary.

Section of the lymphatic gland—spleen—section of the testis—penis—ovary and fallopian tube.

Section of the spinal cord—cerebrum and cerebellum.

EMBRYOLOGY.

General physiology.

The ovum—spermatozoon fertilisation—segmentation of fertilised ovum—formation of three germinal layers and the structures derived from these three layers.

Nourishment of the embryo—foetal membranes—establishment of connection between the foetus and uterus—placenta and its circulation.

The external form of the embryo at different stages.

Organo—genesis.

Development of muscles.

- „ connective tissue and skeleton.
- „ vascular system.
- „ lymphatic system.
- „ digestive and respiratory systems.
- „ body cavities.
- „ urino genital system.
- „ skin and appendages.

PHYSIOLOGY.

Lectures.

Animal cell—elementary tissues as epithelial—connective—muscular and nervous.

Blood clotting—circulation—blood pressure.

Digestive—saliva—gastric juice—pancreatic juice—bile—succus—entericus—actions of ferments of each—liver and its functions—pancreas and its functions—

The lymphatic system—chyle.

Respiratory.—The larynx—bronchi—lungs—nerve supply—production of sounds—special respiratory acts as neighing—bellowing—barking—coughing etc.

Urine.—Kidneys—function—urea—contents of urine—reaction—characters in different animals—act of micturition.

Endocrine glands.—Spleen—adrenals—thyroid—thymus—pituitary—pineal functions.

Nutrition and metabolism.

Animal heat.

Special senses.—Sight—examination of the eye—catoptic—ophthalmoscopic and eye board tests—normal and abnormal vision.—Taste—taste buds—hunger—thirst—sense of hearing—movements of the external ear—semicircular canals.

Reproduction.—Male and female reproductive organs—puberty—sexual act—oestrus—impregnation—foetus—foetal circulation—foetal membranes—milk—its secretion and composition. The foot—plantar cushion—lateral cartilages—their use—circulation—anti-concussion mechanism.

Locomotor system.—Muscles—fatigue—tendons—ligaments—paces employed by the horse—walking—trotting—canter—gallop etc.

Nervous system.—Irritability—differences in structure and function—reflex action—brain and spinal cord—functions—nerve trunks—regeneration and degeneration—motor and sensory nerves—nerve endings—sympathetic system.

Practical.

Excitation of tissues.

Physical properties of blood.

The heart.

The blood vessels.

Circulation.

Pulmonary ventilation.

The gases of the blood.

Reaction of the blood.

The contractile tissues.

Bio-Chemistry.

Use and practical technique of the determination of hydrogen—concentration of fluids—general reaction of proteids—general reaction of the carbo-hydrates—tests for glucose and other sugars—standard estimation of sugar—use of polarimeter.

Fat.—Practical study of digestion of fats.

Milk.—Study of the physical characters—estimation of fat—lactose and inorganic constituents.

Blood.—Study of the action of alkalies and acids on blood. Spectroscopic examination.

Examination for and determination of blood stained materials.

Urine.—Study of physical characters of and determination of the various constituents.

General practice in the determination of substances of physiological interest.

PATHOLOGY.*1. General pathology.*

Health and disease—the conditions of diseases—methods of study—the causes of disease—mechanical including injuries physical, chemical, predisposition and heredity—death, local and general.

The morbid and reactive processes.—Hyperaemia—anaemia—haemorrhage—thrombosis—embolism—infarction—oedema—dropsy—inflammation—its causes—cardinal indications—thermogenesis—pyaemia—vascular and textural phenomena—fibrosis—resolution.

The progressive tissue changes.—Hypertrophy—regeneration—the blood forming organs and organs of internal secretion—metaplasia—cysts—neoplasia—fibroma—papilloma—lipoma—adenoma—sarcoma—round celled and spindle celled epithelioma. The retrogressive tissue changes.—Atrophy. Infiltrations—degenerations—calcification—calculi—pigmentation—necrosis—gangrene—signs of death.

2. Special Pathology.

Liver.—Passive congestion—cloudy swelling—fatty infiltration—fatty degeneration—cirrhosis of the liver—its various types. Lungs.—bronchitis—pneumonia—its types—consolidation—resolution—organisation—emphysema—pleuracy.

Kidneys.—Nephritis—general nature of the process—its diffuse character—acute and chronic glomerular nephritis—tubercular nephritis—interstitial nephritis—arteriosclerosis—disease of the kidney.

Lymphatics.—Lymphadenitis.

Circulating system.—Pericarditis—endocarditis—atheroma—aneurism—phlebitis.

Nervous system.—Meningitis.

3. Practical pathology.

Post-mortem examination.—Reports—examination of pathological fluids and tissues in the fresh state—preservation of organs and tissues—fixative fluids—preparation of films and sections for microscopical examination—staining methods—diagnosis of section.

BACTERIOLOGY.*General bacteriology.*

Classification—morphology—motility—reproduction of bacteria and spore formation—non-pathogenic bacteria—general considerations.

Laboratory methods.

Sterilisation—preparation of more important culture—media cultivation of micro-organisms and methods of isolation of bacteria in pure cultures—general laboratory techniques—animal inoculations and autopsies on them.

Examination of bacteria.

Hanging drop and film—preparations—staining principles—stains—mordants—decolorisers—Gram's and acid-fast methods of staining.

Special bacteriology.—Morphology and identification of

1. Streptococci.
2. Staphylococci.
3. Bacillus anthracis.
4. Vibrio septique.
5. Bacillus chauvoi.
6. Tetanus bacilli
7. Organism of hæmorrhagic septicæmia.
8. „ fowl cholera.
9. Bacillus mallei,
10. Bacillus abortus Bang,
11. „ Coli.
12. Tubercle bacilli.
13. Epizootic lymphangitis organism.
14. Johne's bacillus.
15. Bovine lymphangitis organism.
16. Leptospira Ictero-hæmorrhagica.
17. Spirochaeta gallinarum:

General knowledge of the viruses of:—

1. Rinderpest.
2. Variola.
3. Rabies.
4. Foot and mouth disease.
5. Distemper.
6. Chicken pox.

Mycotic diseases :—

1. Nasal granuloma.
 - (a) Streptothrix variety.
 - (b) Rhinosporidium.
2. Ringworm.
3. Actinomycosis.

Lectures with magic lantern demonstrations will also be given wherever possible and students given opportunities of seeing different cultures of bacteria and examination of film preparation.

IMMUNOLOGY*A. Immunity.*

1. Introductory—relations of bacteria to disease—conditions modifying pathogenicity—disturbance of metabolism by bacterial action—production of toxins by bacteria—the theory of toxic action—Metchnikoff's theory-theory of Vaughan.
2. Natural immunity—principles underlying.
3. Artificial immunity.
 - (a) Against substances of known composition e. g. arsenic.
 - (b) „ vegetable albuminoid poisons e.g. aloin, nux vomica etc.
 - (c) „ substances of unknown composition.
 - (d) „ bacteria and toxins.
4. Methods of producing active immunity.
 - (a) by the injection of virulent organisms.
 - (b) „ „ attenuated organisms.
 - (c) „ „ dead organisms.
 - (d) „ „ toxins or extracts of organisms.
5. Method of producing passive immunity.
6. Autogenous vaccine.
7. The formation of anti-toxic sera.
8. „ anti-bacterial or anti-microbial sera.
9. The properties of anti-bacterial sera.
 - (a) Bactericidal and lysogenic action.
 - (b) Opsonic action.
 - (c) Agglutinative and precipitative action.
10. Fixation and deviation of complements.
11. Theories as to acquired immunity.
 - (a) Ehrlich's side chain theory.
 - (b) Metchnikoff's theory of phagocytosis.
12. Anaphylaxis, allergy or hypersensitiveness.
13. Polyvalent and univalent serum.

B. Vaccine and serum therapy.

The preparation and application of mallein.

„ „ tuberculin.
 „ „ sera and vaccine used in the following diseases :—

Rinderpest. Black Quarter. Anthrax. Strangles. Tetanus. Hæmorrhagic septicæmia. Rabies. Distemper.

Fowl pox.

C. Disinfection.

Methods.—Moist and dry heat—natural agents—chemical agents.
 Action and uses of the following agents :—

Chlorine. Iodine. Nascent oxygen. Perchloride of mercury. Formalin. Sulphuric acid. Iodoform and acriflavine.

PARASITOLOGY INCLUDING PROTOZOOLOGY.

Introduction—the classification of parasites—parasitism.

2. A brief account regarding the zoology of animal parasites enumerated below, their control, diseases produced on the various hosts by their parasitism with the prominent symptoms and the treatment of such conditions.

Theoretical.—30 hours.

