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Vol. IV.	EDITOR: P. SRINIVASA RAO, G.M.V.C., Veterinary Surgeon, MADRAS.	No. I.
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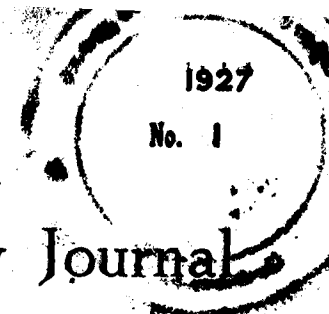
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(The Journal of The All-India Veterinary Association).



Editor :

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

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NOTICE

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

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THE

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Vol. IV]

JULY 1927

[No. I

EDITORIALS.

THE DUTY OF VETERINARY ADVISERS.

II.

UNDER the above caption we pointed out in a previous article, how the course of studies in the several Veterinary colleges needs to be extended to four years, with a curriculum as that is obtaining at the Royal College of Veterinary Surgeons in England, with such modifications as are found necessary to suit the needs of this country; how the various provincial Civil Veterinary Departments stand in sore need of expansion in way of increased number of hands and more hospitals; and how miserably the Veterinary Assistant Surgeons are paid and suffer in consequence; and how far the Veterinary Advisers to Provincial Governments can move in all these directions to improve matters. We shall now endeavour to deal with the other ways and means which strike us as possible venues worthy to be exploited for the improvement of the profession in India.

The staff of the Veterinary colleges must consist of Imperial Veterinary Officers or of officers of the provincial gazetted rank. They must be above the cares of an ill-paid member of a subordinate service. A lecturer on Rs. 120- or even less is a common sight in some of the Veterinary colleges! Is it not necessary that a certain amount of dignity or shall we say sanctity, should be

attached to the post of a lecturer? If the Veterinary Advisers themselves can submit to the present state of treating their lecturers as such cheap men, who else would regard them (the lecturers) as men worthy to train the future Veterinary Surgeons of this land! How will the Alumni of such colleges be valued in the world? Cheapness is generally associated with bad labour. But it is unfair to suggest that the present incumbents are in any way lacking to justify the confidence placed in them. Our contention is that by merit and the responsible nature of the work alone, if by nothing else, they deserve to be raised to the Provincial gazetted rank. Prudence, necessity and professional dignity, all point in the same direction. How many Veterinary Advisers have moved in this matter?

Every province must have its own centre for production of Sera. The necessity for this is being felt more and more every day. What aggressive proposals have been placed before the Local Governments by their respective Veterinary Advisers? Will the Government dare to oppose such a measure? We hope not. Only, we fear, the matter is not pressed upon them as it ought to.

Again is not the field vast enough to undertake research work in every province? Will the Government move in the matter of its own accord, or should the proposal come from the Veterinary Advisers? We leave it unanswered. We don't mean that no Veterinary Adviser has done it. Some of them have attempted a good deal in all these directions. All honour to them. But our point is that unless we ask and keep agitating through our Veterinary Advisers there is no likelihood of the department advancing as it ought to.

A comprehensive scheme for the extension of Veterinary aid in rural areas should be arrived at. There ought to be a Provincial gazetted officer at the head of each district as in the case of the medical department. He should be held responsible for efficient control of any

contagious disease within his district. He can help research work from the field and direct the activities of the assistants under him in the best interests of the ryots at large.

Before we close we wish to warn against one thing. There is absolutely no use of indulging in grandiloquent schemes, without a contented staff. It is the key-note to success. No stone should be left unturned to improve the pay and prospects of the subordinate members of the Civil Veterinary Department. It is a duty, a sacred duty, at that, of all Veterinary Advisers to immediately undertake to improve the lot of their ill-paid subordinates. Will they do it?

RINDERPEST.

The heavy toll of mortality claimed by rinderpest year after year in India and the consequent economic loss to the country necessitate a searching enquiry into the ways and means of preventing this disease to the fullest extent possible. The official year 1925-1926 had been particularly bad throughout India and Burma as evidenced from the reviews of the annual reports of several provinces published in our previous issue. We fear it is the lack of a bold policy of adopting the latest of prophylactic measures—the Serum Simultaneous-method—to combat this scourge of the cattle of India that accounts for so much of preventable loss. Caution is certainly necessary and more so in a country of strong prejudices like India. But when it borders on professional timidity it is high time that serious attention is drawn to it. We do so with no motive of maligning anybody but with the earnest desire of inducing every province to do its utmost towards the prevention of this disease and thus get exalted as a profession before the public eye.

At a conference of the Imperial Veterinary Officers held in Calcutta in 1923, the following resolution was passed. "The process of active immunisation against

rinderpest by socalled 'Serum Simultaneous-method' should be prosecuted with the utmost vigour, wherever possible, as it represents the only means at present known of conferring a satisfactory, permanent immunity on susceptible animals."

It should not be presumed from the above that the proposed scheme was heard of for the first time in 1923 by the profession. We can talk with some knowledge of this scheme in the presidency of Madras. Let us see how far the scheme has been "prosecuted with utmost vigour" in that presidency. The permission of the Government of Madras to try this active immunisation on Government animals was sought of in 1918-1919. In the very next year 69 animals belonging to the Agricultural farm at Coimbatore were protected by this method with signal success. From that time onwards almost every year this Serum Simultaneous-method of inoculation has been done both on private-owned and Government animals with only one fatality in a calf, out of 1557 animals so treated. That is the record for full seven years for the presidency of Madras!

The number of private-owned animals that were brought for the S.S. method of inoculation steadily rose from 100 animals in 1922-1923 to 379 in 1925-1926, inspite of the much advertised risks of the method and the levy of Rs. 2/-per head of cattle. We are at a loss to understand what it is that pervents a wider adoption of this method to check this fell disease. The blame that private owners do not come forward is at the most only a partial truth. What is wanted is a vigorous campaign and confidence in one's own work.

The conference of the Imperial Veterinary Officers having recognised the potency and urgency of this method for general adoption in the resolution quoted above, has followed it up with another resolution, that perhaps accounts for the slow progress of this method. It says "In the districts, time is not yet opportune for the

whole performance of this method of immunisation as the occasional accidents which follow upon its adoption might hinder, in view of the prejudices of the smaller owners, the eventual universal adoption of the method". As a deliberative body the conference was right in recording the risks involved also in the method. But the method should be given a fair trial in the field and then adopted or dropped, in the wake of executive experience.

We have shown above that the experience in the presidency of Madras does not warrant the fear that is usually associated with this method. Perhaps that may not be enough by itself and let us see what the Indian state of Mysore has got to say on this method. The Officiating Director of Agriculture in Mysore says, that the outbreak of rinderpest at Harihar and Kudlu cattle fairs spread it to some 600 villages. "As passive immunisation only lasts for 9 days, it was not possible to reinoculate cattle in villages where the disease had once been suppressed and again the people failing to realise the temporary nature of passive immunisation, even refused reinoculation and became sceptical as to the benefits of inoculation generally. S.S. inoculation on Rayankere Dairy Farm and the herds of Amrit Mahal Department was done. This gave the staff some experience in this work and in view of the comparative failure of the passive method it was decided to discontinue it and practise the active method. Special serum for active immunisation was obtained and the Government sanctioned a special grant for an organised campaign."

"Extra hands were engaged, trained and larger quantities of special serum was arranged for. It was also necessary to organise a regular depot for the production of virus blood, both in order to be absolutely certain of having typical virus producers as also to obviate bleeding animals in the villages which may prejudice the villagers against S.S. inoculations. In the course of four months since the introduction of the S.S. method 34,827 head of

cattle were inoculated. In the second half of the year only 5085 head of cattle were done owing to the introduction of the levy of a fee of Rs. 1/-per head. In all 39,912 head of cattle were actively immunised. The prejudice of the cattle owners on aesthetic grounds against this mode of inoculation can be overcome with some tact and made very popular without minding the *small risks and trouble connected* with this method of inoculation, is proved by the large number of inoculations done before the levy of fees. The results achieved so far are very satisfactory and encouraging *in that rinderpest has subsided in all places where this method was carried on*, and as such the Superintendent believes that with an adequate staff and a sufficient and continuous supply of serum it will be possible to stamp out the disease in the near future, if the question of the fees is reconsidered."

So, Mysore produces its own virus and let us see if she rests satisfied with her achievement. The Director says that, "With a view to meet adequately the need for the copious supply of serum for facilitating active immunisation on a large scale at less cost than hitherto, the manufacture of serum locally is under contemplation and experiments in that direction are being arranged for." Bravo Mysore! Nothing succeeds like success.

From the above it is clear that the method is more sinned against than sinning. Well, granting there is a certain amount of risk about the method, what is the procedure to be adopted? Pool and Doyle in their "Studies in Rinderpest" published in the Memoirs of the Agriculture Department, Veterinary Series Vol. III. No.4, say "The start should be on a small scale in each province and compensation should be given to the owners of animals that die as the result of inoculation. Sufficient experience of the method has now been gained in India and other countries to warrant this step. If ten thousand rupees were allowed to each province for the first year or two, for the grant of compensation until the method be-

came popularised, it would go a long way. . . . Taking everything into consideration the mortality should not exceed one per cent; so ten thousand rupees should be sufficient to compensate for about fifteen thousand inoculations."

How many provinces have moved their respective Governments to launch on this scheme with the necessary precaution quoted above? In the face of the above facts is it not strange to hear the sing-song that the method should be adopted "*slowly and with greatest caution*." Look at the way Mysore has marched! Nearly 40,000 head of cattle have been protected for life against Rinderpest in that small province. The figures are from last year's report. In the adjacent presidency of Madras the policy of 'Hasten slowly' has been rampant. Here is what Mr. F. Ware says "The Government have recently approved of the proposals made by this department.....of performing S. S. inoculation.....in a village—provided it is done under the strict supervision of a Circle Officer of this department.....Their number at present is 5 (*now six*) in the Presidency, and this therefore places a great limitation on the number of animals which can be inoculated in this way. In view, however, of the care and experience which are required in carrying out these inoculations it does not seem desirable to depute the work to *cheaper agency*."

We feel it hard to restrain ourselves from commenting on the sneer, the shame and the contempt conveyed in the words "*cheaper agency*". We leave it to our readers to form their own opinion on this choice expression used by the head of a department. Who made it cheap? It is hard, hard indeed, to be so treated by our own professional men. Never mind. Let us proceed. We wish to point out that it is the self-same "*cheaper agency*" that has been responsible for the great success in Mysore, which neither the Provincial nor the Imperial Officers have been able to achieve in Madras. It may be pointed out here that the Head of the Veterinary Department in

Mysore, and all the rest of the staff are graduates of either the Bombay or the Madras Veterinary College. In the Madras Presidency also all the Circle Officers with the exception of two are the graduates of either Bombay or Madras Veterinary College. We can go into more details and prove that the "cheaper agency" though cheap on account of the apathy of departmental heads, is at any rate not 'inefficient' as the context of the above quoted passage would imply. But that is not the theme of this article.

Regarding the fear of Piroplasmosis-complications, Mr. K. Kylasam Ayyar, G.B.V.C., a Circle Officer in the presidency of Madras after an experience of three years in this particular branch of work, wrote in the Madras Veterinary Journal in September 1923, as follows:—"The appearance of Piroplasms, as observed in the inoculated animals raises some interesting questions, for it is generally supposed that if the virus used for inoculating animals, is free from Piroplasms there is no fear of this complication arising; but what about the Piroplasms already existing? It is known that Piroplasms are frequently present in apparently healthy cattle of this presidency. Are these not latent factors of mischief the same as the Piroplasms introduced with the virus? If the virus is the main source of infection in cross-bred and pure bred animals of foreign strain, why then do only one or two of a herd of forty or fifty inoculated with the same virus become affected and not the rest which are of the same breed and susceptibilities? Apart from the virus, there are possibilities of Piroplasms making their appearance and producing complication in the inoculated animals. This fact needs to be borne in mind."

Commenting on the above, the Editor of that Journal wrote "It also appears that, providing a suitable dose of Trypanblue is given, there need not be much mortality even when there is complication with Piroplasms, if these are of a local strain. This is important, for we know that

most cattle in this country harbour Piroplasms and it seems reasonable to presume that a reaction induced by the injection of local Piroplasms into an already infected animal need not be worse than a relapse following the injection of Piroplasm-free virus, such as happened in some of Mr. Kylasam Ayyar's cases."

Next Mr. Kylasam Ayyar discusses the advantages of using local virus in a natural outbreak of the disease. He says, "There seems to be no valid reason why local virus should not be used. The chances of its causing complications in the inoculated animals are by no means greater and in fact logically speaking, local virus should be more suitable than a strain introduced from outside. Another material point is that it cannot be said in these cases that infection is being introduced into a clean locality. Simplicity in procedure and cheapness of cost—two essential factors in a scheme for wider adoption—are in its favour."

We have attempted to point out in this article that the S.S. method of inoculation is the only method of saving the lakhs of cattle that die annually from rinderpest in this land, that, that method is not so very dangerous and risky as it is generally believed to be, and that the method should be carried on with "utmost vigour" all over India and Burma. Virus and Serum producing centres must be established in every province. Suitable men, who have passed creditably in the Post Graduate course of studies should be sent to Muktesar for qualifying themselves to undertake this work if necessary. Unless and until such aggressive steps are taken to combat the disease, India must rest satisfied with losing her cattle by lakhs every year.

NOTES

With this number of our Journal, we enter on the fourth year of its existence. We convey our thanks to all those who have helped us to build up the popularity it now enjoys both in India and outside.

But we have to renew our complaint against the various Provincial Associate Editors for not helping us in the way they ought to. We are much handicapped in the discharge of our duties, on account of the paucity of "provincial news."

We appeal to the Central Board of management to take up the matter at their next meeting and improve the existing state of affairs.

We regret to record that there are many members of our profession, who have not yet become subscribers to our Journal. We request them to start patronising us at least with the advent of this new year of the Journal. We hope that our present subscribers will help us a good deal in this direction.

Our readers will be pleased to learn that Rai Sahib Debakar Dey of the Bengal Veterinary College has gone to England to undergo a short Post Graduate course of studies. Nothing but the deep love of his profession could have induced him to decide upon such a course, particularly at his age. We hope on his return, the Government of Bengal and the Veterinary Adviser will render him all possible encouragement.

We congratulate Mr. M. Ananta Narayan Rao, on his well deserved promotion to the Madras Veterinary Service. He has been posted to third circle at Bellary. The readers of this Journal, we dare say, know him

personally or by his writings. It will not be out of place here to mention a few of his observations.

In November 1921, he wrote in his article on 'hookworm disease in dogs' vide Madras Veterinary Journal No. 11, November 1921, about intra uterine infection of hookworms in a pup. Alder and Clark in their article on intra uterine infection with *A. caninum* which appears in the annals of Tropical Medicine and Parasitology Vol. XVI. 3rd September 1922, have corroborated his observations, though they have had no knowledge apparently of his observations.

In December 1921, when addressing the Veterinary Graduates' Association at the general meeting held at Madras, he said that when a dog was fed with larvæ of hookworms obtained from a culture, the dog in about a fortnight after that date started getting fits etc., and died and that more than 150 mature worms were recovered from the intestines of that dog on *post-mortem*. This statement is now corroborated by Mr Moris C. Hall, Zoologist, Bureau of Animal Industry, U.S.A. in the department circular 338, May 1925, page 21 which says that eggs from these worms usually appear in the fæces in 4 or 5 weeks after infection takes place, but have been said to appear as early as 16 days after infection. (This circular has been extracted in this issue elsewhere.)

In 1922 he published an article on development of *Microfilaria Recondita* of the dog in mosquito.

His paper on *Hæmogregarina canis* has been the subject of very interesting criticism in our pages.

Last year he proved that *P. canis* (South Indian Strain) could be successfully transmitted to the South Indian jackal, though eminent scientists like Professor Natall of Cambridge and Lousbury of South Africa said

that *P. canis* cannot be transmitted to either the jackal or fox.

Mr. Rao is a man with great aptitude for Research work and we hope he will continue to work in that direction.

Mr. Rao has been the President of the Madras Branch of the A.I.V. Association for the last three years and a half and as such, the news of his elevation to the gazetted rank will be welcomed by all its members.

OBITUARY.

We regret to record the premature death of Captain T.W.W. Wright M.R.C.V.S., the head of the Municipal Veterinary Department, Penang, on 31st December 1926, at his thifty-ninth year after an abdominal operation. He was commanding good respect among the people and his subordinates. We offer our sincere condolence to the members of the bereaved family.

GENERAL ARTICLES

GLAND THERAPY*

BY V. R. GOPAL KRISHNAN, G. M. V. C.

Laboratory Veterinary Assistant Surgeon, Nagpur.