1. Family ascaridae.
 - (a) Ascaris sp.
 - (b) Belascaris marginata.
 - (c) Toxascaris limbata.
2. Strongylidae.
 - (a) Strongylus sp.
 - (b) Cylicostomum sp.
 - (c) Oesophagostomum.
 - (d) Syngamus trachealis.
3. Anchyllostomidae.
 - (a) Anchyllostomum caninum.
 - (b) Bunostomum sp.
4. Trichostrongylidae.
 - (a) Trichostrongylus sp.
 - (b) Haemonchus contortus.
 - (c) Mecistocirrus digitatus.
5. Metastrongylidae.
 - (a) Metastrongylus apri.
 - (b) Dictyocaulus apri.
 - (c) Synthetocaulus refescens.
 - (d) Haemostrongylus vasorum.

6. Spiruridae.
 - (a) *Spirocerca sanguinolenta*.
 - (b) *Habronema* sp.
 - (c) *Thelaria rhodesae*.
7. Angiostomidae—strongyloides stercoralis.
8. Oxyuridae—oxyuris equi.
9. Trichinellidae—trichinella spiralis.
10. Trichuridae—trichuris sp.
11. Filaridae.
 - (a) *Dirofilaria immitis*.
 - (b) *Setaria* sp.
 - (c) *Onchocera* sp.
12. Dracunculidae—dracunculus medinensis.

Order Trematosa.

- (1) Fasciolidae—fasciola sp.
- (2) Schistosomidae—schistosomum sp.

Order cestoda.

- (1) Taenidae—Taenia solium
 - „ saginata,
 - „ pisiformis.
 - „ marginata.
 - „ echinococcus.

Muliticeps multiceps.

- (2) Dipylididae—dipylidium caninum.
- (3) Anaplocephalidae.
 - (a) *Anaplocephala* sp.
 - (b) *Moneizia* sp.

ENTOMOLOGY.

Arthropoda.

A. Insects.

- (1) Culicidae—culex fatigans.
- (2) Tabanidae—tabanus sp.—haematopota sp.
- (3) Muscidae—musca domestica—stomoxys calcitrans.
- (4) Oestridae.

Gastrophilus equi—hypoderma bovis—cestrus ovis,
- (5) Hippoboscidae—hippobosca sp.—melophagus ovinus.
- (6) Pulicidae—Ctenocephalus canis.
- (7) Mallophaga—trichodectus latus.
- (8) Haematopinidae.
 - (a) *Haematopinus* sp.
 - (b) *Linognathus vituli*.

B. Aracharida.

- (1) Ixodidae.
 - (a) *Rhipicephalus* sp.
 - (b) *Hyaloma aegyptium*.
- (2) Argasidae—argas persicus.
- (3) Sarcoptidae—sarcoptis—scabei—psoroptes communis—choriopes.
- (4) Demodecidae—demodex folliculorum.
- (5) Pentastomidae—linguacula taenioides.

PROTOZOOLOGY

Lectures

- Class I. Sarcodina—entamoeba sp.
- „ II. Ciliata—balantidium coli.
- „ III. Flagellata,
 - Trypanosomidae.
 - Trypanosoma evansi.
 - „ theileria.
 - „ equiperdum.
 - „ Spirochaetes—spirochaeta gallinarum.
- Class IV. Sporozoa.

A. Order coccidia.

- Emeria sp.
- Isospora sp.
- (2) Haemosporidia.
 - (a) *Piroplasma canis*.
 - „ gibsoni.
 - „ bigeminum.
 - „ mutans.
 - „ caballi.
 - (b) *Theileria parvum*.
 - (c) *Nuttalia equi*.
- (3) Haemoproteus.
- (4) Haemogregarina—haemogregarina canis.
- (5) Sarcosporidia—sarcocystis sp.

Practical—30 hours.

1. Methods of collection and preservation of parasites.
2. Examination of the more common parasites.
3. Staining and mounting of parasites.
4. Examination of faeces, scrapings and other materials for detection of parasites, their ova or larva.
5. Method to make culture from the ova of parasites.
6. Preservation of the ova of parasites.
7. Common staining methods for protozoan organisms.
8. Examination of blood smears.

PHARMACOLOGY INCLUDING MATERIA MEDICA. CLASS—A.

General definitions—materia medica—pharmacy—pharmacology—
toxicology—pharmacopia—B.P. and V. P.

Materia Medica.

Modes of administration of drugs—circumstances modifying the
action of drugs.

Definition of various terms used in Materia Medica to indicate actions
of drugs.

Anticeptics,—disinfectants—antizymatics—anthelmintics — antipara-
sitics—antiperiodics.

Irritants — vesicants—pustulants — escharotics—caustics — counter-
irritants—astringents—styptics—emollients—demulcents — diaphoretics—
anhydrotics—lithontriptics—antipyretics—antiemetics—laxatives—purga-
tives—emetics—cholagogues—anaesthetics—hypnotics—narcotics — seda-
tives—stimulatives—mydriotics—myotics—aphrodisiacs—emmanagogues
alternatives and tonics—carmainatives—traumatics.

Alkalies and alkaline earths—potassium—sodium — ammonium—
calcium—magnesium—barium.

Metals—aluminium—plumbum—zincum — cuprum — argentum—fer-
rum—hydrargyrum—bismuthum.

Metalloids—antimony—arsenic—phosphorus—chlorine — iodine—bro-
mine—sulphur.

Acids — acidum sulphuricum — nitricum — hydrochloricum — nitro-
hydrochloricum—chromicum—boricum — picricum — acidum—aceticum—
tartaricum—citricum.

Water—oxygen—hydrogen peroxide.

Carbon and its compounds. Carbo ligni and carbo animalis—carbon
disulphide—carbon tetrachloride.

Alcohol—chloroformum—aether—nitrous oxide gas—spiritus aetheris
nitrosi—amylnitro—nitroglycerine.

Collodium—chloral hydras—chloretone—sulphonol acetanilidum—
phenazoxum—phenasetinum—methylene blue—trypan blue—naphthalene
—naphthol—acriflavine—chinosol—salol.

Formaldehyde—hexamine—acid carbolic—creosotum—cresol cyllin—
lysol.

Iodoform.

Paraffins—durum—molle and liquid.

Acidum hydrocyanicum.

Organic.

The vegetable kingdom.—Aconite—colchicum opium—Indian hemp—
cocaine—eucaine—novocaine—stovaine—quinine and urea hydrochloride—
belladonna—hyoscyamus.

Tobacco—calabar bean—jaborandi—nuxvomica—caffeine—digitalis—
strophanthus—squill—cactin — ergot — Calumba — gentian — quassia—
aurantium hydrastis.

Aromatic volatile oils.—Oil of cloves—peppermint—anisi—cardamon,
ginger—oil of Eucalyptus—Oil Terebinthinae—terbene—resin—thymol—
venice turpentine—tar—camphor—benzoin—arnica—asafoetida.

Pepper—cubebs—buchu—mustard.

Vegetable purgatives.—Aloes—rhubarb—cascarasagrada—croton oil
—castor oil—linseed oil—ground nut oil—cocoanut oil.

Anthelmintics.—Malefern—santonin — Oleum Chenopodium—areca
semina—kamala.

Astringents.—galls—catechu—hamamelis.

Chrysarobium—Ipecacuanha—cinchona and quinine—acid salicylic—
yohimbine.

Olive oil—soaps—glycerine—treacle—syrup—tragacanth—gum acacia
—liquorice root—linseed—amylum.

Animal kingdom.—Lanolin—lard—gelatin—keratin—ichthyol—codliver
oil—honey—pepsin—nuclein—cantharidis—adrenalin—pituitary extract—
glandular extracts.

Common bazaar drugs.—Ajwan—sweet flag—abrus precatorius—betal—
butea frondosa—corriandar—cumin—dillseeds—embellic—myrobalams—
allium sativa—calotropiz gigantea—physic nut—soap nut—turmeric etc.

Note. The identification of all the above drugs must be taught then
and there.

Pharmacy.—A fair knowledge of the various pharmaceutical processes
such as levigation, maceration, percolation etc.

Knowledge of the various weights and measures and the symbols
used to represent them. The different systems of weights and measures
and the relation to each—domestic measures and weights—definitions of
the various terms used such as alkaloids—glucosides—saponins—fixed oils
—volatile oils—fats etc,

Definitions of the various pharmaceutical preparations such as
emulsions—pills—boluses—mixtures etc.

Prescription writing.

Practice of the various preparations in the pharmacy.

SURGICAL ANATOMY

Controlling and securing animals for operation.

The different methods of destroying animals.

Suturing—materials used—methods of suturing—continuous, inter-
rupted, pin, quill mattress, Ozerney, Lambert's buried.

The student will be given exercises in surface anatomy on all parts
of the horse, ox and dog and in exposing superficial nerves, vessels,
lymphatic glands etc. He will also undertake the following operations on
appropriate animals;—

The teeth—use of the toothrasp and tooth shears—extraction and
repulsion of teeth.

The tongue—amputation.
 The oesophagus—passing of probang—passing of stomach tube—oesophagotomy.
 The trachea—tracheotomy.
 The salivary glands—operation for salivary calculi in parotid duct.
 The head and the neck—trephining facial sinuses—amputation of the horn—operations for pole evil—yoke tumour and fistulus withers.
 The ear—operation for haematoma.
 The eye—operation for ectropion and entropion—puncturing the cornea—excision of the eye ball—extirpation of the membrana nictitans.
 The veins—phlebotomy—intravenous injections.
 The fore limb—excision of capped elbow—median, ulnar and plantar neurectomy—tenotomy of flexor tendons—amputation of claws or part of limb—line firing for sprained tendons—point firing for ringbone.
 The hind limb—operation for bog spavin—anterior and posterior tibial neurectomy—cunean and peroneal tenotomy—firing for bone spavin and curb.
 The foot—operations for sandcrack, side bone and quittor.
 The thorax—paracentesis thoracis.
 The abdomen—paracentesis abdominis—laparotomy:
 Puncture of the rumen—rumenotomy—operations for herniae.
 The male genital organs—passing the catheter—puncture of the bladder—urethrotomy—lithotomy—amputation of the penis—the different methods of castration.
 The female genital organs—passing the catheter—ovariotomy—hysterectomy—suturing the vulva—operations on the udder and teats.
 The tail—amputation.

HORSE-SHOEING

- I. Introduction.
- II. The form and action of the foot.
 The hoof—divisions of the hoof—the horny portions—the sensitive foot—growth of hoof The bones—the elastic structures—the foot as a whole.
- III. Preparation of the foot:—
 General principles—instruments—the overgrown foot—proportions of the foot—good bearing surface—treatment of sole and frog—faults and malpractices in preparing the foot—uneven bearing surfaces—paring the sole—rasping the wall.
- IV. Frog pressure and development.
- V. Foals and unshod feet.
- VI. The form and manufacture of shoes:—
 Materials—weight—thickness—width—foot and ground surfaces—stamping—fullering—concaving—rodway shoe—calkins—nails and nail-holes—machine-made shoes—prepared bar iron.

- VII. Selection of shoes:—
 Racing and steeplechase of plates—shoes for hunters—polo ponies—hacks—carriage horses—lorry—van and heavy draught horses—knocked-up toed shoe.
- VIII. Fitting and application of shoes:—
 Level of adjusted surface—outline and surface fitting—bevelling—wear of shoes—factors governing wear—clips—hot and cold fitting—tips—Charlier shoeing—nailing on shoes—clinchng.
- IX. Military shoeing:—
 Form and manufacture of army horse-shoes—hand and machine-made shoes—cold shoeing.
- X. Roughing or sharpening.—
 Necessity for and disadvantages of:—
 Frost nails—sharpening—tapping and screwing—cogs and studs.
- XI. Injuries from shoeing:—
 From nails—clips and from the shoe—corns—burnt sole,
- XII. Interference and injuries caused by the shoe—treads—brushing or cutting—speedy cutting—preventative anti-brushing shoes—wedged heel knocked up—feather edged—knocked down three quarter and donkey heeled shoes—advantages and drawbacks of preventative shoes—over-reaching—forging.
- XIII. Shoeing bad feet:—
 Flat feet—convex or 'dropped sole—sandcracks—contracted feet—seedy toe—turned in wall—twisted feet.
- XIV. Leather and rubber pads:—
 King leathers—frog pads—pneumatic pad—bar pad—rubbers—Gray's flexible bad pad.
- XV. Occasional shoes:—
 Bar, fenland, pattern.
 Fitzwygram, hinged—expansion and nailless shoes—side weights and toe weights.
 N. B.—Students will be practically taught how to remove shoes, how to prepare the feet and finishing.

SURGERY

1. Inflammation—its nature—causes—results—symptoms and general treatment.
 Abscesses.—acute and chronic.
 Ulceration.—Necrosis and gangrene.
 Sinus and fistula.
2. Wounds—varieties—symptoms and treatment—frost bite—burns and scalds.
 Complications or sequelae of wounds—syncope—shock—traumatic neuralgia—haemorrhagic—emphysema—venous thrombosis and embolism—ellulitis—crysipelas—septicaemia and pyaemia—malignant oedema—tetanus—actinomycosis—and botryomycosis.

- Cysts.—Causes—symptoms and treatment.
3. Affections of blood vessels.
- Arteries.—Wounds—aneurism—arteritis and arterial thrombosis—thrombosis of aorta and iliac arteries.
- Veins.—Wounds—phlebitis—venous thrombosis—excision of the jugular vein—varicose veins—air embolism—haematoma—haemorrhoids and haemorrhage.
4. Affections of lymphatic system.—Wounds—lymphangitis—and adenitis.
5. Affections of nerves tissues.—Traumatic lesions—effects of neurotomy—compression—contusion of nerves—suturing nerves—neuroma neuralgia—neuritis—neuroses—paraplegia—atoxia.
- Paralysis of the crural sciatic and tibial and external popliteal nerves.
- Stringhalt—shivering—and kumri.
6. Affections of bone.—Contusions—wounds of bone.
- Fractures.—varieties—symptoms—treatment—complications of fractures.
- Fractures of the various bones in the body.
- Fracture of the ribs with complications.
- Dislocations or luxations.
- Horns—fractures—shedding of the horn—fissure of the horn—malignant disease of horn core.
- Osteoperiostitis—osteomyelitis—caries—necrosis of bone—malignant disease of bone.
- Osteoma.
- Splint.—exostosis of knee joint—sore shin—exostosis—around fetlock joint—ring bone—sesamoiditis—spavin—sidebones—pyramidal disease.
7. Affections of Bursae.—Varieties of bursae—contusions and open wounds—bursitis and chronic.
- Synovial sheaths—contusion—open wounds—acute closed synovitis—chronic synovitis—purulent synovitis.
- True joints—contusion—sprain—open joint—septic arthritis—chronic synovitis of a joint.
- Individual cases of affections of bursae.
- Forelimb.—Capped elbow—capped knee—capped fetlock.
- Hind limb.—Point of haunch—subcutaneous bursa in front of patella—superficial capped hock—bog spavin.
- Affection of tendon sheath.—Extensor tendon sheaths in front of knee—extensor tendon sheath in front of fetlock.
- Flexor sheaths.—Carpal sheath—great sesamoidean sheaths—tarsal sheath—peroneal tendon sheath.
8. Affections of joints.—Forelimb—shoulder—elbow—radio carpal—carpal fetlock and pedal.
- Hindlimb.—hip—stifle—hock joint.
- Anchylolysis of joints.—Deformities in animals.
9. Affections of muscles.—(1) Functional and (2) Organic.
- Functional.—paralysis—spasm.
- Organic.—Myositis—atrophy—hypertrophy—degeneration.

- Sprains.—Biceps—shoulder slip—radial paralysis—triceps—mastoides—humeralis—sprained neck—pectoral muscles—flexor muscles—sprained back—psoas muscles—gluteals—quadriceps extensor—crureus—adductors, of thigh—rupture of flexor metatarsi muscle.
10. Affections of tendons and ligaments.—Contusions—open wounds—flexor tendons and suspensory ligaments, sprain of.
- Toxic tendonitis or tendo-synovitis—complete subcutaneous rupture of the perforatus—perforans and suspensory ligament—sprain of the inferior sesamoidean ligament—sprains of gluteal tendon—curb.
11. Affections of the feet in horses and cattle.—Navicular disease—coronitis—injuries to the foot—contusions—brittle hoof—soft sponge foot—contracted feet—sand crack—falsequarter—seedy toe—keratoma—corns—bruise of the sole—pricks in shoeing—nail bound—picked up nail—quit-tor—laminitis—canker—thrush—dropped sole—interdigital dermatitis—deformity of claws—foul in the foot.
- Surgical shoeing for the above.
- Sheep.—Foot sore—laminitis—interdigital boil—inflammation of the bifurcated canal—foot rot.
- Dog.—Tearing away the nail—inflammation of the nail bed—sore pads—interdigital cysts—eczema—foreign body in foot—growing in of the dew claws—tumours on the paws.
12. Affections of the teeth.
- Affections associated with temporary dentition—persistent temporary teeth—symptoms of mouth trouble.
- Irregularities of teeth.—Molars—sharp mouth—shear mouth—a wave formed mouth—step formed mouth—oblique mouth—premature wear of teeth—smooth mouth—caries—fissures in teeth—dental tartar—alveolar periostitis—dental fistula—tumours on teeth.
13. Affections of lips and cheeks.—Wounds—bites—twitch injuries—paralysis—bit injuries—injuries from sharp teeth—foreign body in mouth—ranula.
14. Affections of tongue.—Strangulation—wounds—paralysis—fracture of hyoid bone.
15. Affections of pole—neck—and withers.
- Pole evil—yoke gall—saddle gall—fistulous withers—collar gall—fistula in the neck.
16. Affections of the facial sinuses and nasal chambers.—Empyema of facial sinuses—foreign body in the nose—tumours in nasal chambers—linguistula taenoides in nasal chambers of dog—oestrus ovis in sheep.
- Chronic catarrh of the guttural pouches.
- Sturdy in sheep and cattle.
17. Affections of larynx and trachea.—Tumours in larynx—foreign body in larynx—tumour in trachea—perforating wounds of trachea—foreign body in trachea.