Gland Therapy.—Recent researches in the field of Therapeutics have thrown much light upon the easiest method of treatment with the best possible results for some of those diseases which have been hitherto considered obscure or defying all modes of treatment. One having in view a line of treatment for certain disease, cannot afford to forget the causes of such a disease. Of the many causes for certain constitutional affection the deficiency of organic or inorganic constituents plays an important

* Read at the Third Annual Conference of the Central Provinces and Berar Veterinary Association, 1926.

part. Such deficiency was attributed to the inactive pathological condition of some glands in the body. This conception naturally led keen observers to study the normal and abnormal conditions of such organs which were perplexing and almost held unexplained till the beginning of this century. The systematic study of certain organs and glands has almost reached perfection while certain others are yet baffling. In the latter category come the so-called '*Ductless Glands*'. These are so named because they do not possess ducts or channels for conveying the products of their activity into the system. They are supposed to elaborate substances which find their way directly into the blood or through the lymphatic system.

Generally speaking all the glands have got secretions, but certain glands produce internal secretions. Such internal secretions are described as essential factors for sexual development, ovulation, fat distribution, skeletal growth, maintenance of equilibrium of blood pressure and such other functional activities of the body. Careful observations of abnormal functional activity evinced the association of certain glands in abnormal or pathological condition. This gave further clue to a scrutinising study of the glands especially the ductless which opened out vast field for experiments resulting in beneficial treatment of an unquestionable type. The experiments conducted are equally interesting as to their use and since they (experiments) are beyond the scope of this paper, I leave them aside taking only their use.

The Thyroids.—These are situated one on either side of the supero-lateral aspect of the trachea. Structurally they consist of vesicles lined by a single layer of cubical epithelium. They are enormously vascular and have a rich supply of lymphatics. The active principle of the gland is believed to be a colloidal iodine otherwise known as "Iodothyron" containing 10 % of Iodine.

The atrophy or absence of this gland was generally associated with arrested development—both mental and

physical. This stimulated experimental inquiry in lower animals and it was found that an extract prepared out of this, is of very great value in certain diseases.

In cases of hypothyroidism in which the functional activity is decreased, transplantation of a small piece of tissue of thyroid in a suitable part of the body has been found to be successful and effective. The blood vessels may grow and the tissue may survive and this brings about the disappearance of symptoms.

Hyperthyroidism in which there is increased functional activity, and markedly accelerated metabolism, the remedy has been suggested to be surgical or medicinal. Thyroidectomy as an operative measure or serum from thyroidectomised horse and thyroidectin are being put into practice, and appear, at any rate, successful.

In simple goitre small doses of thyroid in desiccated form is of great value. The preparations of thyroid are very easily absorbed in the alimentary canal. In America, desiccated thyroid is being used for reducing obesity in aged dogs. There is a marked invigoration and one is inclined to think that thyroid does more than presiding over the general distribution of nourishment, it is supposed to stave off premature old age and excessive formation of fat.

It is considered that some of the diseases affecting the eye have their origin in glandular disorders, as in the case of glaucoma. Therefore trials by way of treatment were given by administering the extracts of some ductless glands. The effect was more pronounced in those cases treated with thyroid gland. This was tried in various affections of the eye and it has been found very useful in keratitis and optic atrophy.

Parathyroids are formed of epithelial out-growths from the dorsal aspect of the third and fourth brachial cleft on each side—there being two on each side. But their position is variable in various species of animals and in different individuals too. In ruminants they are

external to thyroids. In bullocks it is not uncommon to find supplementary parathyroids in different regions of the neck.

It was once held that these bodies were accessory thyroids. But histological and functional differences were found between these two after careful study. Now these are regarded to be regulators to the needs of the body. Experimental removal, though comparatively difficult, has proved progressive fatal termination with characteristic activity of the muscles, both voluntary (due to the nervous system being excited), with imperfect metabolism of proteins, and a notable deficiency of calcium salts. Therefore, in other words, the functions of the glands are to act as sedatives to the nervous system in cases of natural irritability thereof, to regulate calcium metabolism in the animal economy and to neutralise the protein toxins incidental to certain conditions. Hence one of the causes of milk fever is attributed, by some prominent observers to the derangement of the internal secretion of parathyroids. The line of treatment adopted and found successful, in such cases, was a substance which is more or less antagonistic in its actions to those of parathyroids. This is a solution of adrenalin which will be dealt with later on. In Chorea, a nervous malady, frequent sequel of distemper, the administration of parathyroids has been claimed to be effective.

In view of the fact that parathyroids are closely connected with the control of calcium content of blood, they are used with advantage in some diseases of bones of animals, especially dogs and cats. In cases of rickets and osteomalacia, treatment with parathyroids is very successful. Preparations of parathyroids in the form of tablets administered, along with particular care for diet and hygiene considerably improve the condition of the case to a good recovery.

Very recently the treatment of varicose ulcer by parathyroids is tried with great success. *Suprarenals* or

Adrenal bodies consist of two distinct portions—Medulla and Cortex. The medulla with which we are more concerned is composed of large irregular cells containing granules. The medulla has been found to be derived, during the process of development from the sympathetic nervous system. The active principle, 'Adrenalin' which it contains was first isolated in 1901 by Dr. Takamine. The remarkable function of medulla is specially noteworthy in the control of the vascular system. It also modified metabolism leading to an increase of sugar in the blood and the excretion thereof in the urine. It has also been found that in certain emotional conditions such as fear or anger, there is an increased production of adrenalin due to the sympathetic stimuli, resulting in the power to sustain the muscular activity incidental to the physical accomplishments of motion. It is also intimately concerned with the muscular metabolism.

The administration of adrenalin is resorted to in conditions where constriction of the arterioles of the part or body is required. It acts as a hæmostatic and constrictant. It increases the blood pressure and regulates the tone and rhythm of the cardiac muscle. It is largely employed in post-partum hæmorrhages. In cases of epistaxis a solution of adrenalin sprayed in the nasal cavities is of great value. Nowadays an injection of adrenalin to race horses just a few minutes before the start effectively prevents bleeding of the above nature. In minor surgery an injection of this solution before the operation enables the operator avoiding hæmorrhage. In grave conditions when the animal is apparently dead, pulseless and gasping for breath, a timely injection restores the animal to life. In milk fever, when there is no desired effect after the inflation of air, an injection of adrenalin solution 2 to 4 drams proves advantageous. In conjunctivitis, straining after parturition, prolapse of the uterus, laminitis it is used with appreciable effect. The local application of a solution of adrenalin alone or along

with Cocaine is very effective in paraphymosis by reducing the condition without operation. In hæmorrhage from stomach adrenalin is given by mouth with good results. However, for hæmorrhages from lung, liver or brain, it acts unfavourably by increasing the blood pressure and hence more bleeding may result. In azoturia and red water in cattle adrenalin injections are reported to be of use, but the treatment seems to be rather empirical. It is also recognised, very recently, that adrenalin is related to the process of calcium metabolism and hence a preparation of adrenalin with the anterior lobe of pituitary and parathyroid, is prescribed in cases of dental caries associated with faulty calcium metabolism. The latter function of adrenalin is not yet universally confirmed.

The real function of the cortex is yet in obscurity and investigations are in progress. Pituitary is situated at the base of the brain consisting of two lobes—anterior and posterior, each differing from the other in its functional activity. The anterior lobe presides over the promotion of skeletal growth and stimulation of sexual development. The posterior has the function to act as stimulant to non-striated muscle, to regulate carbohydrate metabolism and to assist sexual development.

An extract from the posterior lobe—"Pituitrin" is largely employed in practice. It is indicated in uterine inertia, when there is a lack of muscular activity. In cases of dystokia it is very effective, sometimes the expulsion is caused without artificial aid. In internal hæmorrhages pituitrin is preferred to adrenalin as the effect of the former is more lasting, since it acts directly on the muscle whereas adrenalin acting on the arterioles is "passive" or not lasting. In larger animals too, it has been given to effect safe delivery when labour pains are absent. It is interesting to note that a decently large dose of about an ounce of pituitrin was administered subcutaneously to a bad case of dystokia in an elephant.

Within half an hour there was an effective response resulting in the expulsion of the foetus without subsequent complications to the mother. It is equally effective in smaller animals too as the clinical notes on "dystokia in cat" read before the last Conference by Mr. P. S. Sundaram will prove.

It is also used for early and quick removal of milk as it has been shown that pituitrin has no effect on the increase of milk production.

Regarding the anterior lobe, opportunities are rare for its use in our practice at present. *Pineal* gland situated right in the centre of the brain is yet betraying the investigators as to its important function and usage in maladies. It is supposed to have some connection with mental and sexual development. Experimental study of this gland during the last decade by McCord has shown that the internal secretion of Pineal has much to do with the early development. The administration of it in deficient development accelerates the growth to normal maturity but at the same time does not permit the growth beyond physiological limitations. Hence it is prescribed with certain amount of success in those cases of retarded development not attributable to the lack of activity of thyroid or pituitary.

Thymus gland is situated in the thorax anterior to the heart. This undergoes some changes, having a great size at about the time of birth, continues to grow till puberty and then begins to atrophy resulting in a mass of adipose tissue with very little of thymus substance in the adult life. As to its functions opinions are divided and is supposed to participate in stimulating general growth in early life, in co-operation with testes. According to recent authorities, this gland plays an important part in calcium metabolism of the body. It also acts as a defensive mechanism especially in early development by its action in the formation of white corpuscles. Experi-

ments are in progress and hence anything definite as to its usage cannot be foretold.

Testes and Ovaries.—These glands besides having an external secretion, have got internal ones too. The internal secretions work in co-operation with those of ductless ones to regulate and maintain the so-called "Hormone balance" which is so very essential for the upkeep of body functions and health. In the skeletal development the internal secretions of these sex glands play an important part in the early life.

Of late, the use of ovary by implantation to defective animals, has proved successful. In case of premature cessation of oestrus, where medicinal and other methods of treatment have failed, the implantation of healthy and active ovary removed from a healthy animal brings about the occurrence of oestrus. The cow comes in season regularly, conceives and brings forth healthy and lively calves. Implantation has also been tried in cases where ovaries begin to atrophy, and also when the milk production is considerably low. Invariably it was found to be successful, the animal coming in season normally, the milk production being increased.

Mammary.—It will not be out of place here to mention the latest use of mammary substance in therapeutics. This has been recognised as having some connection with ovulating and menstruating activities. It is found that desiccated mammary substances, administered in cases of hyper-activity of ovary (causing Menorrhagia) is of great use.

Pancreas.—Experimental removal of pancreas in dogs was followed by persistent glycosuria and other symptoms of diabetes. This led to an important discovery of an extract from pancreas, called "Insulin" by Banting in 1922. The therapeutic action of Insulin, judiciously used as a valuable treatment in diabetes mellitus, is very encouraging.

Gentlemen, the subject I have chosen is one of

progressive nature. The rapid strides of advancement in this branch of treatment are conspicuous in the utility of the substances in almost everyday practice in Western countries. If I am not wrong, even to-day there are industrious investigators experimenting with these organs to search out more avenues for greater usage of these in combating diseases. As such it behoves us not to lag behind in understanding the usage of these, though to practice them, it may take a longer time. To such an understanding and to have an elementary knowledge thereof, I hope, this short paper of mine will be a humble contribution.

I thank you all sincerely for your patient hearing.

I have appended the bibliography herewith for reference.

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RINDERPEST IN PAHANG

Some Observations.

BY K. SITARAM, G.M.V.C.,

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It may, perhaps, be a surprise to the profession in India when I say that rinderpest is not endemic in Pahang. It is imported into this country from Siam, Burma, Indo-China and India. The indigenous cattle are extraordinarily susceptible to this fell disease. Siamese animals are imported into Malaya for slaughter. The imported cattle, apparently are more refractile to this disease and among the susceptible indigenous animals special mention should be made of the buffaloes and wild pigs. The disease spreads rapidly in this country in

spite of stringent precautions, and perhaps this is due to the dissemination of the virus by the wild pig. Whenever there is an outbreak, one is sure to see carcasses of wild pigs in the jungle. Convincing proof has been obtained to prove that the wild pig plays a very important role in the spread of this disease.

In Malaya the cattle are not kept in sheds, as is obtained in India. They are allowed to graze and remain in "padangs" or fields. In certain places the cattle have to live habitually in padangs near jungles and the owners seem to be ignorant of the number of their stock! Therefore when an outbreak of rinderpest occurs the disease spreads rapidly owing to the movements of cattle from one padang into another without anybody's knowledge and also by wild pigs of the jungle which get infected from cattle.

The next important mode of spread of the disease is through the owners of stock and the butchers. They have absolutely no idea as to the nature of the disease and the owners of cattle go about their rounds with their cattle carrying the disease with them. In the villages sick animals are slaughtered and the people seem to be very fond of smoking this flesh for food hung from a bamboo tripod under which a smouldering fire is kindled. The cutting up of the carcass where cattle move about and the half baked or smoked flesh carried about here and there for food seems to spread the disease in this country. When a buffalo is slaughtered the neighbours are called to help and they get their share of flesh which they carry to their places and the infection is also carried and spread in this way.

Method of dealing with the disease.—In general, methods adopted here, differ from those in India. One can see that our measures have to be necessarily more drastic as the animals involved are more susceptible. The method of mixing healthy serum-inoculated animals with sick ones is good for India. But here, it has produced

disastrous results. The naturally resistant Indian (plains) cattle get a mild attack and get over it, developing an active type of immunity. It has been observed that if healthy Malayan stock after inoculation with Muktesar serum, is mixed up with sick animals, the healthy ones contract rinderpest and die.

To start with, we have to deal with the disease from two heads, viz. *Quarantine Stations and the Villages.*

Quarantine Stations.—Malaya chiefly gets buffaloes from Siam for slaughtering purposes. Exportation of animals is the chief industry of Siam, which feeds 10,000,000 buffaloes and Malaya is their chief purchaser. Preventive measures are taken as soon as the animals are landed. Temperature of all animals is taken every day. As soon as rinderpest is discovered, further importation is stopped and immediate slaughter of the sick animals and segregation of the healthy contacts is resorted to.

I have found that it is always more easy to stamp out an outbreak in towns than in villages surrounded by jungles. For instance, in November 1925, there was an outbreak at Bentong which ended with about thirty deaths. Again there was an outbreak in the same place in January 1926, which stopped with four cases, while the number of deaths among cattle when villages are affected might be counted by hundreds. I should think that the cause is, in towns or in its neighbourhood enforcement of rules to prevent spread of disease is more completely achieved than in the villages. Secondly, the owners could be easily convinced as to the methods of prevention as they are less illiterate than the village folk. The principles that are adopted in dealing with the disease are the same in the towns as in villages. When an outbreak occurs, the first thing done is to take an accurate census of the animals, buffaloes, cattle and sheep. A certain area is put under quarantine. The cattle traffic is stopped. The Veterinary Police are ordered to petrol the roads to see that the animals are kept tied up.

In Villages.—The same methods are adopted with certain modifications. In jungle places where the animals are wild, they are kept within fences, ten or fifteen buffaloes in one. The centre of infection is guarded by employing watchmen if need be. It is always a good plan to start working from circumference towards the centre, as otherwise, we are apt to spread the disease instead of stopping it. A party is posted in the centre to fight it out there. There are several practical difficulties even in this method. The Malays sometimes keep the origin of the disease a secret, being afraid that some great calamity will happen to them if they reveal it. Further they have a great belief in their native treatment of charms and herbs. The so-called Malaya Magician or Bomoh, in many instances, not only persuades his clientele to keep the outbreak a secret, but also spreads the disease—of course, unwillingly—by going about and performing charms on healthy animals by giving them medicines and herbs in food after doing so on sick ones first.

Charms and Amulets.—The Malay language is full of charms and spells which have the Brahminical name 'Mantra' or Arabic name 'Doa'. The charms hung on fruit-trees are supposed to make the fruits disagree with anyone stealing it. There are also charms for wind, bird-charms, beast-charms, vegetable-charms and so on. These are considered to be the special wealth of the Bomoh and are declared to have been handed down from generation to generation. The Bomoh uses them in 'Jampi' i.e. the process of the black-art and finally blows his breath on the patient probably with the idea of blowing the disease out. The practical Bomoh knows the value of ceremony of mystery and elocution in his role as a veritable wizard. Powerful 'Mantras' that are difficult to understand are recited. He uses many sanskrit and Arabic words. Sometimes certain Arabic figures and designs are drawn on a piece of paper which is rolled and put into a small

bamboo tube. After performing 'Jampi' over it, it is tied round the neck or round the horns of the animals.

The disease is reported in some cases only when it spreads like wild fire and could no longer be kept a secret. By the time the preventive machinery is set to work, probably, the worst would have been over. This, I attribute, as one of the causes for apparently condemning the veterinarian by Malayas, but they cannot realise that the Vet is brought in very late. When reports are received sufficiently early, the outbreaks have been quelled early enough.