18. Affections of pharynx.—Wounds of pharynx—foreign body in pharynx—parasites in pharynx—retro pharyngeal abscesses—tumours in pharynx.

19. Affections of oesophagus.—Wounds—choking—impaction of crop in birds—dilatation—diverticulum—stricture or stenosis—tumours pressing on oesophagus—fistula.

20. Affections of salivary glands.—Wounds—fistula—salivary calculus—sub parotid abscesses—tumours.

21. Affections of thorax.—Costal fistula—sternal fistula.

22. Affections of abdominal wall.

Significance of wounds—penetrating wounds—varieties.

(a) Without prolapse or injury of abdominal organs.

(b) With prolapse of abdominal organs.

(c) With perforation of abdominal organs without prolapse.

(d) With prolapse and perforation of the exposed bowel.

Abdominal hernia.—

(1) External abdominal hernia (2) Internal abdominal hernia.

Varieties of contents—enterocele—epiplocele—entero epiplocele—hernia fluid.

Reducible hernia—irreducible hernia—incarcerated—strangulated—umbilical—inguinal—scrotal—false inguinal—crural—ventral—perineal.

23. Affections of rectum and anus.

Congenital abnormalities, (a) Absence of rectum and anus (b) absence of anus (c) presence of rectum and anus but separated by a thin partition or communicating by a narrow orifice and (d) A constricted anus.

Injuries of rectum and anus—abscess in recto-anal region and fistula.

Prolapse of anus and rectum—varieties (a) Prolapse of anus (b) Prolapse of anus and rectum (c) Prolapse of anterior part of rectum only or small colon invagination of bowel appearing behind the anus, and (d) Prolapse of the posterior part of the rectum and anus and invagination of the anterior part of the rectum into this prolapse.

Stenosis of the anus and rectum—dilatation of the anus and rectum—paralysis of rectum and anus.

24. Affections of urinary organs.

Epispedia and hypospedia—operation for urinary calculi—removal of stone from bladder—urethral calculus in ox.

Ischial urethrotomy—puncture of the bladder—indications—procedure—injuries to bladder—foreign bodies in bladder—paralysis of the bladder—inversion of bladder—prolapse of bladder—stricture of the urethra.

25. Affections of male organs of generation.

The penis and prepuce—balanitis—phimosis and paraphimosis—accumulation of smegma in urethral fossae—inflammation of prepuce in carnivora—injuries to penis—tumours on prepuce—tumours on penis.

The testicles and scrotum.—Abnormalities—retention of testicle—orchitis and epididymitis—tumours of testicle—hydrocele—varicocele,

26. Affections of female organs.—Vagina and vulva injuries—rupture of the perineum—recto-vaginal fistula—thrombus or haematoma of vagina—cyst in vagina—tumours of vagina—wounds of uterus—white heifer disease—ovarian cysts.

27. Mammary gland.

Abnormalities congenital and acquired—occlusion of the ducts of teats—polypus in the sinus or duct of the teat—traumatic lesions—contusions—open wounds—milk fistula—fissures or cracks on teat—congestion of mammary gland—overstocking—calculi—warts on teats—mammitis—conditions requiring surgical interference—mammary tumours.

28. The eye.

Methods of examination :

1. Examination of conjunctival cul-de-sac.
2. " eye without aid of instrument.
3. " by lateral light.
4. " direct light using ophthalmoscope.
5. " by indirect light with ophthalmoscope.
6. " catoptric test.

Affections of eye—Warts on eye lids—wounds of eyelids—entropium—ectropium—trichiasis—porosis—ankyloblepharon—symblepharon—stye or hordeolum.

Conjunctivitis—cause—varieties :—

- (a) Catarrhal.
- (b) Purulent.
- (c) Follicular.
- (d) Granular and
- (e) Diphtheritic—symptoms—treatment.

Keratitis—varieties :—

- (a) Interstitial.
- (b) Ulcerative.
- (c) Vascular—and
- (d) Suppurative.

Staphyloma—keratocele.

Opacities of cornea :—

- (a) Nugula.
- (b) Albugo.

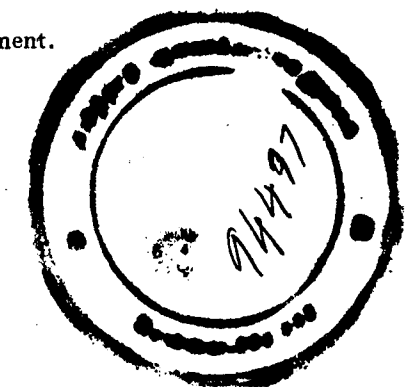
Iritis—iridectomy—choroditis.

Specific opthalmia in horses and cattle.

Cataract—dermoid cyst in eyeball—panopthalmia—glaucoma—hydrophthalmia—lachrymal fistula—obstruction of lachrymal duct inflammation of lachrymal sac—eyeball—dislocation—contusion—burns—carcinoma.

29. Affections of the ear.

Wounds—abscess—ulceration—paralysis of muscles—haematoma.



SOUNDNESS.

Soundness and unsoundness—definition—warranty—insurance—breeds of horses—description and distinguishing features of each—colour of horses—recognition marks—measurement of horses—age of horses.

The systematic examination of animals.

General observation—inspection from all sides—determination of colour—breed—sex—height—age—notation of recognition marks—manipulation and examination of all parts—auscultation of lungs and heart—taking of pulse—respiration and temperature—tests for eye sight—wind—and lameness.

Forms of certificates—diseases—ailments and defects which constitute unsoundness—defects not necessarily constituting unsoundness.

Vices—Crib-biting—wind sucking—weaving—shying.

Veterinary jurisprudence—responsibility for certificates—the giving of expert evidence—criminal cases—private cases—professional etiquette—fees.

OBSTETRICS.

The obstetric anatomy.—The pelvis and the generative organs.

The obstetric physiology.—Maturation of the ovisac—embryology.

Pregnancy or gestation.—The form of the pregnant uterus—the position of the foetus in the uterus—the diagnosis of pregnancy—menstruation—cessation of oestrus—the uterine seat—palpation of the uterus—etc.—per rectum, the corpus luteum of pregnancy—abdominal ballotment—auscultation of the foetal heart.

The duration of pregnancy of the domestic animals—the number of foetuses in the domestic animals—twin pregnancy and its diagnosis.

Anomalies in fecundations.—such as superfecundation—super foetation—the wandering of the genital cells.

The diseases associated with pregnancy.—Pica—cramp—constipation—oedema—hydrops-amni—amaurosis—paraplegia and albuminuria.

The antipartum accidents.—Prolapse of the vagina—rupture of the prepubic tendon—hysterocele—antipartum rupture of the uterus—haemorrhage from the gravid uterus, abnormal retention and mummification of the foetus and sporadic abortion.

Physiologic parturition.—Symptoms of parturition—expulsion of the foetal membranes and involution of the uterus—physiologic presentations and positions of the uterus and management of normal parturition.

The care of the new born animal.

Dystokia—equipment for obstetric work—position—control—examination—of dystokia—prevention of infection during the operation and general handling of dystokia.

Obstetric operations.—Mutation—forced—forced extraction—embryotomy—gastro hysterotomy and hysterectomy.

Maternal dystokia.—Tumultuous or precipitate labour—dystokia due to displacement of uterus—torsion of the uterus—pelvic dystokia—

dystokia due to induration of the cervix—stricture of the vagina—vulvar constriction—persistent median wall—malignant and other new growths.

Foetal dystokia.—Abnormalities in the development and primary diseases of the foetus—foetal ascitis—anasarca—emphysema of the foetus—hydrocephalus—wryneck in the foal—monstrosities.

The development of the normal foetus in abnormal positions—transverse (sterno-abdominal) presentation and transverse (dorso-lumbar presentation).

(a) Anterior presentation.—Dorso sacral and dorso pubic position—deviations of the head and neck—lateral—down and upward deviations of the head—deviations of the limbs in the anterior presentations—flexion of the anterior limbs at the elbow—carpal flexion—complete retention of one or both forelimbs—the forelimbs crossed over the neck—dog sitting (anterior presentation).

(b) Posterior presentation.—Lumbo sacral and lumbo pubic presentation—hock presentation and breech presentation.

Accidents following parturition.—Retention of the foetal membranes—postmortem haemorrhage—rupture of the uterus—vagina—the perinium—the bladder—the rectum—the intestine and the diaphragm—vesico vaginal fistula—haematoma of the vulva—prolapse of the uterus—the vagina—the rectum and the bladder.

Puerperal infection.—Acute and chronic metritis—metroperitonitis—vaginitis—parturient laminitis—parturient tetanus.

Puerperal eclamptic diseases.—Eclampsia in the mare—cow and bitch—milk fever.

Diseases and accidents of young stock.—

Non-infectious diseases—general weakness—retention of the muco-nium—umbilical haemorrhage—pervious urachus—imperforations—indigestion and diarrhoea.

Sterility.—Its causes and treatment.

THERAPEUTICS AND TOXICOLOGY**A. Semiology.**

General remarks on case taking and diagnosis—history of the case—general appearance of the patient—pyrexia—anoxia symptoms furnished by visible mucous membranes—palpation—percussion and auscultation.

The pulse—alterations in character—action of the heart.

Respiration—different types—physical examination of chest—nasal discharge.

Symptoms furnished by digestive organs.—Salivation—arrest of salivary secretions—alterations in buccal mucosa—foetor oris—constipation—diarrhoea—vomiting—eructations—cessation of rumination—grunting.

Pain.—Attitudes and postures assumed by patient—physical examination of abdomen.

Symptoms connected with micturition.—Dysuria—strangury—retention of urine—incontinence of urine.

Examination of urine.—Albuminuria—haematuria—haemoglobinuria—glycosuria—pyuria—bile pigments in urine.

Symptoms in connection with the nervous system.

Symptoms furnished by the surface of the body and extremities—rigor—sweating—coldness of the extremities—oedema of the limbs—dropical swellings.

X-rays as an aid to diagnosis.

B. General Therapeutics.

The course—complications—terminations and sequelae of disease—prognosis.

Temperature charts—crisis of disease.

General principles governing treatment—rational and empirical therapeutics—specific remedies and their limitations.

Nursing.—The care and feeding of sick animals—nutrient enemata—clothing.

The internal administration of therapeutic agents—drenches—stomach tube—pills—powders—electuaries—inhalations—suppositories—pessaries—enemata—injections—hypodermic—intradermic—intravenous—intratracheal—intraperitoneal—intramammary—intrauterine and intra-thecal.

Drug therapy.—The pharmacological action of the following drugs on the different organs and functions of the body.

The mouth and salivary glands.—Sialagogues, antisialics, demulcents.

The stomach.—Stomachics—gastric stimulants—gastric sedatives—gastric astringents—gastric tonics—carminatives—emetics—antacids—gastric antiseptics.

The intestines.—Purgatives—intestinal astringents—intestinal antiseptics.

The liver.—Chologogues.

The urinary organs.—Diuretics—vesical sedatives—vesical tonics—lithontriptics—urinary antiseptics.

The generative organs.—Aphrodisiacs, anaphrodisiacs—ecbolics.

The mammary glands.—Galactagogues—antigalactagogues.

The circulation.—Cardiac stimulants—cardiac tonics—cardiac depressants—vaso constrictors—vaso dilators.

The respiratory organs.—Expectorants—respiratory stimulants—respiratory sedatives.

The eye.—Mydriatics—myotics—antiseptics.

Tissue change.—Tonics—hæmatinics—alteratives—febrifuges.

The skin.—Sudorifics—anhidrotics—diaphoretics.

The surface of the body.—Counter irritants—cold and hot applications—poultices—caustics—styptics or hæmostatics—astringents—emollients.

The nervous system.—Cerebral stimulants—cerebral sedatives—hypnotics—narcotics—anodynes—antispasmodics—anaesthetics—spinal stimulants—spinal depressants.

Anaesthesia.—General remarks—the merits and demerits of chloroform—ether—A.C.E. mixture—chloral hydrate, etc.—methods of administration to the different animals.

The different stages of chloroform anaesthesia—danger signals—antidotes—artificial respiration.

Local anaesthetics—agents—suitable and indications for use—Cocaine and its derivatives.

Vaccine and serum therapy—agents used in local diseases—auto-genous vaccines.

Chemo therapy—the synthetic drugs used in veterinary practice.

Organo therapy—endocrinology—the actions of thyroid—pituitary—suprarenal and ovarian extracts.

Other forms of therapy, e.g.—radio and oxygeno therapy and their application to local diseases.

C. Special Therapeutics.

The morbid anatomy—macroscopic and microscopic (where necessary),—symptoms—diagnosis and treatment of the following diseased conditions:—

The digestive system.—Stomatitis—glossitis—ptyalism—pharyngitis—spasm and stricture of the oesophagus—tyimpanitis—impaction of the rumen and omasum—gastritis—rupture of the stomach—omasitis—abomasitis—indigestion—enteritis—colic—volvulus—intussusception—impaction of colon—constipation—diarrhoea—seasonal diarrhoea in cattle,—superpurgation—dysentery—calculi.

The liver.—Congestion, hepatitis—fatty liver—cirrhosis—jaundice.

The peritoneum.—peritonitis—ascites.

The respiratory system.—Catarrh—coryza—laryngitis—whistling and roaring—bronchitis—asthma—congestion of the lungs—pneumonia—pleurisy—emphysema and broken wind—atalectasis—hydro thorax—pneumo thorax—anthracosis.

The circulatory system.—Pericarditis—endocarditis—hypertrophy—dilatation and rupture of the heart—valvular disease—cyanosis—syncope—arteritis, phlebitis, aneurism, leucocythaemia.

The Lymphatics.—Lymphangitis—lymphadenitis.

The kidneys and bladder.—Congestion—nephritis—cirrhosis of the kidneys—calculi—haematuria—haemoglobinuria—albuminuria—cystitis—spasm—stricture and rupture of the bladder.

The nervous system.—Delirium—convulsions—coma—paralysis—paraplegia—hemiplegia—hyperaesthesia—cerebral congestion—staggers—apoplexy—epilepsy—eclampsia—chorea—meningitis.

The eye.—Conjunctivitis—opacity of cornea.

The ear.—Otorrhoea—canker.

Mammary glands—genitals and umbilicus.—mammitis—metritis—omphalitis—balanitis.

Non-parasitic diseases of the skin.—Erythema—urticaria—eczema—dermatitis—prurigo—psoriasis.

Deficiency diseases.—Avitaminosis—calcium deficiency—rickets—osteoporosis—goitre.

Unclassified diseases.—Rheumatism—azoturia—diabetes—purpura—haemorrhagica—heat stroke—night blindness in cattle—non-sweating in horses.

D. Toxicology.

Definition of a poison—general chemistry of poisons—conditions governing their action—absorption—distribution—accumulation and elimination—individual idiosyncrasy.

Classifications of poisons.—Corrosives—irritants—narcotics.

Diagnosis.—General treatment and preservation of materials for examination.

The sources—symptoms—postmortem appearances and antidotal treatment in:—

(a) Mineral or inorganic poisons.—Arsenic—antimony—lead—mercury—copper—zinc—silver—phosphorus—acid—salkalies—chlorine—iodine—carbon dioxide—carbon monoxide.

(b) Organic poisons.—Prussic acid—carbolic acid—strychnine—morphine and opium—cocaine—eserine—pilocarpine—emetine—cannabis indica—santonin—turpentine—camphor—alcohol—oil of chenopodium—cantharides—picrotoxin—carbon tetrachloride—etc.

(c) Poisonous plants.—Abrus precatorius—nerium odorum—cerebra thevetia—ricinus communis—croton tiglium—atropa belladonna—calotropis gigantea—hyoscyamus niger—datura stramonium—nicotina—tabacum, digitalis purpurea—lathyrism.

(d) Diseased moulds and food—ustilago carbo—puccinia graminis—claviceps purpurea—ptomaine poisoning—botulism.

(e) Foods reported to be poisonous—cotton seed cake or meal—brewer's and distiller's grains—horse gram—cholam or juarsoya meal.

PREVENTIVE MEDICINE.