We shall consider how healthy, sick and contacts are dealt with. Healthy animals are, as already pointed out, kept tied under the penalty of fines. The sick animals, I personally think—if cure is impossible, as it seems to be at present—are better to be shot and thus to end the suffering. By that way spreading could be checked to a great extent. Secondly, an outbreak could be thrashed out in a shorter period. The difficulty comes in, in persuading the owners to do it. Their superstitions and their supreme faith in the native treatment and in the wonderful magician, creates some trouble. But I have always found that firm but gentle persuasion, pointing out the real advantages, change their mind. Most of them desire to eat the flesh and keep it after putting it through the smoking process. There is real danger in this process because the virus lives in bone marrow for some length of time. Infected animals are allowed to be eaten and that is done in the owner's premises, smuggling of flesh being, of course, prevented.

Treatment of sick animals by Malays.—The preliminary facts of nursing are ignored. When animal is sick, the anxious owner brings in the inevitable magician. This busy-body visits the patient and starts his charms and chants. It is done in a variety of ways. Some kinds of charms are tied round the neck of the animals. The turmeric is a favourite. The rhizome is charged with certain occult chants, and then tied around the neck of

the victim. Some medicines are also given, roots and leaves of certain herbs are boiled in water and cooled. It is probable that the resultant fluid has some antiseptic and astringent properties. The sick patient after undergoing the above treatment is left on his own defences in the open, without even a possible shelter from rain or sun. Mostly they die from actual starvation or due to sheer exhaustion.

Whenever an opportunity presented itself I tried to treat a few cases with intra-jugular injection of Tr. Iodine and glycerine. The results were not satisfactory. The difficulty in treating these cases is the apathy the owners show towards nursing their animals. This is as important, if not more than medicinal treatment. When another opportunity presents itself I want to try Hyper Tonic Saline intra jugular injection. We know in rinderpest, animal organism loses a great deal of fluids in the shape of dysentery and diarrhoea resulting in vital starvation of the cell.

Contacts are dangerous.—Generally, when there is a set of contacts, slaughter is recommended and the owners compensated for, the amount depending on the size of the animals and the market rate. It need not be said that the price will be very low in an infected area. It helps a great deal in preventing spread to other areas. The policy will work more satisfactorily in a small outbreak helping to localise it. But in extensive outbreaks, the advantages are not very perceptible. A sensible owner sees the double disadvantage of losing his animal and also flesh, if his animal gets the disease.

In areas near towns the butcher is persuaded to buy healthy contacts. Thereby, we can reduce the number of animals exposed to infection. By this method of reduction in and around the danger-zone and destroying the sick animals, an ordinary outbreak is checked.

Early notification of the disease, isolation of the patient, disinfection or burning the dung, infected cloth-

ings, utensils etc. are essential to prevent spread. Five per cent Izal or Carbolic Acid is used for disinfection of standing places. Lime is also largely used.

Protective inoculations.—This wholesale slaughter policy could at least be partly avoided if there exists a reliable protective inoculation. Let us consider the anti-rinderpest serum. So far it has been found to have no real effect in protecting the animals in Pahang. This raises a very interesting biological problem. The serum is prepared from Indian cattle. Why is it (even in large doses) it does not have any marked effect on the native buffaloes? This failure suggests the existence of a different strain of the same type of virus. The varying resistance displayed by the cattle, sheep and goats to the disease strengthens the above deduction. We know, for example, of different strains of T. B. It is just possible that there are different strains in rinderpest also. The problem, perhaps will be solved if an anti-serum made from the Malayan buffaloes is found to be efficient. However, there is a contradictory point to the above theory. It was indicated that rinderpest mostly comes from Siam. It is a fact that in Siam Muktesar serum is satisfactory. The serum is employed extensively in that country. It may be said, as a point of interest, that Siam being a Buddhist State prohibits any kind of slaughter policy. Hence, in Siam, serum is the only resort, and it is said to give a certain amount of protection. If Muktesar anti-rinderpest serum is effective in Siamese buffaloes it follows that that it should be so to cattle in Malaya also. But this is not the case. Muktesar serum is ineffective in Malaya while it is said to be effective in Siam. In all probability, the root cause of the biological incongruity depends on the varying degree of susceptibility. In Siam, Rinderpest has been existing for centuries; so also in India. Therefore they have developed a natural resistance to a degree. This common factor has a great deal to do with the action of the Muktesar serum, while in Malaya, the disease is new. So

the animals are very susceptible. Therefore, there is, strong possibility of the modification of virus. We know, for instance, certain bacteria increase in virulence when passed through certain other set of animals. Probably, such a phenomenon takes place when the susceptible Malaya buffaloe is infected by the ordinary virus of rinderpest, resulting in increased virulence. If such is the case, it could be inferred that the potential degree of the anti-bodies contained in the ordinary anti-serum obtained from Muktesar is unable to cope with the stronger and more virulent virus as occurs in the buffaloes of this country. Whether it is due to the difference in strain or because of the modification of the virulence of the same strain, it is certain, that the Indian serum is ineffective. It does not help us to solve the problem of protective inoculation. The only way is to try anti-serum prepared from the native buffaloes.

Some closing suggestions.—The chief trouble one meets in Malaya is the ignorance of the ryot. Evil consequences of such a state of things could be easily imagined. Propaganda is the best way out of it. It will be of great practical use to teach boys in schools about the disease, the ordinary causes, symptoms and the preliminary measures of dealing with an outbreak. When an outbreak is about, it is advisable to broadcast pamphlets regarding the nature of the disease, quarantine regulations and the various advantages of keeping the animals from moving about and so forth. I should think lantern lectures will be very useful to impress the people specially during an outbreak. Pictures of sick animals on the screen and how the disease might get spread and the various precautions to be taken can all be well impressed on the villagers.

I propose to conclude this paper with a hope to continue on this subject and give more details later.

(In the treatment of Rinderpest cases Tincture Iodine with camphor has been found very effective, as many as 90 % of cases recovering. 2 drams of Tr. Iodine Rectificatus with 20 grains camphor dissolved in it is injected subcutaneously only once or in some cases twice depending upon the severity and stage of the disease

It is hoped that the profession will give a trial to this treatment and record their experience. Ed.)

THE DISEASES OF TEETH IN ANIMALS

BY G.A. AJWANI, M.S.C., D.V.M.,

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The following notes on diseases of teeth are the result of my endeavour to review literature on the subject and of the theoretical and practical work followed at the Kansas State Agricultural college under a learned surgeon, Dr. R.R. Dykstra.

The subject of this kind has been totally neglected in the Indian Veterinary colleges and the Veterinary surgeon in India has rarely, if ever, made an attempt to investigate such diseases in animals.

I trust this material on the subject will be of interest to the Veterinary students and members of the profession.

Before we take up the discussion on this subject one should familiarise oneself with the dentition of animals. The following table, taken from "Chauveau's Comparative Anatomy of Domesticated Animals", on the dentition of animals will serve the purpose.

The next important thing to know is the anæsthetisation of animals for dental operations. This will be stated under three headings.

1. Nerve blocking for dental anæsthesia.
2. Method of placing anæsthesia over the mandibular alveolar nerve.
3. The European method (Belgian) of anæsthetising the infraorbital nerve.

Nerve Blocking for Dental Anæsthesia.

In this operation a local anæsthetic is injected over the *infraorbital nerve* when it is desired to anæsthetise the teeth in the upper jaw and the *mandibular alveolar nerve*, when it is desired to anæsthetise the teeth in the lower jaw; for the upper jaw the anæsthetic should be deposited over the nerve at the point where the latter

Dentition Table of Animals [Copied from Chauveau's Comparative Anatomy of the domesticated animals.
Translated By G. Flemings.

TEETH.	HORSE.		RUMINANTS.		PIG.		DOG.	
	Eruption.	Replacement.	Eruption.	Replacement.	Eruption.	Replacement.	Eruption.	Replacement.
I. INCISOR TEETH.								
Centrals	Before or some days after birth.	2½ years.	Before or some days after birth.	1½ years.	3 to 4 months.	2½ years.	4 to 6 weeks.	3 to 4 months.
First laterals	4 to 6 weeks.	3½ years.	Idem.	2½ years.	Idem.	Idem.	Idem.	Idem.
Second laterals	6 to 9 months.	4½ years.	14 days.	3½ years.	Before or some days after birth.	6 months.	Idem.	Idem.
Corners			2 to 3 weeks.	4½ years.				
II. CANINE TEETH.								
CANINE TEETH.	6 months.	4 to 5 years.			Idem.	1 year.	Idem.	5 to 6 months.
III. MOLAR TEETH.								
First	Before, or some days after birth.	2½ years.	Before, or some days after birth.	1½ years.	Before, or some days after birth.	2 years.	3 to 4 months.	5 to 6 months.
Second	Idem.	Idem.	Idem.	2½ years.	Idem.	2 years.	4 to 5 weeks.	Idem.
Third	Idem.	3½ years.	Idem.	3½ years.	Idem.	Idem.	Idem.	Idem.
Fourth	10 to 12 months.		6 to 9 months.		5 to 6 months.		4 to 5 months.	
Fifth	2 to 2½ years.		2½ years.		1½ to 2 years.		5 to 6 months.	
Sixth	4 to 5 years.		4 to 5 years.		1 year.		5½ to 6½ months.	
Seventh					3 years.			
NUMBER OF TEETH.								
Males	40		32		44		Dog	42
Females	36						Cat	30

enters maxillary foramen and for the lower teeth when the nerve enters the mandibular orbit.

Instruments needed.—A hypodermic syringe with a twenty gauge needle—four or five inches long.

Place of Injection.—For the injection over the infraorbital nerve select a point on the side of the face opposite to lateral canthus of the eye, just inferior to the facial crest, being careful to keep with the transverse vessel. The point of injection should be shaved and disinfected and the injecting instruments and the anæsthetic solution should be sterile. Add to this a few drops of adrenalin chloride and phenol as an antiseptic. In this particular form of anæsthesia, in dental surgery in an average sized horse it is advisable to inject over the nerve to be anaesthetised 2 drams of a 2% solution. The point of the needle is caused to enter at the designated site and the point of the needle should be directed downward and forward, (the animal's head being in lateral recumbency), so that it will follow the posterior border of the zygomatic process and dropped into the pterygopalatine process just posterior to the tubermaxillary. Push the needle until it strikes the perpendicular portion of the palatine bone in the region of the maxillary foramen which is at a distance of $6\frac{1}{2}$ to $7\frac{1}{2}$ c. m. from the surface depending upon the size of the animal.

Following this technic it is possible to avoid puncture of the vena-reflexa which lies just posterior to the point of injection.

Method of Placing Anæsthesia Over the Mandibular Alveolar Nerve.

In order to determine the site of injection over the mandibular alveolar nerve the operator should first draw an imaginary line from the centre of and parallel to the supra-orbital process. A second imaginary line is extended backward from the outer border of the upper molar teeth. The mandibular foramen is opposite the intersec-

tion of the two imaginary lines; with these imaginary lines as guides the needle can be so directed so that its point will reach the nerve where the latter enters the mandibular foramen. In order to reach this location the point of the needle should be caused to follow very closely the median aspect or surface of the rimus of the mandible. After the point of the needle has reached the nerve 2 drams of the 2% solution of cocaine hydrochloride may be deposited in and around the nerve.

The European Method (Belgian) of Anæsthetising the Infraorbital Nerve.

Same amount and of the same strength and character of anæsthetic is used as in the preceding method. The injection is made into the superior dental canal through the infraorbital foramen. It is claimed that such an injection will anaesthetise all the structures like the preceding method, i.e., on the injected side the molars, the canines, the incisors, the sinuses, the upper lip, the nostril, the turbinated bones and one side of the nasal septum. The superior dental canal has a calibre much greater than the volume of the nerve trunk and therefore the anæsthetic may be deposited around the nerve trunk without injuries to the latter nerve. The injection is made with ordinary hypodermic syringe armed with a needle 4 to 5 c. m. long but having a round extremity like a cannula instead of a double point.

The blunted needle, in order to facilitate its introduction, is provided with a small sharp pointed trocar extending 1. m. m. beyond the opening of the blunt needle or cannula.

The injection of anæsthetic is made through the infraorbital foramen which may quite easily be located by palpation. The injection may be made in standing or in recumbent position. The infraorbital foramen is located by palpation with the index finger and the facial

muscle covering the foramen pushed aside. With a sharp pointed knife a small incision is made through the skin directly over the infraorbital foramen. Capillary trocar and cannula are then passed into the dental canal as far as possible. This is easily done and provokes no resistance on the animal's part, provided the (cannula) instrument follows the wall of the canal and is not plunged into the nerve tissue. The stylette or trocar is then withdrawn, the syringe attached and as the anæsthetic is injected the cannula is gradually withdrawn so as to deposit the anæsthetic solution along the course of the nerve trunk. In order to prevent any of the anæsthetic solution from escaping through the cutaneous incision, the latter should be compressed with the finger for one or two minutes. Anæsthesia is complete in 10 to 15 minutes.

Alveolar Periostitis of the Teeth of Herbivora.

Tooth is lined by periostium at alveolar cavity. The disease is also known as peridentitis. The disease is also commonly but wrongly known as decayed tooth.

Characterization.—The stage at which the clinician sees it is a more or less complete necrosis of one or more molars of herbivorous animals due to infective inflammation of the dental pulp and alveolar periostium.

Etiology.—1. Infection may gain entrance and in 95% of the cases in horses it does gain entrance through an imperfectly enclosed infundibulum; normally the infundibulum should be sealed by the crusta petrosa. When the latter is lacking or wanting there is an open passage way, extending from the grinding surface of the tooth to the apex of the root.

2. In a very small percentage of the cases of alveolar periostitis the infection is admitted directly to the alveolar periostium through imperfect gums, i.e., between the molar teeth, or, at the time the animal is shedding its temporary teeth.

3. A still smaller percentage of cases of alveolar

periostitis are due to the development of cystic tumours on the roots of the teeth, atheromatous degeneration of the branches of the superior dental artery, external violence, systemic disturbances such as rickets and osteoporosis and occasionally insufficient mineral in the food.

Pathological anatomy.—Alveolar Periostitis on account of the mode of infection begins as a pulpitis and ends in self-extraction of the tooth. Between these two extremes the following chain of abnormalities occur:—

1. Extension of the inflammation to the local blood vessels, nerves and alveolar periostium.
2. As a result of infection co-existent with the inflammation there is abscess formation at the root of the tooth and this abscess breaks through the peridental plate into the sinuses or to the surface of the skull.
3. Pathological change.—Involvement of the blood vessels in shutting of the blood supply of the tooth.
4. Death, desiccation and splitting of the tooth.
5. Impaction and decomposition of food between the split sections.
6. Ostitis and necrosis of the tooth and of the alveolar border from pressure of the split section.
7. Self-extraction.

The entire seven processes may extend over a period varying from three to four years; the chain of processes is not always regular.

In old horses with short roots on the teeth self-extraction will take place much quicker than in young horse with the long tooth. In fact in young horses the tooth is so deeply implanted that it is held as a vice-like grip by the swelling of the inflammation. Incisors or canine teeth are not susceptible to this condition.

Symptoms.—In most cases the disease reaches an advanced stage before clinical symptoms are noticed. Later characteristic clinical symptoms are:—fœtid breath, fistula or tumefaction of the jaws and difficulty in

mastication when the abscess has broken into the sinus, there soon results a unilateral discharge; there may be some anorexia, rejection of partially masticated food, dislike for cold water, turning the head to one side while masticating and occasionally evident necrosis of the crown of the tooth. Relatively the fourth superior molar is most frequently diseased. Of the total of 200 cases of alveolar periostitis, 119 involve the fourth superior molar, the fifth superior, the third superior and the fourth inferior are next in the order named; very rarely is the first superior, or the sixth superior affected. The second superior was not found affected until 232 cases were investigated.

Treatment.—Removal of the offending tooth is a proper line of treatment. When the tooth produces no inconvenience and when it cannot be removed by forceps-extraction it should be left alone. In many of these cases, although the tooth is a dead foreign body becoming encysted in a protecting wall, causes no further trouble. In these cases many operators place the offending tooth out of commission, by cutting off with a pair of claw-cutters, the crown of the opposing molar. A diseased tooth when its removal is necessary may be removed by one of the following methods and attempts should be made to remove it in the order in which operations are named :—

1. Forceps-extraction.
2. By removal of the external alveolar plate.
3. By repulsion with punch and mallet.
4. By splitting with chisel and mallet.

Forceps-extraction.—Forceps-extraction should be adopted as the universal method of removal in all cases where the crown of the tooth is long enough and strong enough to be handled in this way.

Whether the patient is in standing position or in recumbency the extraction depends entirely upon the competency of the patient and skill of the operator.

With many animals it is sufficient to back the animal into a single stall; apply a twitch and speculum, and proceed with the extraction. If the animal resists it should be placed on the operating table or cast in lateral recumbency and head lightly elevated by placing under it grass or straw. If the tooth is at all firmly implanted nerve blocking should be resorted to. This must be more frequently resorted to in the case of young animals.

Technic.—It is a good practice to first separate the gums and tooth to be extracted. It is needless to attempt to extract the tooth that is not loose in its socket. If the diseased process has not loosened it this should be accomplished by firmly grasping the crown with molar extractor by very gentle and slight lateral movement in an attempt to loosen the implantation of the tooth. These movements may result in fracture of the jaw if they are carelessly applied, or, if the operator does not guard against the side movements of the animal's head.

After the tooth has been loosened the operator again makes certain that the extractors are firmly applied, then a fulcrum is placed between the sound teeth and the handles of the instruments and the diseased tooth extracted.

After the tooth has been extracted and in order to prevent the packing of the food in the alveola the crown of the opposing molar should be cut off close to the gums with the claw of the tooth cutter.

Accidents of the extraction.—

1. **Fracture of the crown.**—This is very likely to occur when the tooth is badly diseased or when the manipulations to loosen the tooth are too vigorous. It should be guarded against because after it has taken place it will necessitate a more serious operation than extraction to remove the diseased tooth.

2. **Palatine hæmorrhage.**—This is a serious condition and may endanger life. It is caused by the animal chewing forcibly upon the end of the internal jaw of the

forceps while the latter is being adjusted to one of the upper molars.

Treatment.—As soon as the accident occurs the operation must cease and the animal's mouth must be packed full of cotton, gauze, or other suitable packing material. If there is any delay in getting this packing material the operator should hold his finger over this breach until the packing arrives. After the mouth has been packed full the jaws are closed tightly by encircling them with several straps of cord or other leather straps. The animal is then backed into a single stall, kept on pillar rings and out of the sight of food for at least six hours until the packing is safely removed.

3. **Hæmorrhage from the Dental Artery.**—This may be very profuse but is easily controlled by suitable packing of the alveolus.

After-care.—The alveolus should if possible be washed out daily with potassium permanganate solution and should be packed lightly every day. The packing should not be so light as to prevent the alveolus from closing up. Purpose of the packing is to prevent food filling the alveolus.

In those cases where it is not practical to give the animals daily treatment the best that can be done is to cut off the crown of the opposing molar. If the alveolus does not heal promptly a search should be made for small particles of tooth that may be adherent to the wall of the alveolus.

By removal of the external alveolar plate.—If extraction fails or cannot be applied the second preferred operation in the case of the first, second or third upper molars is by removal of the external alveolar plate. This operation has no advantages over punching out tooth in-so-far-as the inferior molar or last three upper molars are concerned. This operation is of advantage in the case of last three upper molars because it results in serious deformity of the face when performed in that region.

This operation is almost indispensable for the first three molars. Repulsion of the first three molars is difficult because of the almost perpendicular side of the face and the punch cannot be placed in straight line with it.

A properly placed punch for one of the first three molars will necessitate considerable destruction of nerve tissue.

Technic of the operation.—shave and disinfect the area over the root of the tooth. Make an incision 2 inches long through the soft tissues parallel to the long axis of the head and overlying the deepest parts of the root of the tooth.

Next, separate the soft tissues from the skull from the incision down to the gingival margin of the tooth to be removed. Then, with a saw cut through the skull along the interdendum on each side of the tooth; then, with the bone chisel connect the two incisions superiorly by the saw. The next step is to pry loose with a chisel the plate of bone.

The next step consists in trying out tooth to be removed. This is the most difficult part of the operation and no prescribed method will work in all cases. Generally speaking a chisel and mallet are the most beautiful instruments for this purpose.

Final steps of the operation consist in suturing the soft tissues, packing the alveolar cavity and removing the crown of the opposing molar.

After care:—This is similar to other methods of removal.

(To be continued).

DOG'S PLACE IN HISTORY

BY S. K. ACHARYA, G. B. V. C.,

Vet. Asst. Surgeon, i/c Laboratory, C.V.D. U.P., Agra.

From time immemorial dogs have, through their intelligence, skill and heroic deeds succeeded in occupying an important place in history.

There are innumerable striking instances where dogs have displayed their intellect, faithfulness and bravery with remarkable success. I would not like to put them down here, as every-one of us have heard and read about them, but I would endeavour to tell something about dogs of historic importance in brief.

It is difficult to ascertain when for the first time dogs were brought under domestication, but there is no doubt that they have been in the services of men from a very very remote age.

More than a thousand years before the birth of Christ, Cambysis' engaged dogs during the time of attacking Egypt. Dogs were also said to have been engaged by Agislaus while capturing Mantinea. Plutarch and Pliny have also mentioned about war-dogs in their works. Aeneas has mentioned about dogs, who used to carry messages, tied round their necks, from one place to another.

During wars, company of dogs, armed with spears and other weapons were used for carrying food and other useful accessories and they were real cause of panic to the enemy.

Attila, king of Huned, had a large number of dogs to guard the camps. Romans used to keep dogs as fort-guards, and these dogs could, by their power of smelling, scent the advance of enemies from long distances. Mount Philip and Edole of Spain also used to retain dogs to guard the forts.

Pling, king of Gramante was able to bring back under his control, by the help of his dogs, his lost kingdom.

Christopher Columbus, the discoverer of America had two famous dogs 'Bercillo' and 'Leoncillo' and they are renowned in the history of the world for their bravery.

Frederick the Great of Scotland ordered Field-Marshal Keith to secure 'Collies dogs' and engage them as guards.

When Charles V, Emperor of Spain, was engaged in war with France, Henry VIII, king of England, helped him with 400 war dogs, 'garnished with good yarn collars,' these dogs displayed wonderful war-tactics during the capture of Valencia and Charles was so much pleased with their bravery that he presented them before his Spanish soldiers as an example.

In the year 1779, during the capture of Dubnitz, the Turks were able to drive away the Austrian soldier guards with the help of dogs.

In the year 1779, on the 21st January, Napoleon wrote a letter to Marmont, in which he said, "They ought to have at Alaxendria.....a large number of dogs, which you can easily make use of by fastening a large number at a short distance from your walls."

The famous dog 'Moustache' is renowned in the history for heroism and bravery in the wars of Consulate and Austerlitz.

A band of Austrian conspirators contemplated to attack suddenly on the French and were hiding in the valley of Balbo for this purpose. It was this dog Moustache, who informed the French of the danger, and thus saved them from crisis. An Austrian spy was captured by this dog while entering the French camps.

In the battle of Austerlitz Moustache recovered the regimental flag from the Austrians with great skill and bravery and as a reward to this great work Field-Marshal Lannes himself dressed this dog with military garments of honour and respect.

In the year 1882, the citizens of Athens were alarmed by dogs during its capture for the second time.

Dogs were used by Americans during wars, and in the year 1870, the Germans introduced the system of maintaining war dogs.

In the Russo-Turkish war, dogs were used on both sides.

In the Indian history there are references of furious dogs 'Dal-kuttas' maintained by the Mohammadan emperors.

William I. Conqueror of England had a special liking for blood-hounds. He introduced these dogs in England which were subsequently known as English Blood-Hounds.

In Europe, dogs were used as village guards. In the year 1770, the system of engaging police dogs was introduced for the first time in St. Malo.

In Europe and America, large contingents of dogs are still maintained by the police and criminal intelligence departments. Blood-hound, Bull-Mastiff, Airdale, Terrier and Collie dogs are most successful for this work. These dogs are also very suitable for ambulance and are engaged during wars for this purpose.

In conclusion, I would like to point out that dogs have played a very important role in the various spheres of world's activities and their names are associated with prominent peoples of world's history.

Dogs have been honest friends, brave soldiers, fighting for the King and Country, faithful servants, loyal to their masters, good police guards and intelligent detectives, helping to detect crime and to maintain the law and order of the country.

CLINICAL ARTICLES.

MIXED INFECTIONS AND SIMULTANEOUS ATTACKS OF TWO INFECTIVE DISEASES IN ONE ANIMAL.

BY S.K. ACHARYA, G.B.V.C.

Vet. Asst. Surgeon i c Laboratory. C.V.D. U.P. Agra.

During the last Kumbha Fair at Hardwar, I was deputed to subject a horse to Mallein test, segregated on suspicion of glanders.

History: No definite history could be obtained from the owner, except that the animal looked dull for the past ten or fifteen days.

Symptoms: On the 2nd of April 1927, at 8 A.M. the horse was examined and the symptoms were as follows:—

1. Conjunctival mucous membrane highly congested.
2. Ulceration in the off nostril.
3. Mucopurulent discharge from both the nostrils.
4. Oedema of the hind limbs.
5. Inflammation of the submaxillary lymphatic glands.
6. Emaciation.
7. Temperature 100.4° F. (the temperature on previous days rose up to 104° F.)

From the above symptoms it could be strongly suspected that the animal was suffering from glanders.

Mallein-Test: On the 2nd April 1927, 9.30 P.M., the horse was subjected to Mallein-test. The temperature of the horse, immediately, before the injection, was 100.2° F.

Thermal Reaction: On the 3rd of April, at the 9th, 12th and 15th hours, after the injection, the temperature of the horse, was 101° F. 100.8° F. and 103.2° F. respectively, and at 6.30 P.M., the temperature was 103.2° F.

Swelling Reaction: On the morning of the 3rd a swelling was found to have formed at the seat of injection, which assumed a size of about 5 inches and was hard and painful to touch. The swelling did not vary in size till the morning of the 4th, afterwards it began to decline slowly and disappeared totally by the morning of the 5th. April.

From the above result the animal could not be confidently declared as glandered, but the case seemed to me extremely doubtful. The Superintendent, Civil Veterinary Department, United Provinces, Agra, was telegraphically informed of the result and I was instructed to retest it on the evening of the 7th April.

The animal was again subjected to test but with no satisfactory result. The thermal and swelling reaction did not answer satisfactorily to the test as on previous occasion.

The animal was again carefully examined, petechial spots were found in the conjunctival mucous membrane, which developed in the mean time, and the swelling of the posterior limbs, which extended upto the hock joint gave room for the suspicion of "Surra" also.

Accordingly blood smears from the case were taken and examined under the microscope at the Infectious Diseases Hospital, Hardwar. After a careful examination of a number of blood smears for two consecutive days, only one parasite of Surra-'Trypanosome', was found. The microscope was then taken to the segregation camp and fresh blood examined under cover slips, but no more parasites were found.

I am thankful to the Officer-in-charge, Infectious Diseases Hospital, for the courtesy and help extended to me.

Another point of interest with the case was that the urine was whitish in appearance and contained the sediment of a ropy character, which signified the presence of pus in urine, due to purulent nephritis.

Points of Interest:—(1) From the above it is evident that one and the same animal can be attacked with two infective diseases at one and the same time.

(2) That the diagnosis in such cases is met with great difficulty.

(3) That such cases are very rare.

(4) That in addition to glanders and surra, pyuria was also present in the above case, which was due to purulent nephritis.

A CASE OF MULTIPLE ABSCESES IN AN ELEPHANT TREATED SUCCESSFULLY WITH INTRAVENOUS INJECTION OF TR. IODINE.

BY S. B. DAS GUPTA, G. B. V. C.,

Veterinary Assistant Surgeon, Cox's Bazar, Chittagong.

In response to the request of the Deputy Conservator of Forests, Cox's Bazar Division, I went out to Bhomariaghona on 28th February, 1926, to examine one elephant, Joytara, belonging to the Forest Department which was reported to be suffering from multiple abscesses. On my first observation, I found that the elephant was poor in condition and that five abscesses had been incised at different parts of its body by the mahut. I examined the elephant and was led to believe that some systemic derangement was responsible for this condition. I had to rely on the attendant or mahut for the previous history of the case, but I had to struggle hard to get the true history from him, because I found that he was trying to conceal facts probably to hide the mistakes he had committed by way of treatment given to the elephant in the preliminary stage.

History of the case as given by him was as follows:—

In the early part of November 1925, this Government elephant was off feed for a day or so, during which time

an extensive swelling was noticed in the near hind leg extending from thigh to the lower part of the shank. The mahut treated that inflammation with fomentation and with the remedies that were known to him which he evaded mentioning. He continued this for some days, and one abscess on the abdomen and four abscesses on the near hind were noticed. From November 1925 to January 1926, fourteen abscesses were opened and treated by him. But finding all his efforts unsuccessful, a requisition was made by the Range Officer, Bhomariaghona, to the Deputy Conservator of Forests, Cox's Bazar, for a Veterinary aid. Lastly a hint was given to me by the mahut that there was a wound on the sole of the near hind leg, to begin with, before the first swelling on the leg was observed. The wound was treated by him and it healed up.

The above facts led me to believe that the animal was suffering from pyemic infection. I informed the Deputy Conservator of Forests about the condition of the elephant, who sent an urgent order to the Range Officer to send the elephant for my treatment.

The elephant was placed under my observation on 19th March, 1926. There were then five unopened abscesses present. Appetite was alright, but the bowels were irregular. No other symptoms were noticeable.

Treatment.—The animal was given the following powders.

R Pot. Iodide 4 dr.
Ferri Sulp. 2 dr.
Pulv. Nux. 2 dr.

Mft. Pulvis I. to be given twice daily.

The wounds created by the mahut by incising the abscesses were enlarged and dressed with cyllin lotion and Tinct. Iodine. On 21st March, 1926, I opened two abscesses, one on the right buttock and one on the right side of the chest.

During the period from 19th March, 1926 to 28th March, 1926, no improvement was observed by the above

treatment and as several other small inflammatory swellings were developing upon different parts of the body and because an extensive inflammation was noticed on the right hind thigh, it was decided to try an injection of "Streptococcus—staphylococcus bacterin". Endeavours were made to obtain this but it was not procurable.

I next thought of trying intravenous injection of Iodine and it was given. The most suitable place for intravenous injection in elephant is on the back of the ears where veins are most superficial and prominent. The seat of injection was washed first with soap and water and then with rectified spirits.

Tr. Iodine Rectificatus was used as follows:—

1st injection on	28-3-26	...	15 mins. Tr. Iodine with 1½ c. c. of normal saline.
2nd "	30-3-26	...	25 mins. Tr. Iodine with 2 c. c. of normal saline.
3rd "	1-4-26	...	35 mins. Tr. Iodine with 2½ c. c. of normal saline.
4th "	3-4-26	...	45 mins. Tr. Iodine with 3 c. c. of normal saline.
5th "	5-4-26	...	55 mins. Tr. Iodine with 3½ c. c. of normal saline.
6th "	7-4-26	..	1 dr. 5 mins. Tr. Iodine with 4 c. c. of normal saline.
7th "	9-4-26	...	1 dr. 15 mins. Tr. Iodine with 4½ c.c. of normal saline.
8th "	11-4-26	...	1 dr. 25 mins. Tr. Iodine with 5 c. c. of normal saline.
9th "	13-4-26	...	1 dr. 35 mins. Tr. Iodine with 5½ c.c. of normal saline.
10th "	15-4-26	...	1 dr. 45 mins. Tr. Iodine with 6 c. c. of normal saline.
11th "	17-4-26	...	2 dr. Tr. Iodine with 7 c. c. of normal saline.
12th, 13th and 14th "	19th, 21st, and 23rd April 1926.		2 dr. Tr. Iodine with 7 c. c. of normal saline.

After the 2nd injection, the extensive inflammation on the thigh disappeared and the small inflammatory swellings gradually disappeared. During the course of the injections the three swellings did not show any signs of absorption. So they were opened and two of them contained pus. One big inflammatory swelling on the

lumbar region was left unopened but subsequently when opened it did not contain pus.

From 24th-April, 1926 to 7th June, 1926, I kept the elephant under observation, and it was given two drachms of Pot. Iodide daily for fifteen days.

The elephant was discharged cured on 7th June, 1926.

SPIROCERCA SANGUINOLENTA IN THE ŒSOPHAGUS OF TWO DOGS.

BY M. V. PILLAI, G.B.V.C.,

Assistant Veterinary Surgeon, Municipal Veterinary Department, Penang.

This disease does not seem to be very common in this country, but the writer has had the opportunity of seeing two cases of a very interesting nature which were diagnosed only after post-mortem examination. The short history of these two cases will be of interest.