A. General.

Definition of—sporadic—contagious—epizootic—enzootic—etiology—period of incubation—pyaemia—septicaemia—toxaemia—antiseptic—germicide—disinfectant—deodorant—anthelmintic.

Vermifuge—parasiticide.

Sanitary law—State control of contagious diseases.—Acts applicable in India.

Fever—Simple and specific—classical symptoms in each animal.

Specific diseases.—Pyaemia—septicaemia—malignant oedema—rinderpest—contagious bovine pleuro pneumonia—foot and mouth disease—rabies—distemper—canine typhus—equine influenza—lymphangitis—anthrax—glanders—tuberculosis—black quarter—the variolae—strangels—

fowl cholera—the hæmorrhagic Septicæmia—tetanus—contagious pneumonia of calves—South African horse sickness—contagious mammitis—joint ill or naval ill—malignant aphtha—contagious abortion of cows—contagious abortion of mares—bovine lymphangitis—actinomycosis—nasal granuloma—Jones disease—Swine fever—swine plague—swine erysipelas—coccidiosis of the ox, rabbits, birds—texas fever—east coast fever—biliary fever of horses—malignant jaundice of dogs—European redwater—theileriasis—trypanosomiasis—surra—nagana—dourine—mal de caderas.

B. Prevention of the spread of disease—Isolation—quarantine—notification—prophylaxis—cleaning and disinfection.

Disinfection—disinfectants—antiseptics—deodorants—fresh air—wind—sunlight—heat—electricity—disinfection by heat—dry heat—moist heat—hot water—steam—superheated steam—steam under increased pressure—steam under reduced pressure.

Chemical disinfectants.—Perchloride of mercury—bleaching powder—lime—slaked lime—formaldehyde—tar—coal tar—carbolic acid—cresol—lysol—creolin—carbolic powders.

Fumigation.—Sulphurous acid gas—chlorine gas—formaldehyde—the potas permanganas method—standardisation of disinfectants. Disinfection of stables—cowsheds—piggeries—etc. Mange—strangles—influenza—pneumonia—swine fever—anthrax—rinderpest—foot and mouth disease.

Disinfection of harness—drains—cattle and horse trucks.

Disposal of carcasses: Chemical digestion—cremation—burial.

C. Meat and Milk Inspection:—

(a) Meat inspection—objects—necessity for regulation and inspection—methods of inspection—ante-mortem and post-mortem.

Slaughter houses—methods of slaughter and dressing of carcasses—rigor mortis and the setting of meat,

Normal condition of carcasses—dressed weight—distinguishing features of different species—classification of meat and butcher's parts.

Frozen meat—chilled meat—salted and pickled meat—substitution of falsification of flesh.

Changes in carcasses not properly slaughtered—suffocation—fatigue—animals killed in a morbid condition—fevered flesh—foetal flesh—defective bleeding.

Diseased conditions caused by bacteria and parasites—parts to be condemned—disposal.

Putrefaction—phosphorescent meat and flesh—"blown" meat—condition rendering the flesh innutritious—emaciation and "slink" meat.

(b) Milk inspection—appearance and composition of normal cow's—buffaloo's—and goat's milk—adulterants and their detection—colostrum.

Methods of milking—cleanliness of milkmen—sterilization of utensils.

Bacteriology of milk—normal—bacterial content—sources of contamination—diseases of the udder and their recognition—communicable diseases of the udder and their recognition—communicable diseases—other milk borne diseases.

Products of milk—skimmed milk—butter milk—butter—ghee—cheese—etc.

Souring and clotting of milk.

Preservation—storage and transmission of milk and its products—refrigeration—pasteurisation and boiling.

HYGIENE

Definition and general introduction.

I. Water.

Rain water—surface water—brooks—streams—rivers—wells—shallow, deep and artisan springs—ice water—distilled water—utility of water from various sources—classification of waters—hardness of water—significance of hard and soft waters—softening of hard water—action of water on metals—storage of water—filtration of water—sand filtration—mechanical filtration—sterilisation of water—amount of water required by animals—effect of sewage polluted water on animals—examination of water and water supplies—collection of samples—physical—microscopical—chemical and bacteriological examinations—interpretation of results.

II. Sanitation.

Drainage systems—drain pipes—stoneware—fireclay—cast iron pipe connections—junctions—access covers—size of pipes—gradient of pipes—traps—definition of a good trap—Mason's trap—Buchin's trap—raking arms—gully traps—bell trap—grease trap—joining pipes and fittings—comparison between fireclay and cast iron pipes and fittings—laying drains—defects testing drains—air test—smoke test—hydraulic test—smell test—drainage system for habitations—surface drains—under ground drains—disposal of manure—solid and liquid—liquid manure tanks—disposal of sewage—dry method—wet method—cesspools—surface irrigation—sewage farming—intermittant filtration—chemical treatment—electrolytic method—biologic method.

III. Air Ventilation.

Air.—Composition of air—pollution—oxygen decrease—carbon dioxide increase—signification of carbon dioxide—heat and humidity—organic and suspended matter—bad effects of impure air.

Ventilation.—Amount of air required—cubic space—general principles of ventilation—natural ventilation—size of air inlets and outlets—methods of ventilating buildings—inlets—wall windows—tobin tubes—inlet pipes—air bricks—hit and miss windows—outlets—Findlay's system—sky light—ridge ventilators—outlet shafts—extraction cowls—louvre-board ventilators—mechanical ventilation—plenum method—vacuum method—ventilation of double storied stables—the king system of ventilation—testing the efficient of ventilation—estimation of carbon dioxide—Angus Smith method—lunge—Zechadoroff method—suspended matter—bacterial content—physical state of atmosphere in a building.

IV. Building Construction and Animal Habitations.

Choice of sites.—Farm buildings—town buildings—arrangement of farm buildings on the site.

Building materials.—Bricks—tiles—building stones—igneous rocks—sedimentary rocks—slates—limes—mortars—cements—concrete—asphalts—felts and bituminous roof coverings—timber for building purposes—defects in timber—characters of good timber.

Construction of walls.—Brick walls—stone walls.

Construction of roofs.—couple roofs—framed roofs—steel trusses.

Construction of floors.—Foundations—bottoming—cement—concrete—whinstone and granite sets—paving bricks—asphalt—porous bricks—wood.

Construction of stables for horses.—Arrangement of stalls—passage—air space—ventilation and lighting—flooring—walls and doors—stall divisions—bails—mangers—hayracks—waterpots—yard troughs—loose boxes—horse fastenings—harness room—food store and food preparation room—artificial light.

Construction of cow sheds.—Types of byres and general arrangement of stalls—slope of stalls—flooring of stalls—drainage of byres—milking passage—air space—floor space—food troughs—watering—stall divisions—lighting and ventilation—walls—door ways—food and manure carriers—securing cows—calf houses—food preparation room—milking shed—milk house.

Construction of piggeries.—Types of piggeries and general arrangement—lighting and ventilation—fitting of pens.

Construction of dog kennels.—rabbit hutches—poultry houses—duck and goose pens.

V. Animal Nutrition and Veterinary Dietetics.

1. Comparison and functions of foods.

General analysis—water—succulent and non-succulent foods—carbohydrates—crude fibre—soluble carbohydrates or nitrogen-free extract—monosaccharides—disaccharides—polysaccharides—starch—cellulose—lignin—cutin—dextrose—glycogen—gums—mucilage—etc.—fat or ether extract—the proteins—crude protein—true protein—non protein—nitrogenous substances—nitrogenous concentrates—aminoacids—classification of proteins—simple proteins—conjugated proteins—glucosides—alkaloids.

Functions of food constituents.—Water—nitrogen—crude fibre—fat—protein—minerals—mineral elements of the body—the role of minerals in nutrition—mineral requirements of animals—mineral composition of foods—mineral composition of pastures—minerals and the pig, cow, sheep, poultry etc.—the relation of minerals to disease—vitamins.

2. The foods.

(a) Grains and seeds:—

Oats. Composition of oats and by-products—varieties—foreign oats—clipped oats—kiln dried oats—bleached oats—weathered and musty oats—

new oats—germinated oats—milling of oats—by-products—screenings—oat husks—meal seeds—screen and oat dust—oat meal—oat flour—rolled oats—oat chaff—oat chippings—Sussex-ground oats—bruised oats.

Wheat.—Composition—kinds of wheat—wheat offal—barn—pollards sharps—midlings—thirds—parings—toppings—germ screenings.

Barley.—Composition—barley meal—pot and pearl barley—barley dust—barley feed—brewer's by-products—brewer's grains—distiller's grains.

Maize.—Composition—varieties—maize preparations and by-products—flaked maize—maize meal or Indian meal—maize germ cake—maize gluten meal—maize gluten feed or Paisley meal—corn and cob meal.