Case No. 1. A fox-terrier dog, the property of an European, was admitted into the infirmary for treatment of a wound on July 6th, 1926. The wound, having healed up, the animal was sent to the convalescent ward, where, after a few days, the temperature rose up to 105° F. The animal was therefore sent back to the infirmary for further treatment. As a result of continuous fever which went on for nearly a fortnight, symptoms of gradual emaciation became more marked. Appetite remained more or less normal throughout. Difficulty of respiration led to the suspicion of pleurisy. Examination of blood smears and fæces proved negative. Towards the latter part vomiting developed. The vomited matter contained only mucus. The pulse became weak. Oedema of the submaxillary space developed and the patient finally died on July 29th.

A systematic treatment according to the symptoms presented was adopted. Special attention was directed

to keep up the strength of the patient by a variety of nourishing foods.

Post-mortem findings were interesting and they were confined only to the thoracic cavity which was full of purulent effusion measuring about eight ounces. The pleura and pericardium were inflamed. In the thoracic portion of the œsophagus, two tumours were found. One was as big as a pigeon's egg and the other a little smaller. On cutting these tumours small compartments were present containing pus in which were embedded seven worms of a blood-red colour—four in the big tumour and three in the small.

Case No 2. was an airdale bitch, aged about three years, admitted for treatment of a flyblown wound inside the ear on 19-7-26. It took nearly a fortnight to heal the wound and unfortunately the animal had to remain in the hospital for more than a month and a half as the owner was away from Penang for a long time. On close observation every day the dog was noticed to show loss of spirits in spite of great care bestowed on it. Though it was taking its usual food symptoms of emaciation were soon observed. The temperature throughout was normal. Usual examination of blood and fæces proved negative. The animal was put under a regular course of tonics and special food. On the 25th of August, the bitch suddenly started vomiting immediately after its morning feed. Since then the respirations were found to be hurried and the bitch was very dull. The animal died the same night.

On post-mortem examination the thoracic portion of the œsophagus was found to contain three tumours, which when cut open showed worms numbering seventy-three. No pleurisy was seen. What could have been the cause of death? due to the large number of parasites? I am not sure whether any one of my professional brothers had the chance of seeing such a large number of worms from œsophagus of dogs.

TRANSLATION.

ASVAVAIIDYAKAM—EQINE MEDICINE.

BY SRI MAHASAMANTA JAYADATTA.

*Translated into English from the original Sanskrit with notes and commentaries, By Nripendra Nath Majumdar.**(Bengal Veterinary Service.)*

(Continued from 3rd issue, Vol. III. page 226.)

Chapter III. (contd.)

Pundraka¹—Star Marks.

Sl. 73. Now shall I describe the signs and indications of star marks, in due order, as had been said by the sages who had knowledge of their true significance.

Sl. 74. Stars of the shape of a mother of pearl (Sukti),² a conch shell (Sankha), a wrestler's club (Gada), a scimitar (Khalga)³, a lotus (Padma), a discus (Cakra)⁴, an iron goad used in driving elephants (Ankusa), or a bow (Sarasana), are said to be auspicious.

Sl. 75. (Stars) of the shape of a fish, a vase with a spout, a temple, a garland, an altar or platform, a sacrificial post, a Sribrksa,⁵ or a mirror (round), are said to be lucky.

Sl. 76. A mark extending over the head, forehead and the face, specially when it is straight, is always very much adored.

Sl. 77. Those (Star) marks that resemble a hill, moon, flag or a wreath of flowers, are always adored and are said to bring in a good harvest and prosperity (to its owner).

Sl. 78. These, according to the Sastras, are the lucky marks and now shall I briefly describe the unlucky ones.

1. Pundraka lit. means the mark or line on the forehead of a man made with sandal or some such thing.

2. Sukti is the general term for shells but is generally used to mean pearl oysters; it also denotes the heart-shaped cockle which is probably meant here.

3. Pronounced as Kharhga.

4. Cakra (Chakra) is sharp circular weapon used by the ancients in battle.

5. Sribrksa is a row of white hairs on the breast of a horse. See Sl. 70 of this chapter.

Sl. 79. Star marks of a black, red or yellow colour and those resembling the shape of a crow, a heron, a headless trunk, a serpent, a vulture or a jackal are (not praised) inauspicious.

Sl. 80. Star marks running obliquely or tortuously, or severed, or like a chain, or like a spear-point and placed on the left side are unlucky.

Sl. 81. Star marks of a dirty colour like that of a coated tongue or ash colour, or of a mixed or variegated colour are not praise-worthy.

PUSPA¹—Dot marks.

Sl. 82. Marks like dots and of a different colour (from that of the horse) and which appear adventitiously on the body of a horse, are called Puspa (points or dots) and are also indicative of good or bad. (i.e. prosperity or adversity).

Sl. 83. Now I am going to describe briefly but clearly their indications that have been established according to their position and distribution.

Sl. 84. Such marks (Puspa) on the anus², forehead, eyebrows, ears, neck³ and on the place where the mane ends, are said to be auspicious.

Sl. 85. Dot marks on the shoulders, breast, flank, scrotum,⁴ forearms,⁵ mane,⁶ jaws⁷ and back of a horse are also indicative of bringing good to its owner.

Sl. 86. Such marks on the naval region,⁸ throat and

1. Puspa means flower, but here it is used to mean a point. They are not congenital, but appear on the body afterwards.

2. The words 'Apāna' and 'Bhrūva' in this sloka should be 'Prapana' and 'Srūva' respectively. Apāna is anus and Bhrūva is eyebrows. Dot marks on those places have been described to be inauspicious in slokas 88 & 89. Moreover, it is quite reasonable to infer that the author, when describing the face will not go over to the other end. The sloka, therefore, will run thus.—Such marks on the upper lip, forehead, head, ears, neck and on the part where the mane ends, are said to be auspicious.

3. Neck—that portion where bells are tied, i. e. Nigala.

4, 5, 6, 7. These words have been used in the dual number which indicates that they should be on both the sides. If on one side only, they are not lucky.

8. In the text it is—"Nabhokese" i. e. naval and mane, but Kesa-mane has already been mentioned in the preceding sloka. Two other mss. showed "Nabhidase" i. e. naval region. This being more appropriate has been accepted.

teeth of a horse, have been said to be the most auspicious and fulfil every desire of its owner.

Sl. 87. Those that had been found by the sages to be inauspicious I shall now describe, according to the Sastras.

Sl. 88 & 89. Dot marks on the lower lip, tip of the nose, upper lip, face, cheeks,¹ angles of the mouth, temples,² eyebrows,³ neck, the portion between the forearms, the portion where the collar rests, croup, loins, anus and point of the hock, are always condemned.

Sl. 90. Dot marks of a red, yellow or black colour on any part of the body are not desirable. But when occurring on the auspicious parts, they are neither lucky nor unlucky.

Sl. 91. Dot marks on the auspicious parts bring in sons, health, wealth and success to its owner, while those on the inauspicious parts are indicative of opposite results.

Sl. 92. A horse with dot marks on all over the body should no doubt be rejected.

GATI¹—ACTION.

Sl. 93. A horse that is cheerful and runs swiftly, lifting the legs high up as if they touched burning coal, is said to have a good action (and pace).

Sl. 94. A horse with an action resembling that of an ox, an elephant, a lion or a tiger, is adored, but any other kind of action is not desirable.

Sl. 95. A short or contracted, hideous, unsteady, inelegant or dissymmetrical, too high or any odd or peculiar action is condemned.

Sl. 96 & 97. A horse that can cover a distance of 200 cubits and come back within the time taken up in performing 16 fillips with the fingers, is said to have a fast pace; and that which covers a distance of 10 cubits less

1, 2, 3.—See 4 last page.

1. Gati = Action, pace and speed.

than the above within the time, is Medium; and another 10 cubits less, is Adham or the Inferior.¹

VARNA—COLOUR.

Sl. 98 & 99. Salihotra and others have mentioned about colours like those of the ruddy goose or Brahmini duck and pink or pale red etc., but those are not found at present (so) I shall describe briefly and in due order, those colours only that are now well known and are found on the body of horses.

Sl. 100. A white² horse is called Kokaha, a black one-Khungaha, a yellow one-Harita and a red one is termed Kasaya.

Sl. 101. A horse with a colour like that of a ripe palm fruit³ (reddish brown—dark bay) is called Kayaha, a cream coloured one is Seraha and a horse with a colour like that of an ass is called Suruhaka.

Sl. 102. A blue horse is Nilaka and a yellowish brown or tawny coloured is Triyuha and Khilaha is triyuha with pale yellow mane and tail. (Possibly chestnut)

Sl. 103. Halaha is of a variegated colour, Khalgaha is white and yellow (Skewbald?) and a horse with a yellowish colour but with black knees, is Kulaha.

Sl. 104. A yellow horse with black knees, and face and a black line along the vertebral column is Uraha.

Sl. 105. Veruhana is a horse with a pale red colour.

Sl. 105 and 106. A horse with a colour resembling that produced by a mixture of red, yellow and brown, is well known as Ukanaha.

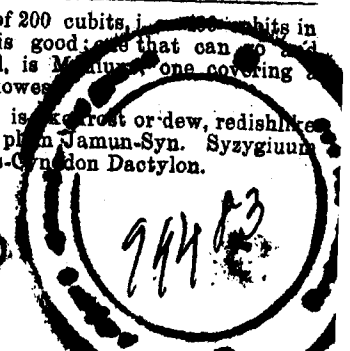
Sl. 106 and 107. Now shall I describe in regular order the distinctions in the above mentioned colours according to the occurrence of the star marks.

1. A horse that can go and come back a distance of 200 cubits, i.e. 300 cubits in all, in as much time as is taken in performing 16 fillips, is good; one that can go and come back a distance of 190 cubits i.e. 380 cubits in all, is Medium; one covering a distance of 180 cubits i.e. 360 cubits in all, is Adham or lower.

2. White is possibly grey. Nakula says:—White is like frost or dew, reddish like saffron, yellow is like turmeric, black is like the black plum Jamun-Syn. Syzygium Jambolanum, Eugenia Jambolana, blue is like Dub grass-Cynodon Dactylon.

3. Borassus flabelliformis.

KZ m 2, N 24
N 27-4.)



Sl. 107. A Kokaha (white or grey horse) with a star is Kokuraha.

Sl. 108. A Khangaha with a star is Khararaha and a Harita (yellow) is Harirohaka. A Kalaha (Kayaha-red-dish brown) with star is Vollaha and a Seraha (Cream coloured) is Sarurohaka.

Sl. 109. A Kulaha (with stars) is Kulraha and a Suraha (Suruhaka-colour like an ass) is Sarurahaka and a Voruraha (Veruhana-pale red) is termed Viruraha.

Sl. 110. A Dukulaha (Ukanaha-mixture of red, yellow and brown) with stars is Dururaha and a Triyuha (yellowish brown) even with a variegated colour is Triyuraha.

Sl. 111. Now shall I describe the good or bad (indications) of the colour of a horse's body according to the afore-mentioned Sastras.

Sl. 112. A horse with a coat having white and yellow hairs or red and white hairs brings in prosperity to its owner.

Sl. 113. A horse having all the four points, breast, face, head and tail white is known as Astamangal.

Sl. 114. Large and black irises (of the eye) are commended by the sages, while those with a mixed colour of red and yellow or black and white are not praiseworthy.

Sl. 115. & 116. When the iris is black, but with a white rim around, it is known as Mallikaksa which is very auspicious and increases the happiness of its owner. White iris is unlucky and brings in distress to its owner.

Sl. 117. The worthy sages have said that horses that are white, or red, or black or yellow throughout, are war horses.

Sl. 118. The Harita (yellow) horses are surely born for the good of kings and are indicative of health, wealth and success.

Sl. 119. A white horse with dark ears (known as Syamkarna) and red face and yard is commended and so also one with a colour like that of a dove or a pigeon but with white mane.

Sl. 120 & 121. A horse with white face and points is auspicious and one that is whiter in the face is called Pancabhadra.¹ And one with white round patches (possibly dapple grey) fulfils every desire of its owner.

Sl. 122. A horse with a faint yellow line along the spinal column or one with a black and white head is not commended.

Sl. 123. A horse with its head and tail coloured differently from that of its body or having its head and tail of a variegated colour, is condemned.

Sl. 124. A horse with an obscure or indistinct colour, or with a colour like that of a Francoline partridge, or with eyes like that of a monkey, or with a tongue like that of a tiger, is condemned.

(To be continued.)

THERAPEUTICAL NOTES..

BY MANTHAYAM.

1. *Oedema*:—In oedema in animals chemical examination of the blood indicates increased retention of chlorides and urine shows low NaCl except during the periods of elimination. The efficacy of the treatment in this affection is best obtained by avoiding sodium chloride.

2. *Anthelmintics*:—The anthelmintics which are maximally parasitrophic and minimally organotropic is the ideal one. Santonin complies with the ideal.

3. *Pruritus*:—A course of the thyroid gland extract is recorded to have often produced the desired result in chronic pruritus in small animals. Pot. Bromide, internally, is also said to produce equally good results.

4. *Azoturia*:—1. Hypodermic injection of 1 dram of Adrenalin chloride (1 in 1,000 normal saline) 3 times a day.

2. Hot packs of salt over the loins and quarters.

3. Internal administration of Pot. Nitrates, Sodium chloride, and Calomel.

1. Pancabhadra is now known as Panchkalyan.

4. Allow as much water as the animal desires.

(W. C. Miller in Vet. Rec.)

5. *Identification of rinderpest hides*:—If a hide is held up to the light, the rinderpest hide presents a typical skin eruption; and in the tanned skin the erythematous areas either show up as weak, thin, soft patches in the leather or in aggravated cases fall out completely.

(Vet. Rec.)

Barbone Bacilli:—Barbone Bacilli (H.S.) is considered by Veterinary authorities in Siam as a natural harmless inhabitant of the bodies of healthy cattle and the pathogenicity of the invading organism is favoured when the vital defences of the body is lowered by prolonged and wearisome train journey or other similar contributory causes.

7. *Coal gas poisoning*:—Treatment is bleeding and injection of normal saline.

8. *Salt-licks in Elephants*:—Withhold grain ration till the dung is free from earthy smell and colour. Avoid bathing the animal. Feed on leaves and branches of *Ficus* trees. From on the third day for three days give balls containing half to one pound (according to the size of the animal) of Sodium chloride in double the quantity of jaggey or castor oil leaves, twice a day.

9. *Cleaning devitrified slides*:—Devitrified slides may be cleaned by allowing them to remain in a 3 p.c. solution of iron alum for a variable length of time, depending upon the degree of milkiness and then rubbing them while in the solution between the finger and the thumb. They are then washed and dried and are ready for use.

(Trop. Vet. Bulltn.)

Urotropine, Citrate of Soda and Bromide of Ammonia in the Treatment of Epilepsy:—Dr. E. J. McC. Morris, in the *Lancet*, says:—Recently I have investigated the treatment of epilepsy in the light of my belief that an important factor in the causation of this disease is the colon bacillus; and the one outstanding result of my investigations is the

discovery that the power possessed by ammonium bromide of preventing epileptic fits is decidedly raised by administering with this remedy urotropine and citrate of soda. In almost every case of fits under my care, I now give two separate prescriptions, as follows. (1) Ammonium bromide 4 drs., urotropine 2 drs., Chloroform water to 6 drs. Sig. one teaspoonful in water night and morning. (2) Sodium citrate, 6 drs. Sig. one teaspoonful in half a tumblerful of water night and morning. Under the action of the medicines shown in these two prescriptions the fits in all my cases have so far disappeared. In one remarkable case of hystero-epilepsy, where attacks were occurring at the rate of three to eight a day, and where 20 gr. of bromide thrice daily, failed to control them, the use of these prescriptions in a short time caused them to cease. (*Practical Medicine, January 1927.*)

Ether in the Treatment of the Middle Ear Suppuration:—Dr. G. B. McAuliffe, M. D., Assistant Oto-laryngologist to Cornell University Medical School, has expressly proved the value of ether in discharging ears and won a series of seventy-five cases. His technic is as follows:—The ears are thoroughly cleansed by a boric acid irrigation, partially dried, and then, with the affected ear uppermost, the canal is filled with ether. The patient remains in that position until the ether has evaporated. This treatment is given twice a day. Ether boils at 95 degrees so it gives the patient the same sensation as peroxide of hydrogen. It is an easy method for home treatment, where syringing, at best, is not always one hundred per cent efficient. (*Practical Medicine, April 1927.*)

Treatment of Ankylostomiasis by Glycerin:—Twenty-two patients with ankylostomiasis have been treated with glycerin by Shelley on the theory that as the mature parasite usually occupies a portion of the duodenum or the proximal part of the jejunum, if the glycerin could be given in such an amount as to form a pool around the parasite, it would dehydrate it, and by so doing kill it.

The method of administration is as follows: The patient remains one day in bed on a liquid diet. One ounce (30 gm.) of magnesium sulphate solution is administered in the evening. Next morning from 3 to 5 drachms (11 to 18 c. c.) of glycerin is given. One ounce of magnesium sulphate solution is administered the same evening. The advantages of this method are said to be that it is entirely free from danger and it rapidly relieves the abdominal pain. (*Practical Medicine*, May 1927.)

EXTRACTS

RECENT ADVANCES IN THE PROTECTION OF CATTLE AND OTHER ANIMALS AGAINST DISEASE.

I. COCCIDIOSIS WITH PARTICULAR REFERENCE TO BOVINE COCCIDIOSIS AND ITS SIGNIFICANCE AS AN INFECTION OF CATTLE IN INDIA.

BY HUGH COOPER, M.R.C.V.S.,

Pathologist, Muktesar.

(Reprinted from 'The Agricultural Journal of India, March 1927')

The coccidia are microscopic organisms belonging to the Order Sporozoa of the Protozoa. As is well known, the Order to which they belong embraces also a number of other important parasites of man and animals, including the causative organisms of malaria of man and "piroplasmosis" of animals.

In a great many of the sporozoa two distinct stages occur in the life-cycle: one of these is spent in the animal host whilst the other takes place in the vector, or transmitting agent, such as a tick or a fly. But in the case of the coccidium one stage is spent in the animal, and the other in the outside world.

The life-cycle of the coccidium within the animal is a complicated one which results finally in the liberation of a very resistant body, the encysted egg or oocyst. The oocyst must now spend a certain period of time in the outside world exposed to air and moisture, and during this time minute spores are formed within it, which in turn must reach the cells of another animal in order to complete the life-cycle.

In a great number of cases coccidia are parasites of the intestinal tract of animals, and from this position the oocyst is able to escape easily in the faeces to the outside world and the spores can also readily gain entrance to other animals in food or in drinking water. Invasion of the animal body by coccidia is not, however, restricted to the intestine. The urinary tract has also been found to harbour these parasites. Infection of the kidneys and ureters in birds is known, and invasion of the bladder has been reported in cattle. The liver is involved very commonly in rabbits, but oocysts that develop in this organ are believed to be unable to escape from it, and so to complete their life-cycle. The same phenomenon is known in the case of liver abscess in man, caused by amoebæ.

Interest is centred for a number of reasons upon the stages in the life-cycle that takes place in the outside world. The oocyst, as it occurs in the faeces of animals, is distinctive and easily recognizable, and it is upon the demonstration under the microscope of this body that a diagnosis of infection in an animal is usually made. The earlier developmental forms, while within the animal cells, are more difficult to find or to recognize with certainty, for indeed in many cases the complete life-cycle has not yet been fully worked out. On the other hand, it is not a difficult matter to follow completely the changes that occur within the oocyst outside the animal body. The division into spores can be watched in the laboratory, and upon the characters of this division the

species of coccidia are differentiated, for several species of the parasite are recognized.

Coccidia have an exceedingly widespread distribution among animals, including man, most of the domesticated animals, carnivora, birds of all kinds, and even reptiles and still lower forms of animal life, extending to the invertebrates. It is of interest that intestinal coccidia have probably never yet been found in the Equidæ—a division which embraces horses, donkeys, mules, etc. Recently, an examination of a small number of various animals has been undertaken at the Muktesar Institute, and infection has been found to occur in bovines, buffaloes, sheep, goats, ducks, geese, turkeys, and in domesticated and wild pigeons.

The occurrence of coccidium was first recorded in the rabbit, and when infection of other animals was later detected, the rabbit coccidium was frequently incriminated as being responsible for infection in these animals also. Coccidia of both man and cattle have been thus stated to be identical and to have originated from rabbits. This supposition is now known with certainty to be without foundation, and the coccidia do not appear to be an exception to the general principle of parasitism and host-speciation, namely, that each kind of animal harbours its own species of parasite.

In what appears to be a most common form of coccidiosis infection of animals, no noticeable effect upon the host is produced. The healthy animal body is usually able to support the parasites and probably to limit their multiplication and thereby prevent widespread invasion of cells.

This appears to be the case invariably in infection of the intestines of man, for no authentic example has yet been reported where any symptoms or lesions are known to have been due to the effects of coccidia. This would appear to be the case also in pigs, whilst, again, a very large number of dogs and cats are infected by these

parasites, and it is probably rarely indeed that any ill effects result directly from the infection. On the other hand, coccidia are capable of inducing a very severe form of intestinal disturbance by rapid and widespread invasion of cells lining the intestine, and this may result in outbreaks of disease among certain animals and cause a large number of deaths. Outbreaks of this nature are illustrated in rabbits. It would appear to be a difficult matter to find an adult rabbit free from coccidiosis, and indeed severe infection is quite commonly seen which nevertheless may still appear to cause no ill effects. Yet in other cases the disease may wipe out the entire rabbit population in a locality, and this disease forms therefore one of the greatest obstacles to the successful raising of these animals on a large scale.

The extent of incidence of the disease amongst rabbits in India will be realized from the fact that during two years and a half (1922-24) at the Muktesar Institute, out of 1,967 *post-mortem* examinations made upon rabbits, only in 349 were no coccidia detected, i.e., over 83 per cent. were certainly infected. Later, when a special concentration method for the detection of very mild infections was adopted, in a period of just more than one year, out of 855 consecutive *post-mortem* examinations, only in 5 (i.e., in less than 1 per cent.) were no coccidia demonstrated.

A similar condition appears to exist in sheep, for in certain places, where careful examination of large numbers of apparently healthy sheep has been undertaken, infection with coccidia has been found to be almost invariable. It has been recorded, however, for example in Egypt, that severe mortality has been found to be due to the effects of coccidiosis. It is, however, amongst birds probably that coccidiosis is found to occur in its severest form. Although, again, an exceedingly large number of all kinds of birds harbour the infection without any noticeable ill effects, yet very severe epizootics have

frequently occurred causing enormous mortality. These outbreaks have mainly been observed in game birds, including grouse, pheasants and partridges, and a mortality of 60 to 70 per cent. or even higher has been recorded.

Since 1922 at the Muktesar Institute, a study has been made of coccidiosis as it affects cattle in India. This disease appears to have a peculiar distribution in that it has been reported most frequently in mountainous or hilly regions. The reason for this is probably the existence of moisture conditions in these regions necessary for the development of the oocysts in the outside world. The oocysts of many animals, for example those of the rabbit, will undergo development readily in a fairly abundant supply of moisture; yet if a layer of more than about one centimeter of liquid covers them, no development will occur. The moisture conditions necessary for the development of bovine oocysts are still more exacting, for although they require a certain amount of moisture, yet no development will occur if the liquid present is even in slight excess, and at Muktesar it has been found to be very difficult to devise methods to satisfy these conditions. At first sight, this would appear to be a paradox by reason of the occurrence of coccidiosis on hill tops, but in reality these regions are not as dry as it might be thought on account of the escape of water from them. Dew is more abundant in the hilly regions than at lower altitudes, and sheltered damp gullies exist which support a luxuriant vegetation. Regions of this kind are ideal for the development of oocysts on account of the protection from desiccation that is thus afforded. On the other hand, valleys and flat country either allow an excess of water to remain or else are exposed to greater desiccation, and in either event they are unsuitable for the development of the oocysts. It was in the mountainous regions of Switzerland that bovine coccidiosis was first discovered in 1878. These mountains are covered by snow in the winter

months, and on account of the protection and low temperature, oocysts of coccidia are probably able to exist from one year to the next and so to infect the cattle which come up to the mountains in the spring time. Bovine coccidiosis has since been found in a large number of countries, but nearly always it is described as an enzootic disease responsible for a characteristic form of dysentery and resulting in a number of deaths.

A careful search of the available literature has failed to find any record of its occurrence in India. In other countries it has already been recognized by a few workers that an apparent relationship exists between coccidiosis and rinderpest, for in the later stages of rinderpest coccidiosis infection has not infrequently been encountered, and a certain similarity between the symptoms of the two diseases has been noticed. During extensive investigations upon rinderpest at Muktesar, it had been realized that a number of deaths occurred at a late period after inoculation with rinderpest virus, and in many of these cases it was difficult to ascribe the cause of death to the effects of the inoculation. For the reason also that the cattle used in the experiments came from the mountainous districts near the laboratory, the possibility of a complication of rinderpest syndrome by coccidiosis suggested itself. This possibility was borne in mind while undertaking the routine *post-mortem* examination of cattle at the Institute, and on 4th August, 1922, the disease was demonstrated to be present in a bull which had died in the circumstances mentioned. It is of interest that a reason that has been given to explain the failure to detect coccidiosis in India hitherto, is that the cattle faeces in this country are collected and made into cakes for consumption as fuel and that in this way spread of the disease is entirely checked (Baldrey, 1906). The real explanation, however, would appear to be the close similarity between coccidiosis and rinderpest, which undoubtedly exists both in incidence and the character of symptoms and lesions.

Rinderpest has so strongly attracted the attention of observers that when deaths have occurred among cattle that have shown symptoms and *post-mortem* lesions characteristic of this disease, such deaths have been invariably attributed to rinderpest.

Following upon the detection of the first case of coccidiosis in cattle at Muktesar investigations that were instituted soon showed that the disease was of common occurrence, particularly among the animals used in rinderpest investigations. It was not, however, until special methods for concentrating the oocysts of the parasite in fæces were utilized, which rendered possible the detection of very mild infections, that a correct appreciation of the incidence among bovines was made. In a paper read before the meeting of the Indian Science Congress held in 1924¹, it was mentioned that at Muktesar a number of (twelve) healthy young hill bull-calves were specially procured in order to attempt transmission experiments with coccidia, and it was found that every one of the twelve calves was already infected. It has now been established beyond doubt, from the large number of examinations made, that hill cattle in the Kumaon and surrounding districts almost, if not quite, invariably harbour coccidiosis infection. Up to the present time, only a limited number of cattle have been examined in other parts of India, but the results of examination of samples of fæces obtained would appear to justify the conclusion that coccidiosis is very widespread in the plains of India also.

Although in the literature upon coccidiosis of cattle it is almost always described as an epizootic or an enzootic disease, yet not infrequent mention is made of concurrent infections, such as piroplasmiasis, pneumonia and other diseases, the most important of these infections mentioned being undoubtedly rinderpest. In another paper of this series the importance of the relationship between coccidiosis and rinderpest has been discussed.

1. Since published in the *Agricultural Journal of India* Vol. XXI, pp. 95-100 (March 1926.)

In other countries a definite train of symptoms and certain *post-mortem* lesions have been described. The experience obtained at Muktesar is that although these symptoms and lesions may be shown by an animal suffering from coccidiosis, yet severe and even fatal affection may occur in which little or nothing characteristic can be found. From the symptoms observed elsewhere the disease has received the name of "red dysentery." This is based upon the fact that a variable quantity of blood mixed with mucus is passed in fæces. Although in every case of severe coccidiosis at Muktesar the presence of blood in the fæces has not been seen, yet in the very large majority of cases it has been noticed, and its occurrence would appear to be the only really characterized symptom shown. The clinically recognizable disease of coccidiosis in cattle then is a true dysentery, which ends either in death or recovery after a short interval of a few days, and it is accompanied by a very severe wasting and debility. A certain diagnosis can only be made by the microscopic examination of the fæces for the oocysts at the height of the malady.

The most striking feature of the *post-mortem* examination of an animal that has died of coccidiosis is the frequent absence of naked eye lesions, in spite of, perhaps, a history of severe intestinal disturbance. Infection by coccidia is almost entirely limited to the mucous membrane of the large intestine, and in spite of the fact that large quantities of blood may have been passed in the fæces by the animal during life, very little alteration in the intestine to account for this may be seen. This is due to the fact that escape of blood takes place from a large number of very minute ulcers, which may be even microscopic in size, or only just appreciable to the naked eye as very small, apparently insignificant, "blood spots" upon the lining of the intestinal wall.

Methods devised to prevent the spread of coccidia have been recommended, but in view of the fact that latent

Infection already exists in probably nearly all cattle in India, these methods are of little practical value in this country. Unfortunately also, up to the present time, all types of coccidia have shown themselves to be remarkably resistant to every form of curative treatment that has so far been tried.

Further investigation is needed in order to understand more fully the circumstances which allow this latent and usually harmless infection to assume the characteristic of a severe and sometimes fatal disease.

II VACCINATION AGAINST BLACKQUARTER IN CATTLE AND SHEEP.

The experience of many workers abroad and of this Institute during the last four years indicates that a satisfactory, active or prolonged immunity can be set up against the above disease by preventive inoculation with a "germ-free," safe product commonly known as an "aggressin." The "aggressin" is prepared by cultivating the germs of blackquarter in suitable culture media or animal tissues, the extracts of which after filtration through a bacterial filter are "germ-free." The "germ-free" filtrate thus obtained contains certain properties elaborated by the germs that are known as "aggressins," which are held to be non-toxic in themselves but enable the germs when they gain entrance into the body to gain a foothold, or become "aggressive," without the support of these so-called "aggressins" the germs would be innocuous. After inoculation with the germ-free fluid containing these "aggressins" the animal body develops in the course of a few days an active immunity against them, which enables the animal subsequently to withstand invasion with the germs of blackquarter. It will be understood that during the few days (5 to 7) that the body is developing this response it is still susceptible, and the "aggressins" may aid actually in developing the infection.

[Reprinted from the Agriculture Journal of India, November, 1926.]

For short, the "germ-free" fluid containing the "aggressins" is issued under the name "blackquarter" aggressin."

For many years, blackquarter was understood to be caused by a specific germ, the bacillus of blackquarter. Modern researches have shown that cattle become affected with disease that cannot be diagnosed clinically otherwise than as black-quarter, caused by more than one germ. In addition to the germ originally known as the Bacillus of blackquarter, now commonly more precisely known as *Bacillus chauvoei*, cases of blackquarter occur which are set up by the germs of what has been termed "malignant oedema" or "gas gangrene," and the most notable of these germs goes by the name *Vibrio septique*. In India, sporadic cases of blackquarter have been actually found to be caused by the germs of malignant oedema, and not by the true black-quarter bacillus, *B. chauvoei*. We have reason to believe, however, that veritable outbreaks of black-quarter are caused by the true blackquarter bacillus, while sporadic cases, especially those associated with traumatism, may be caused by the other organisms of the malignant oedema group.

Hence, the "blackquarter aggressin" issued from Muktesar for preventive inoculation has been prepared from what has been authentically determined to be *B. chauvoei* as well as from about one hundred "strains" derived from material kindly forwarded to the laboratory by veterinary workers from various parts of India. The "aggressin" may therefore be termed a "polyvalent" one.

The dose of the "blackquarter aggressin" for cattle varies from 5 to 10 c.c., depending on the size of the animals, inoculated subcutaneously. For sheep, the dose is proportionately smaller, 1 to 2 c.c.

Animals should be inoculated preventively about one month before the onset of the season when outbreaks are commonly known to occur. It is a wise plan to repeat the inoculation in about 9 to 10 days, for the reason that

a single inoculation is not highly effective as a means of intervention to ward off infection due to some of the "malignant oedema" organisms: a single inoculation, however, appears to be sufficient to protect against infection due to *B. chauvoei*. The artificial immunity set up is believed to remain sufficiently strong to prevent natural infection for at least a year, which covers the time in an animal's life when it is most susceptible to blackquarter, and hence calves or yearlings may obtain in this manner adequate protection to carry them through to the time when they develop sufficient natural immunity. The "blackquarter aggressin" possesses the following marked advantages over the older, powder or pillule (Arloing's) form of vaccine:—(i) It is safe; (ii) it is conveniently administered, by subcutaneous inoculation; (iii) its mode of manufacture can be more readily regulated so as to obtain an efficacious product. The powder or pillule form of vaccine, on the other hand, has these disadvantages:—(i) It acts in virtue of containing minimal numbers of active fully virulent spores of the blackquarter germs; (ii) if excessive care is taken to make the vaccine "safe" it is likely to be inefficacious; (iii) if steps are taken to ensure that it is undoubtedly efficacious, then it is likely that a dose may contain a dangerous amount of the living germ. These defects have been ascertained to be of frequent actual occurrence. Sufficient evidence is now deemed to have been obtained concerning the efficacy and safety of the new product, "blackquarter aggressin," when applied in ordinary field conditions in India, and hence in future it is intended to issue this product to comply with indents, except when indenting officers distinctly specify that they require the "pillule" vaccine.

Adequate stocks of the "aggressin" are in course of preparation to meet all likely demands.

The Institute also manufactures an anti-blackquarter serum for issue. The serum is of value in cutting short

the spread of blackquarter in the scene of actual outbreaks, especially those that are running a very virulent course. In such outbreaks the best method to adopt is to inoculate all the animals exposed to danger with a dose of anti-serum (dose for cattle = 15 c.c.) The protection conferred by the serum, however, lasts only about 9 days, and hence in order to obtain a durable immunity the animals should be inoculated simultaneously with the "blackquarter aggressin."