Rice.—Composition—rice meal—rice bran—rice slump—dari seed—millet—rye.

The leguminous seeds or pulses.—Beans—peas—locust beans—gram—lentiles—kulthi—muth—mung—ured—bajri and jowari.

C. *The forage plants* :—

Some common grasses in South India :—

Andropogon monticola.

„ *annulatus*.

„ *punilus*.

Cynodon dactylon.

Digitaria sanguinalis.

Eriochloa polystachya.

Panicum colonum.

„ *javanicum*.

„ *crus-galli*.

„ *prostratum*.

„ *ramosum*.

Pennisetum cenchroides.

Setaria verticillata.

Medicago sativa.

Hay.—Hay making—nutritional value of hay—varieties—ensilage—preparations—types of silage—silos—feeding of silage.

Grass land.—Management of pastures.

Roots, tubers—etc.—Turnips—seeds—mangolds—beets—potatoes—carrots—cabbages.

(c) The straws.—Oat—wheat—barley—rye—paddy—digested straw—chaff—cavings.

(d) Oil cakes and meals.—Methods of manufacture—pressure solvents—expeller—cocoanut—cotton seed—groundnut—linseed—palm kernel—rape—sesame—soya bean—soycot—compound cakes.

(e) Animal products.—carcase residues—meat meal—meat and bone meal—bone meal—blood meal—fish meal—milk and its by-products—composition of milk of different animals—separated or skim milk—butter-milk—whey—lactose residues—colostrum.

(3) The nutritive value of food.—Energy—cross energy—metabolisable energy—net energy—starch equivalent—maintenance starch equivalents—production starch equivalents—food units—monetary value of foods—manurial value of foods—nitrogenous ratios—fatty ratios.

(4) Preparation and storage of foods.—Cooking and heating—dampening—soaking—grinding—crushing—preparation of roots—cutting or chaffing hay and straws—storage of grains—cakes—meals—potatoes and roots.

(5) The feeding of animals.—

Maintenance rations of animals.

Feeding dairy cows—general principles.

Bulk—minerals water—palatability—effects of foods on cow and foetus—effect of roots—foods affecting milk and butter—requirement for maintenance—requirement for milk production—requirement for foetus—feeding cows preparatory to calving—feeding after calving—wet and dry feeding—constructing rations—examples of rations—general management in cow sheds.

Calf rearing.—Treatment of new-born calf—systems of calf rearing—natural and artificial rearing—points in calf management—feeding for veal.

Fattening of cattle.—Fattening of store cattle on pasture—fattening in courts or stalls—food requirements for fattening—bullocks—production of baby beef.

Feeding of horses.—Food requirement of working horses—coarse fodder—stable management—nitrogenous ratios—watering—choice of foods—rations for work horses—feeding during idleness—feeding on pasture—feeding mares in foals—feeding foals—feeding mine animals.

Feeding of pigs.—Feeding breeding stock and young pigs—feeding for pork and bacon.

Feeding of sheep.—Methods of sheep feeding.

Feeding of dogs.—Methods of feeding—composition of dog biscuits—nutritive requirements of dogs.

Feeding of poultry.—Foods given to poultry—grains—meals—concentrates—vegetables—methods of feeding—chickens—ducks—geese—turkeys.

(6) Some harmful foods.—Mouldy and decomposed foods—mow-burnt hay—new grains—dried brewer's grain—lathyrus peas—foods containing cyanogenetic glucosides—flesh products—fishmeal—cotton seed—castor seed—soya beans—ergot—salt poisoning.

VI. *The Care and Management of Animals.*

A. *Care of the body.*

(a) Care of the skin.—Cleaning—grooming—washing and bathing—shearing and clipping—blanketing and bandaging—dipping

(b) Care of the legs, hoofs, and horns.

(c) Care of animals during land and sea transportation.

B. *The management of animals.*

(a) Stable tricks and vices and how to prevent them—teatening or weaving—hiccoughing—windsucking—crib-biting—biting—tearing the

clothing—kicking—gnawing the walls and eating their own droppings—bawling—masturbating:

(b) Management of working horses.—Age at which horses are put to various kinds of work—breaking and training—amount of work—treatment after strenuous work—fit of harness and saddlery—bedding.

(c) Management of working bullocks.—Selection of oxen—hours of work for oxen—pace of working oxen—care of oxen during wet weather—care of the neck—feeding and watering of working oxen—yokes—selecting oxen for a pair.

(d) Management of dairy cattle.—Housing—feeding—milking—etc.

(e) Management of wool-producing sheep.—Care of the wool—time of shearing—care after shearing.

(f) Management of sick animals.—Housing—feeding—clothing exercise—etc.

VII. Genetics.

The breeder—suitability of locality and climate—suitability of surroundings—water supply selection of type.

General principles of breeding.—Variation—causes of variation.—heredity—inheritance and variation—prepotency—heredity and diseases—fecundity—œstrum—maturity—sex—nutrition—selection in breeding—outbreeding—the mendelian theory in brief outline—telegony—period of gestation—period of lactation—signs of pregnancy.

Horses.—Selection of stallions and mares—age at which to breed—prevention of injuries to stallions and mares during service—feeding and exercise of stallions—care of foaling mares—their feed and exercise—foaling—care of the foal—weaning the foal.

Cattle.—Selection of bulls and cows for various purposes—milk production—work purposes—beef—age at which to breed—food and exercise of breeding bulls—care of cows before and after calving—their feeding and exercise—calving—care of calves—weaning.

A short description of the more prominent Indian dairy breeds—Delhi or Munah buffaloes—Surti buffaloes—Jaffrabadi buffaloes—Sindi cow—Gir cow—Mewati cow—Montgomery cow—cross breeds.

A short description of the more important breeds of cattle in the Madras Presidency:—

Amritamahar—Punganur—Alambadi—Kangayam—Nellore.

Association News.

THE MYSORE VETERINARY MEDICAL ASSOCIATION.

The following resolutions were unanimously passed at the meeting of the Managing Committee of the Mysore Veterinary Medical Association held at "Mashie Lodge," Lal Bagh Road, Bangalore, on the 15th September 1930.

1. That in pursuance of the resolution passed unanimously at the meeting of the General Body on the 29th May 1930, and in view of the fact that the Government of his Highness the Maharaja have been graciously pleased to permit the holding of the Seventh Conference of the All India Veterinary Association at Bangalore, and to sanction a sum of Rs. 1,000 towards the expenses, it is resolved to invite the All India Veterinary Conference to hold its sessions at Bangalore during the ensuing Christmas week.
2. Resolved that a Reception Committee of all the members present, with powers to add and Major Simpson as its Chairman, be formed to make all necessary arrangements for holding the conference at Bangalore.
3. Resolved to recommend the name of Colonel Olver, C. B., C. M. G., F. R. C. V. S., Expert Adviser in Animal Husbandary to the Government of India for nomination to the Presidentship of the ensuing conference, by the provincial associations.
4. Resolved that the Dewan Sahib be requested to open the conference.
5. Resolved that the Managing Committee of the All India Veterinary Association be requested to invite all the provincial committees to send as many delegates as possible to make the conference a fully representative one.
6. Resolved that the Editor of the Indian Veterinary Journal, be requested to invite all the Provincial

Branches to send as many professional papers as possible to the Secretary, Reception Committee to reach him before the 15th Nov. 1930, to enable the latter to get them printed for distribution with a view to facilitate discussion.

K. RANGANATHA RAO,
Secretary.

R. W. SIMPSON, MAJOR,
President, M.V.M.A.

[We have since received a wire from the General Secretary, All-India Veterinary Association, fixing the dates of the Conference on 27th, 28th and 29th December 1930.—E.D.]

Correspondence.

(We have received the following letter from an esteemed correspondent and we publish it gladly. The editorial in this issue also deals with the same subject.—Ed. I. V. J.)

The Revision of Curriculum in the Madras Veterinary College.
SIR,

The Government Order recently passed on the revision of the curriculum of studies in the Madras Veterinary College, and published in the Madras dailies and in the last issue of your esteemed journal, came as a painful surprise to the Veterinary Profession in India in general and in Madras in particular. The profession, in its numerous conferences and meetings held all over the country for over a decade has been pressing on the attention of the powers-that-be, the fact that the curriculum of studies introduced over a quarter of a century ago should be revised without delay and improved to keep abreast of the growing science and the period of training should be extended to four years as the present 3 years are quite insufficient to cover up and do justice to the subjects as included even in the present course. It has been further urged that the whole standard of Veterinary Education in this country should be at least equal to that of the Royal College of Veterinary Surgeons in Great Britain and Ireland, so that the Indian youths may be able to get at least as high a standard of Veterinary Education as the British youths. The present course, as already said, is over a quarter of a century

old, and as such is most antiquated, unsuited and insufficient to the present pressing needs of the country.

During the ministry of Mr. A. Ranganatha Mudaliar in this presidency in 1927, it was openly said that arrangements had far advanced to raise the curriculum and extend the course of studies from the present three years to one of four years from July 1928. These arrangements had the hearty support and co-operation of the then Principal of the College and of the then Veterinary Adviser to the Government. But, when Mr. Ware returned to Madras as Veterinary Adviser to the Government, he seems to have pressed the postponing of the opening of the expanded course from 1928 to 1929 or to some later period on the ostensible ground of insufficiency of well trained staff to undertake the work of teaching the new curriculum. But, there was a shrewd doubt in some quarters whether this postponement augured well for the future of the Veterinary Education at any rate in Southern India. Whatever may be the intention of the authority that pressed for the postponement of this much needed introduction of revision, the fact now remains that that step has produced a tragic effect on the future of the Veterinary Science in this country. It was even doubted that this suggestion to postpone came in anticipation of the recommendations of the Royal Commission on Agriculture in India, according to which only a short course of two years would suffice in all the existing Indian Veterinary Colleges, and in only one institute, an expanded course of five years should be introduced. In your numerous reviews on the Royal Commission report, you have well pointed out, the shallowness of these recommendations and urged the importance of introducing an expanded course of four years in all the existing institutions of this country. How the worthy gentlemen on the Commission failed to understand the exact Veterinary needs of the country can only be explained from the fact that no experienced and independent Indian Veterinary Surgeon was invited by the Commission to enlighten its members on the real needs. The Veterinary Advisers and other official witnesses have not in one voice asked for this improvement in Indian Veterinary Education but seem to have been satisfied with the existing state of things depending upon the supply of Veterinary Graduates

from British Colleges for all the superior work to be done in this country. The recommendation of the Royal Commission in this respect is unfortunately highly retrogressive, is plain to any thinking mind. The Indian Veterinary Colleges have been built at a great cost to the Agriculturists. Some of them have been well equipped.

The Punjab Veterinary College has got a four years' course now for the past some years. All the other colleges have a three years' course; the subjects taught are vast and numerous, and as such the pupils of the latter colleges have hardly time to read the text books and assimilate the knowledge imparted therein. As this has been the experience of all the Indian Veterinary Surgeons who have gone through these institutions and as most of the staff in them have also felt the need for the expansion, they are not tired of bringing this matter to the prominent notice of the authorities concerned, but the latter have turned a deaf ear to these representations from the Indian Veterinary Profession. Evidently every province that has a Veterinary institution feels its position awkward now and is unable to take a step forward and open the expanded course or to take a retrograde step of curtailing even the present insufficient and over-cramped three years' course to a two year' one. It is very difficult even for the newly started Imperial Council of Agricultural Research to decide the Veterinary needs of which province are greater than the rest of the provinces in India to claim for the introduction of a superior training of five years in her institution to the exclusion of all the others. Similarly, it is difficult for this Council to decide which of the existing colleges should sacrifice even their present insufficient three years' course to one of two years. The Council is fully aware of the geographical vastness of the country and her varied needs.

When Great Britain and Ireland have got about half a dozen Veterinary Colleges imparting a training of four years, that the latest Royal Commission should have thought it wise to recommend the establishment of only one college of similar type for the whole of India and to reduce the courses in all the other existing colleges to one of two years looks like a huge joke at the cost of the Indian ryot. The enormity of this retrogressive recommendation can be well seen when we

notice that Great Britain has not been satisfied with the present four years' course in her colleges but has been making huge attempts to revise the course of studies prescribed for the Royal College of Veterinary Surgeons by introducing a five years' course. This movement is being led by such great savants in Veterinary Science as Sir John M'Fadyean, Principals Hobday, Share Jones and others. And this is much for an industrial country like England. Whereas for India mainly an agricultural country with her vast veterinary problems one college of advanced course is something like a drop in the ocean. It also knows that India is essentially an agricultural country depending mainly upon cattle for this important industry.

The provincial Agricultural Committees appointed to consider the recommendation of the Royal Commission similarly find themselves in an awkward position with regard to the step they should take in following the counsel i.e., whether to reduce or increase the course, as almost all the members of the provincial committees are on the central council. The only members of the committee who should assert themselves and press their views in the interest of the provinces are the Development Ministers and non official members. The latter are not overburdened with the knowledge of the veterinary needs of the country.

The revised curriculum in the Madras Veterinary College wisely included some new subjects such as Zoology, Biochemistry and others. The vast subject of Anatomy, which was spread up over two years in the old course has been unfortunately compressed in one year, in the revised curriculum. Dear Editor, permit me to say that this is the worst step in the curriculum. Similarly many such deviations to the detriment of the real education have been introduced into the revised curriculum. Whoever is responsible for these changes, he will not be considered by the future Veterinary Profession to have contributed to the advance of Veterinary Science in this country. He will pardon me, if I say he has done a positive dis-service by agreeing to drop the proposal to introduce the four year's course and by compressing the vast and useful subjects into small periods of one year.

What you and others write in your valuable journal on this and cognate subjects will be read only by those who

already know the several drawbacks in the education of this country. The vast majority of them feel and desire for improvement but they cannot improve the matter as they are all in subordinate positions. The others for obvious reasons do not seem to move in the matter with sufficient vigour and perseverance. Under such circumstances, I feel, it is your duty and privilege to enlighten the Government and the public at large on these matters through the medium of the daily press, periodicals and the meetings. In addition to what you have been doing now in the cause of the Veterinary Profession, if you gird up your loins and take up this subject of improving the Veterinary Education in this country, you will be doing an immense good to the profession to which you belong.

27-9-30.

Yours truly,
"DISAPPOINTED".

Review.

Practical Veterinary Pharmacology, Materia Medica and Therapeutics.—By Howard Jay Milks, D.V.M. Professor of Therapeutics and Director of the small animal clinic, New York State, Veterinary College at Cornell University, Ithaca, N. Y.

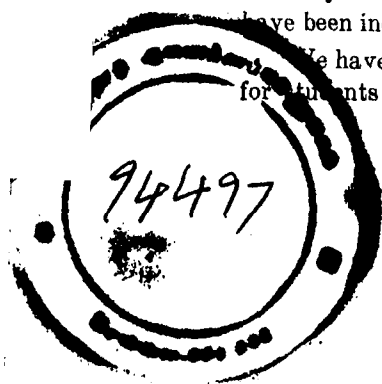
With a chapter on Biological Therapeutics.—By Adolph Eichhorn, D. V. S. Director of the Veterinary Department, Lederle Antitoxin Laboratories, formerly chief of the Pathological Division, United States Bureau of Animal Industry. Second Edition, 1930. London, Bailliere, Tindall and Cox 7 & 8 Henrietta Street, covent Garden W. C. 2.

Size $6\frac{1}{4} \times 9\frac{1}{4}$. Number of pages XI+539.

Figures in the text 32. Price 28/- net.

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Veterinary Surgeon, Madras, South India,

Office : 26, Wallajah Road, Mount Road,
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	6 inch long	3	0	0
	8 inch long	3	0	0
	10 inch long	3	0	0
	12 inch long	3	0	0
	14 inch long	3	0	0
	16 inch long	3	0	0
	18 inch long	3	0	0
	20 inch long	3	0	0
	22 inch long	3	0	0
	24 inch long	3	0	0
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	32 inch long	3	0	0
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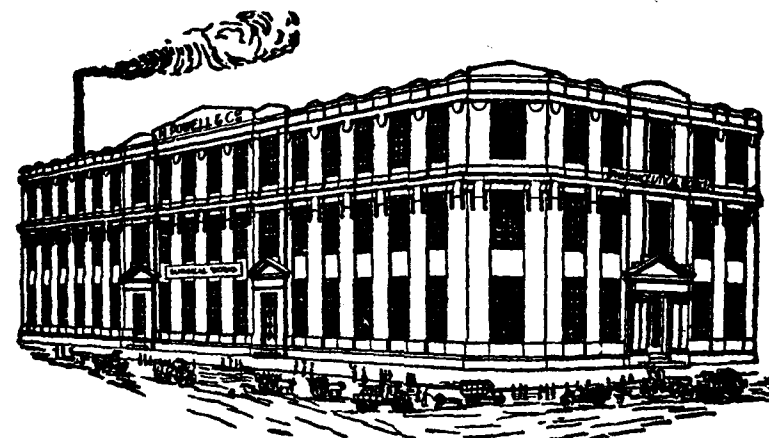
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