ANTHELMINTIC EFFICIENCY OF KAMALA AND TETRACHLORETHYLENE IN THE TREATMENT OF CHICKENS.

BY A.S. SCHLINGMAN.

The anthelmintic value on chickens, of Kamala and tetrachlorethylene when administered simultaneously, of Kamala when given alone and of these two drugs when used separately at the intervals of three days, was experimented upon. All food was withheld one night previous to the administration of drugs on the following morning until about two hours after the administration of the anthelmintic. The diet of the birds under experiment consisted of cracked corn soaked with skim-milk. He gave Kamala in the form of compressed tablets one gram each and tetrachlorethylene in soluble elastic globules of 1 c.c. capacity.

He treated 27 birds (12 ounces to 6½ pounds weight) with the simultaneous administration of 1 c.c. of tetrachlorethylene and one gram of Kamala. He made post-mortem of these birds at intervals varying from 2 to 32 days after dosing. On post-mortem of this group of birds in 14 no parasites were detected nor after treatment; 2 were found to be infested with round worms, tapeworms and cæcal worms, 5 with round worms and tapeworms, 2 with round worms only, and 4 with tapeworms only—

showing that the combination effected removal in 61.8 per cent of tapeworms present, 28 per cent of round worms and 0 per cent of cæcal worms.

In the treatment of 15 chickens (1 pound and 15 ounces to 4½ pounds weight) with one gram of Kamala alone 7 passed no worms nor any showed at post-mortem; one was infested with round worms and tape worms, 3 with round worms only and 4 with tapeworms only. They were destroyed at intervals of 4 to 11 days after dosing. Only slight purgation was noticed 24 hours after dosing. The result shows that it was 100 percent effective against tapeworms, and 0 per cent negative against round and cæcal worms.

The writer concludes that Kamala in 1 gm. dose is efficient tæniacide; that in the simultaneous treatment with both decreases the efficacy of both against round worms and tapeworms; that when both these drugs are given at intervals of three days they are effective in removing roundworms and tapeworms from chickens; that best results would be obtained by the administration of specific drugs for each group of parasites in poultry infested with mixed internal parasites and that no toxic effects were noticed through the administration of both these drugs in poultry.

Journal of the American Veterinary Medical Association, New Series Vol. 23, No. 4., January, 1927, pp. 514—519.

AN ANALYSIS OF 108 INTRAVENOUS IODINE INJECTIONS.

BY CH. KRISHNAMURTHY, L. M. P.,

Sub-Assistant Surgeon, Sompeta, Ganjam District.

During the year 1925-26, partly from the dearth of drugs and partly with a view to test its results, 108 intravenous iodine injections were given for the following conditions in this dispensary.

Analysis of 108 Intravenous Iodine Injections 69

1. Respiratory diseases (except tubercle of the lung)—

13.

(a) For sero-fibrinous pleurisy, recurrent—9.

(b) For intractable bronchitis, generally resistant to expectorants—4.

The results were satisfactory. The injections for pleurisy represent two cases. In one case which used to recur almost every month 8 intravenous injections were given, first a series of six, one every day and later one every alternate day. The patient has not had his usual recurrence for some months now. In the second case the patient was getting salicylates, iodides, etc., with no marked improvement. After a single injection the pleural friction disappeared and the mixture appeared to work better. The four injections for bronchitis represent two cases which were running a very prolonged course, now clearing up in one area and attacking another. In both the cases two injections, one each on alternate days, brought down the temperature and cleared the lungs wonderfully. Mixture by mouth was also being continued at the same time.

(2) Diseases of organs of locomotion—19.

These were cases of rheumatoid arthritis; chronic synovitis and gonorrhoeal rheumatism. These represent six cases. A cure was found with six injections in one case and the rest were greatly relieved, but these latter did not have an appreciable number of injections, each of them having 2 to 3 and discontinuing for several reasons, mostly being satisfied with the relief and unable to spare time.

(3) Lymphangitis—10.

Two cases of lymphangitis were treated and they were both cured. These were both chronic and of some years' duration. One had six and the other 4 injections.

(4) Cellulitis, Chronic ulcers, phagedena, and necrosis of bone—12.

Reprinted from 'The Indian Medical Gazette, Vol. LXII, No. 3, March 1927'.

The inflammation in cases of cellulitis used to improve after one or two injections. When there was obvious suppuration; multiple incisions and continuous antiseptic baths were also used. In cases of chronic ulcers lasting for months with indurated edges and where scraping was refused, 2 or 3 iodine injections stimulated them to heal fast. In cases of phagedena the improvement was remarkable, even with the first injection. In cases of necrosis of bones the sequestrum used to separate with great rapidity and the discharge from the sinus became less foul every day; the wound used to close ultimately.

(5) *Furunculosis*—7.

During the height of summer some people are in the habit of suffering from crop after crop of boils on the face, hands and anywhere on the body. All external measures such as zinc, boric, ichthyol, antiphlogistine, etc., give only temporary relief. I have seen a course of Kalazana tablets with one or two iodine injections improve the condition marvellously.

(6) *Scabies*—22.

Persons suffering from scabies in these parts are a common sight at this dispensary. Cases were selected for iodine treatment. Such as had it all over the body or those suffering for several months were chosen. About three to four injections with nothing but general cleanliness locally twice a day improved them all.

(7) *Enlarged lymphatic glands, scrofular and otherwise*—7.

It is unfortunate that none of the cases underwent a thorough course. They were all improved after two or three injections each.

(8) The other 18 injections were—2 for chronic otorrhoea, cured; 2 for pyemia—the case stopped developing further abscesses and the abscesses then existing began to heal; 2 for general debility, where the patient felt much better; 12 for cases of tuberculosis of the lung where sodium morrhate had stopped showing further im-

provement, or alternately with sodium morrhate. Two cases were thus tried and showed marked improvement.

In all the above cases the prescription given in the *Indian Medical Gazette* (iodine 1 dr., potassium iodide 1 dr., aqua distillata 5 oz. 2 dr.) was followed. If 1 dr. is taken to be equivalent to $27\frac{1}{2}$ grains according to Avoirdupois weight, 20 minims of such a solution contains about one-fifth grain of iodine, and with the dose suggested (3 to 6 minims) the iodine content is far too little. I therefore employed the above prescription with 10 minims as my initial dose, and increased it by 5 minims at every other injection until I reached 40 minims, which is approximately equal to half a grain of iodine. Intravenous iodine treatment in comparison with other method is very cheap, saves a lot of trouble, and from the leucocytosis it produces may be claimed as a panacea. A time may come when many of the drugs in the *Pharmacopoeia* may disappear and be displaced by iodine.

PARASITES AND PARASITIC DISEASES OF DOGS.

BY MAURICE C. HALL

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(Re-printed from U. S. Department of Agriculture, Department Circular 338).

Internal Parasites and Diseases Due to Them.

A large number of different kinds of worms have been found in dogs in various parts of the world, but only a few of the more important need be discussed here. Some are important because they are seriously injurious to dogs, and others because they may be transferred in some stage of their development to man and to livestock. Worms are most prevalent in pups and are more injurious to them than to mature dogs, many pups dying from worm infestations. This high infant mortality, so to speak, among dogs as well as among human infants, indicates that there is a lack of proper care and of sanitation

responsible for it. The remedy among dogs, as among people, is proper care and sanitation. The mother of the pup should be free from internal and external parasites before being bred, should then be kept in an area free from parasitic infection, and the pup should be born in clean surroundings and raised there until it can feed for itself and until it has acquired some age immunity or resistance to parasitic infection and to the bad effects of infestation. For parasites, as for other evils, the ounce of prevention is worth the pound of cure. When a pup is infested with worms it is advisable to use medicinal treatment to remove them, and the more serious the infestation the more urgent the need of treatment, but the younger the pup and the more serious the need of treatment the more dangerous is the treatment.

In treating dogs for worms, it should be kept in mind that worm remedies (anthelmintics) if potent are also dangerous and should be prescribed and administered by a competent veterinarian whenever possible. Among the conditions which make drug administration for worms especially dangerous are extreme youth, age, or weakness of the patient, or the presence of such debilitating diseases as mange or such febrile conditions as distemper. If treatment is imperative under these conditions, diminished doses should be given at two week intervals, removing part of the worms present each time and thus protecting the patient. Purgation is highly important in connection with anthelmintics. Adequate doses of a suitable purgative should be given, as a rule, with the anthelmintic, and if evacuation of the bowels does not occur in the course of three or four hours, another dose of purgative should be given. Enemas may also be given if it seems advisable.

Roundworm Infestation.

Cause.—There are two species of roundworms (ascarid^{is}) which commonly infest dogs, and both of these occur

in the United States. They look very much alike and for practical purposes need not be definitely identified. One of these, *Toxascaris limbata*, is a milky white worm which may attain a thickness of about one-twelfth inch (2 millimeters); the male is 1.6 to 2.4 inches (5 to 6 centimeters) long, and the female is 2.4 to 5 inches (6 to 10 centimeters) or even 5.4 inches (13 centimeters) long. The internal genital tubes, which can be seen through the body wall, do not extend in the female into the anterior third of the body. This is the worm most likely to be present in mature dogs. The other ascid, *Belascaris marginata*, is pale butter-yellow in colour, of about the same thickness as the preceding, but longer as a rule; the male is 2 to 4 inches (5 to 10 centimeters) long, and the female is 2.4 to 7.2 inches (6 to 18 centimeters) or even 8.4 inches (21 centimeters) long. The internal genital tubes extend in the female into the anterior third, and commonly into the anterior ninth, of the body. This is the worm most likely to be present in pups.

The female worms produce numerous eggs which pass out in the faeces and develop under favourable conditions of warmth and moisture, in the course of two or three days under very favourable conditions, to the stage where each egg contains an infective embryo worm. When such eggs are swallowed by dogs in contaminated food or water or in other ways, the eggs hatch and the young worms enter the walls of the digestive tract, get into blood vessels or lymph vessels, and finally many of them get to the lungs, usually by way of the blood stream through the liver and heart. In the lungs they leave the blood and enter the air passages, ascend these air passages to the mouth and are swallowed. On reaching the intestine they settle down and grow to mature worms, the females beginning egg production in the course of a few weeks. Prenatal infection of the pups in the uterus of the pregnant bitch has been shown to occur with the second of the ascarids referred to above.

Symptoms.—These ascarids are especially injurious to pups, and as many as 2,000 have been found in one animal. They cause derangements of the appetite and digestion, and heavily infested pups become unthrifty and emaciated and may die if the condition is not relieved. When present in large numbers the worms may form masses which produce a stoppage of the bowels, they may wander into the ducts of the liver, into the stomach, causing the animal to vomit the worms, or may crawl up the œsophagus and enter the lungs or nostrils. The young worms leaving the blood and entering the air passages of the lungs may cause such serious injury to the lungs as to produce pneumonia and this may terminate in death.

The presence of these worms may be suspected when pups are unthrifty and have a history of passing worms or when they are known to have been associated with older dogs infested with worms. Diagnosis is best made by a microscopic examination of the fæces and the finding of the eggs. This examination can be made by any competent veterinarian.

Treatment.—The most effective drug for removing ascarids from dogs is oil of American wormseed (chenopodium): It may be given in hard or soft gelatine capsules at a dose rate of one-fourth fluid dram (1 cubic centimeter) for a dog weighing 22 pounds (10 kilograms). This should be immediately preceded or followed by 1 fluid ounce of castor oil. The dog may vomit after treatment, but experiments on many dogs show that the treatment will remove all the ascarids present in practically all cases regardless of vomiting. If the bowels do not move in four or five hours it is advisable in the case of sick or weak dogs to give another ounce of castor oil. As already noted, it is dangerous to give chenopodium to dogs under certain circumstances, and the services of a veterinarian should be obtained if possible to prevent accidents. The fæces passed for the two days after treatments for

worms of any sort should be carefully collected and burned or buried deep, as they have an unusually high content of worm eggs.

Carbon tetrachloride given in the same dose and manner as stated for hookworms is also very effective in removing ascarids from dogs, being only a little less effective than chenopodium, and for the great majority of dogs is safer than chenopodium.

Santonin is effective in removing ascarids from dogs when it is properly given. It is usually safe and is especially valuable in the case of animals in which the digestive tract is inflamed. It should be given in the morning, three hours before feeding, every day for five or six days in doses of one-fourth to 1 grain, according to the size of the animal, and accompanied by an equal quantity of calomel.

Preventive measures are along the line of sanitation and depend largely on the fact that the infective agents are the worm eggs which pass in the fæces. The prompt and thorough removal of these fæces from yards and kennels removes the source of infection. Dirt surfaces should be scraped and renewed from time to time, and wooden and concrete structures cleaned with boiling water, soap, and lye, or hot, strong coaltar creosote solutions, dependence for results being placed primarily on the vigorous and thorough use of a brush. Especial attention should be paid to keeping pups in clean areas away from infected places and from older animals, and to keeping these older animals free from worms by treatment whenever necessary.

Hookworm Infestation (Kennel Anemia).

Cause.—Dogs are frequently infested in this country with the common dog hookworm, *Ankylostoma caninum*. This worm is comparatively small, the male from a little over one-third to one-half inch (9 to 12 millimeters) long,

and the female from a little over one-third to almost 1 inch (9 to 21 millimeters) long, and thinner than an ordinary pin. The mouth is armed with six pointed teeth, and the worm attaches with this armed mouth to the lining of the small intestine and sucks blood. Another dog hookworm, the narrow-headed hookworm, *Uncinaria stenocephala*, is not uncommon in dogs in Europe and, in foxes in the United States and Canada, but appears to be very rare in the dog in this country. This is a smaller worm, the male being one-fifth to one-third inch (5 to 8 millimeters) long, and the female one-third to almost one-half inch (8 to 11 millimeters) long. The mouth is armed with cutting plates, but is without the six teeth which are present in the common dog hookworm. It is, however, a blood-sucker like the other.

The female worms produce numerous eggs which pass out in the faeces and under favourable conditions may develop in the course of 36 hours to the stage where each egg contains an active embryo. In the course of from three to six days, as a rule, a first-stage larva hatches from the egg. In about three more days this larva molts its skin and forms a second stage larva. In about eight more days this larva molts to form a third-stage larva which retains the skin of the previous stage for a time at least. This is the infective larva, capable of infecting dogs when swallowed in contaminated food or water, or when put in contact with the feet or any part of the dog's skin. Whether the larvæ enter by the mouth or through the skin, they go into the circulation and behave in much the same way that the ascarid larvæ behave, ultimately getting to the lungs, entering the air passages, going up these to the mouth, being swallowed, and finally reaching the small intestine, where they undergo two more molts and then become mature worms. Eggs from these worms usually appear in the faeces in four or five weeks after infection takes place, but have been said to appear as early as 16 days after infection. In all probability prenatal

infection of pups in the uterus of the mother occurs occasionally, and perhaps frequently.

Symptoms.—Owing to the fact that hookworms are bloodsuckers and that such worms not only remove blood from an animal but also appear to produce poisonous substances which exert an injurious effect on the blood, dogs heavily infested with hookworms usually show anemia (a condition in which the blood is thinner and paler than normal, which is shown by a pale colour of the mucous membrane in the lining of the mouth and eyelids) and oedema (a condition in which there is an accumulation of serum which seeps from the thinned blood into the tissues and accumulates in pendant portions of the body, as under the jaw). The disease is sometimes referred to as kennel anemia. In early stages of the disease there are digestive disturbances, and in later stages there is often diarrhoea, sometimes with blood visible in the feces. Owing to the impoverished condition of the blood and to other disturbances due to the worms, the infested dogs become weak and emaciated, the resistance to disease and to unfavourable conditions is diminished, and the vitality is reduced. In severe cases the following symptoms may be observed. A sunken eye, foul breath, unthrifty coat, reddening of the skin inside the thighs and elbows, pronounced dullness or depression, and a slow healing of operative wounds or accidental injuries, with a tendency to ulcer formation in such cases. The larval worms going through the lungs have been reported as the cause of a fatal pneumonia in pups. Pups are highly susceptible to infection with hookworms and to the bad effects of such infestations and many of them die from hookworm disease, especially in the South.

When the symptoms noted above are present, hookworms may be suspected as the cause, but it is inadvisable to allow dogs to go to the stage where they show clinical evidence of hookworm disease, as such dogs have a diminished resistance to the drugs used in removing the

hookworms. In regions where hookworms are prevalent, especially in the South but also in many parts of this country outside of the South, the faeces of dogs, and especially of pups, should be examined occasionally for worm eggs, and, if they are present, suitable treatment undertaken at once without waiting for ill effects to become evident.

Treatment.—Until comparatively recently no satisfactory treatment for removing hookworms from dogs was known, but as result of numerous experiments carried out in the Bureau of Animal Industry in a search for a satisfactory treatment, a very effective and quite safe treatment has been discovered. The drug used is carbon tetrachloride, which in suitable doses will remove all the hookworms from infested dogs in practically every case. A chemically pure drug must be used. Most dogs tolerate enormous doses of this drug, but an occasional animal proves highly susceptible to bad effects from its use. For this reason it is advisable to employ a veterinarian to administer it whenever possible.

The dose of carbon tetrachloride is at the rate of threefourths fluid dram (3 cubic centimeters) for a 22-pound dog. This may be given in hard capsules with entire safety in most cases, but care must be exercised in administering such a capsule, as the drug is very poisonous if it gets into the lungs; if the capsule breaks in the mouth the drug usually gets into the lungs and may kill the dog. Purgation may be omitted, but it is better to give a purgative than to omit it. To avoid the bad effects sometimes observed in highly susceptible animals a stomach tube may be used to administer the treatment; the carbon tetrachloride is poured down the tube and followed immediately by a fluid ounce (30 cubic centimeters) of a saturated solution of Epsom salt. The animal's mouth is held open with a speculum of some sort while the tube is passed into the stomach and the drug poured in. Care must be taken that the tube does not

get into the windpipe, as the drug will prove promptly fatal if poured into the lungs. Dry Epsom salt or Glauber's salt may be given in capsules if the carbon tetrachloride is given in capsules.

This treatment should be given in the morning, the animal being kept without food overnight and no food given for three hours after treatment. Fats, oils, and cream should be excluded from the diet; a carbohydrate diet apparently adds to the safety of the treatment. In order to aid the action of the purgative the dog should be allowed to run about in a yard after treatment, and if the bowels do not move in the course of three or four hours, another dose of salts should be given. Salts in solution may be given as a drench to dogs, but as a solution of salts sometimes causes them to vomit, partly because they object to its taste, it is best administered by stomach tube. Ordinarily treatments for worms should not be given to pups until they are weaned, but as a rule pups two weeks old or older may be given carbon tetrachloride with safety. It is advisable to diminish the dose rate for pups; one drop (not one minim) per pound of weight of animal is a dose rate commonly used for pups. Animals with severe inflammation of the digestive tract appear to be bad risks for this treatment as for most anthelmintic treatments. In connection with the treatment, the same preventive measures given for ascarids should be employed.

Tapeworm Infestation.

Cause.—Tapeworms are elongated, flat worms made up of few to numerous segments and with a head which is usually provided with four suckers and two or more hook circlets. The head is located at the small end of the worm. Dogs are infested with a number of kinds of tapeworms, ranging in size from the small hydatid tapeworm, *Echinococcus granulosus* (synonym: *Taenia echinococcus*), which is less than two-fifths of an inch (1 centimeter) long,

to the marginate tapeworm, *Tænia hydatigena* (synonym: *T. marginata*), which is from 2.5 to over 16 feet (75 centimeters to 5 meters) long, or to the broad fish tapeworm, *Diphyllobothrium latum* (synonym: *Dibothriocephalus latus*), which may attain a length of almost 30 feet 9 (meters). All the dog tapeworms live in the small intestine of the dog. All of them produce eggs which pass out in the fæces and which on being swallowed by a suitable host animal will develop to a larval tapeworm, taking the worm of a bladderworm of some sort. The host of this bladderworm will be in some cases a domesticated animal, such as the sheep, cow, or pig; in some cases a wild animal, such as the hare or rabbit; in some cases a fish; and in other cases an insect, such as the dog, louse or flea. In any case the bladderworm will not occur in the lumen of the digestive tract, but will occur in the tissues, such as the lungs, liver, muscles, mesenteries, brain, or intermuscular or subcutaneous connective tissue, or in the body cavity. In the larger animals, such as sheep, cattle, and swine, the bladderworms may be very large, as in the case of the hydatid, which may attain the size of a child's head and which is often the size of an orange; in insects, such as the flea or louse, the bladderworm is very tiny, as it must be in a host of this size.

Probably the most common of the tapeworms in the dog is the common double-pored dog tapeworm, *Dipylidium caninum*. This tapeworm and a closely related species, the six-crowned double-pored tapeworm, *Dipylidium sex-coronatum* have more than two circlets of hooks on the head, and have a genital pore on each side of each segment; the thin-shelled eggs occur in egg capsules and are often found in these capsules in the fæces. The segments may be white or pink, and the terminal segments break off from time to time and either escape in the fæces or creep out of the anus; such escaping segments are often seen and referred to as rectal worms or pinworms. The common double-pored tapeworm has

a larval stage in fleas and the biting lice of dogs. The fleas become infected while they are flea larvæ feeding on the organic matter in trash, the larval fleas swallowing the tapeworm eggs in this trash. Biting lice swallow the eggs while feeding on the contaminated skin of the dog.

In these insects the tapeworm eggs hatch and the escaping embryo develops to a larval tapeworm in the body of the insect. When dogs, annoyed by the itching and irritation due to these insects, hunt them out and swallow them the tapeworm larvæ become adult tapeworm in the intestine of the dog. This tapeworm sometimes occurs in man, especially in children, as a result of the accidental swallowing of infested fleas or lice by persons.

A larger group of tapeworms is made up of forms which have only two circlets of hooks and have a genital pore on only one side of each segment. The thick-shelled eggs do not occur in egg capsules but in a uterus from which some eggs escape into the intestinal contents and fæces. The eggs occur as isolated specimens in the fæces. The segments, usually containing only a part of the original egg content, escape in the fæces and in time break up, releasing the remaining eggs, which are washed about on the ground and on vegetation by the rain. When such eggs are swallowed by a suitable host, such as sheep, cattle, swine, hares, rabbits, etc., the hosts varying with different species of tapeworms, the eggs hatch and each releases an embryo which penetrates the walls of the digestive tract and develops in some tissue (liver, lungs, muscles, brain, intermuscular or subcutaneous connective tissue, etc.) to form a larval tapeworm or bladderworm. When these bladderworms are eaten by dogs, the tapeworm head in the bladderworm resists digestion and becomes the head of a tapeworm in the intestine of the dog.

Other dog tapeworms include such forms as the broad fish tapeworm, *Diphyllobothrium latum*, which has two slitlike suckers in place of the four rounded suckers of the

preceding forms, and which has its intermediate stages in fish. Dogs become infected by eating infested fish. The broad fish tapeworm also occurs in man.

Symptoms.—In general, tapeworms in the dog may cause disturbances in appetite and digestion, a disposition to vomit, general restlessness, and sometimes cramps. In heavy infestations they may cause an inflammation of the digestive tract and occasionally cause occlusion, or stoppage, of the intestine by filling and blocking the intestinal lumen. In addition, tapeworms in heavy or even light infestation may cause more or less well-marked nervous disturbances, in some cases simulating rabies. The passage of a segment or a string of segments through the anus often causes itching or irritation, manifested by the dog's sitting down and dragging itself forward on its haunches. This symptom is sometimes said to be due to pinworms in the dog, but dogs do not have pinworms. The common double-pored tapeworm is especially likely to cause this symptom, and segments of this worm are sometimes referred to as pinworms or rectal worms.

Treatment.—A treatment which has been much used of late for tapeworms in dogs consists in the administration of arecoline hydrobromide in doses of one-eighth grain to small dogs, one-fourth grain to dogs of medium size, and one-half grain to large dogs. The treatment is given in the morning after food has been withheld overnight, and no food is given for three hours after dosing. No purgative is given with this drug, as the drug is itself a very fast and effective purgative. It is quite safe in the great majority of cases, but in many cases the animal will appear very much depressed and subdued for some time after treatment. Very weak or sick animals must be given diminished doses or given some other and safer treatment if treated at all. In any case, and especially in the case of such sick and weak animals, it is advisable to call in a veterinarian. Other drugs which may be used are those such as oleoresin of male fern, kamala, and

freshly ground areca nut. Purgation must be assured in any case for the protection of the animal.

Coccidiosis.

Cause.—Coccidiosis in the dog is due to the presence and effects of very small protozoan parasites. There are four species of these parasites reported from dogs. Some of them occur in the epithelium of the intestine and some of them under the epithelium in the submucous connective tissue. The parasites undergo certain developments in these tissues and multiply here. Ultimately they develop resistant forms called oocysts which pass out in the faeces and serve to infect other dogs.

Symptoms.—In light infestations coccidia may cause no perceptible symptoms in dogs, but in heavy infestations diarrhoea appears at the time when the oocysts are passing in the faeces and it may be accompanied by the passage of blood and gas. There may be a slight rise in temperature during this time. Under unfavourable conditions, as in heavy infestations in very weak or young dogs or those with secondary infections, the animals may die. The diagnosis of coccidiosis depends on the finding of oocysts in the faeces.

Treatment.—No effective treatment for coccidiosis in dogs is known. However, the disease appears to be self-limited, all of the organisms present developing in the course of time to the oocyst stage and passing out. From observations of the writer this will probably occur, as a rule, within two weeks. There is some evidence indicating that an attack of coccidiosis confers some subsequent immunity. The indicated treatment, therefore, is along the lines of good care and nursing, the animal being fed nourishing food in quantities suited to its condition and protected against unfavourable conditions until the infection terminates. Such symptoms as diarrhoea may be controlled by appropriate treatment if necessary. The premises occupied by infected dogs must be regarded as

infected, and thoroughly cleaned; the use of strong, hot coal-tar creosote dips appears to be of value. Heat and drying are destructive to oocysts. As indicated in the introductory paragraphs, preventive measures for this disease and other parasitic diseases are along the line of sanitation, and sanitary preventive measures are primarily the business of the dog owner. In coccidiosis, as in the other diseases, diagnosis and treatment are primarily the affair of the veterinarian and the employment of a competent veterinarian is always advisable when diseases are actually present.

(Ed.—In India as far as is known *A. caninum* is the most common intestinal parasite of the dog. *A. crasiliense* (*A. ceylanience*) has also been encountered, though less frequently. *Uncinaria stenocephala*, have not been reported on. *Isospora* species have been encountered in the dog, occasionally in Southern India and it does not appear that any work has been done on it. Apparently the infection is harmless, but one cannot think it is so unless it is proved.)

ASSOCIATION NEWS.

The Central Provinces and Berar.

We have received a copy of the Proceedings of the Third Annual Conference of the Central Provinces and Berar Veterinary Association, held during November 1926.

The year was one of progress all round. The number of members rose from 108 to 126. The association has been recognised by the local Government and it is interesting to note that the Veterinary Adviser to the Government of Central Provinces is the President of the association. Mrs. Stirling, wife of Major R. F. Stirling F.R.C.V.S., D.V.S.M., I.V.S. has been elected as the first Honorary member of the association. Major R. F. Stirling, who is the Second Superintendent of the C.V.D. Central Provinces and Berar has been elected as the Chairman of the Executive Committee. Under such patronage the association is bound to prosper and prove an institution of great benefit to the Profession at large.

The following papers were read and discussed:—

1. Gland Therapy by Mr. V. R. Gopalakrishnan, G.M.V.C.
2. Rabies by Mr. K. B. Pillai, G.B.V.C.
3. Extracts from different authors on Natural Powers of recovery or healing, by Mr. T.V. Kuppuswamy, G.M.V.C.
4. Canine Typhus by Mr. K. Soorya Prakash, G.B.V.C.
5. Clinical Notes on Dystokia, Ascites, Distemper, Summer Diarrhoea by Mr. T.V. Kuppuswamy G.M.V.C.
6. Clinical Notes by Mr P.S. Sundaram, G.B.V.C., on
 - (a) The use of Eupad and Eusol in surgical wounds,
 - (b) Removal of Fibro-lipoma in a bull,
 - (c) Coronitis and defective hoof in a horse,
 - (d) Prick in shoeing,
 - (e) Treatment for opacity of cornea,
 - (f) Iodine injection for skin diseases.

Mrs. Stirling was "At Home" to the members of the association, which contributed not a little to the social atmosphere of the entire conference.

REVIEW

The Journal of the Central Bureau for Animal Husbandry and Dairying in India.

The first issue of this journal has been received by us. It has started life with a Foreword by that "Farmer-Viceroy" Lord Irwin. As an instance of the Viceroy's deep love for Agriculture, the following words are significant.—"At present the tendency of the educated classes is to immerse themselves in politics or the law. These two spheres of action are important and necessary for the constitutional administration of the country, but they are not the vital necessities on which

the people of India depend for their very existence from day to day. What is the good of concentrating on strong reins to drive a horse or on rubber tyred wheels to make the carriage comfortable if the horse is so weak that he cannot pull the carriage, or the carriage so frail that it falls to pieces directly anybody sits in it?"

The Journal contains many useful articles. The articles on "The Importance of the Cattle Breeding and Dairying Industry in India"; "Co-operative Dairying in Bengal"; "The Introduction of Foreign Milk Stock into India for cross-breeding"; "Poultry Breeding" and "Hints" on the management of sheep in the Punjab are all good and practical. The article on "A Veterinary Entomology for India" should interest the Veterinarians very much. We shall extract in our pages the series of the last article as space permits. The get-up of the journal is all that could be desired and is published every quarter on a modest subscription of Rs. 2-8-0 per annum. Any information required regarding the Journal can be had from the Agricultural Adviser to the Government of India, Pusa, Bihar. We wish the Journal every success.

The Quarterly Journal of Medicine. This is the official organ of the Patna Medical Association and the number for April 1927 is an extremely interesting one. A number of valuable papers appear in this issue but we would like to draw special attention to the article on "Thyroid" by Lt. Col. Singh, B. J. C.I.E., I.M.S. (Retired). According to this writer this ductless gland plays an important part in the causation of that much dreaded disease "Cancer". We are told that the incidence of cancer is due to an inefficient defensive mechanism of the body caused by a disordered functioning of the adrenal system consisting of the adrenals, Thyroid and Pituitary. The most effective agent to tone up this defunct system, the author tells us, is the thyroid gland preparations aided by X ray or Radium. This article throws a new light on the causa-

tion and cure of cancer and is written in a very convincing style. A few statistics in support of the statements made therein would have, in our opinion, enhanced the value of the paper.

The other articles also are very interesting and well worth a perusal.

Annual Report of the Punjab Veterinary College, Civil Veterinary Department, Punjab, and the Government Cattle Farm, Hissar, for the year 1925-26.

This is an interesting record of "steady progress in all spheres of the Veterinary Department". The college has become an institution comparable with anything of its kind in the whole world, all due to the energy, enthusiasm and driving force of Col. Walker whose retirement is to be deeply regretted. The number of Hospitals in the province is steadily increasing and it is gratifying to find that one of the institutions—Simla—is bringing a profit to the Government.

It is a matter for congratulation that, of the total number of castrations done throughout India, 56% was done in this province alone. That clearly shows the real enthusiasm with which the department is working amongst the masses.

As in other provinces, the contagious diseases, especially Rinderpest, continue to levy a heavy toll. The serum-alone method of combating Rinderpest is rightly found uneconomic and it is pleasing to learn that the chief Superintendent hopes to introduce S.S. method as soon as adequate staff is available.

We think that Punjab is the only province in India wherein the cattle and pony breeding operations are carried on a large scale and that, by the Veterinary Department. It is therefore a matter for pride that the activity of the department in this direction is very popular amongst the ryots of the province and, what is more, is bringing money, by way of profits, to the coffers of the

Government. This should be an object lesson to other provinces which are offered to the Veterinary Department tackling the question of breeding operations. We are quite sure that, given the opportunity, the Veterinarian can rise equal to the occasion and justify the trust reposed in him.

A number of graphs illustrate diagrammatically the activities of the Department.



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EDITED BY

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

Veterinary Surgeon, Madras.

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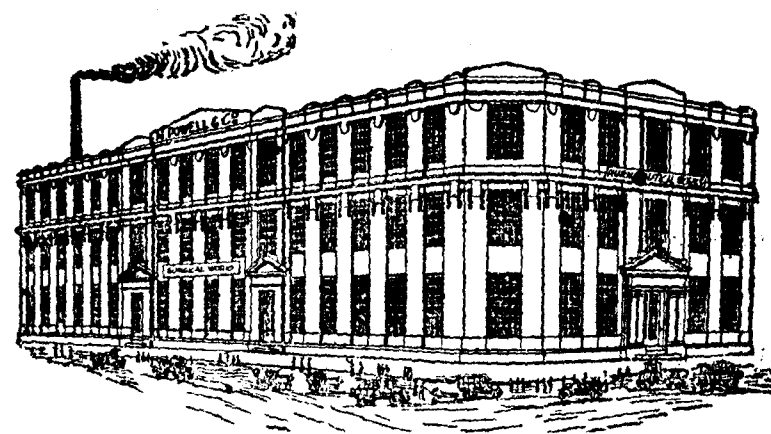
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