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JOURNAL



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The Indian Veterinary Journal.

(The Journal of The All-India Veterinary Association.)



Editor :

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The Indian Veterinary Journal.

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devoted to the cause of the Veterinary Profession.

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THE INDIAN VETERINARY JOURNAL

(The Journal of the All-India Veterinary Association)

VOL. II.

JULY 1925.

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THE

Indian Veterinary Journal

Vol. 2.]

JULY, 1925

[No. 1

Editorials.

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THE VETERINARY EDUCATION.

It seems nothing short of a calamity that the 'leading lights' of the Veterinary profession in India, do not pay as much attention as it deserves to the question of improving Veterinary education in this country. Disinterested motives must point in the only direction which they ought to—to make India self-contained in the matter of Veterinary education as early as possible. We cannot be too grateful to the little band of Britishers who have been chiefly responsible for inaugurating a generous scheme of Veterinary education that is obtained in India to-day.

We advisedly use the word 'generous' for unlike some of the present day proposals the scheme originally laid out and continued to the present day, covers a period of three years and includes most of the important subjects of Veterinary Science. The benefits of this scheme are being realised all over India to-day. The graduates of the Indian Veterinary Colleges are managing almost all the biggest Veterinary Hospitals in this land quite independently with great credit to themselves and the profession. They have popularised the Veterinary institutions to an extent unheard of in other fields of human activities, during an incredulously short period. The toll from epizootics is steadily on the decrease. Centuries old of superstition and prejudice are being slowly yet successfully got over and preventive inoculations are being introduced. The staff have been complimented from more than one platform for their valuable services. All these we owe to the efficient course of studies obtained in the Indian Veterinary Colleges to-day. We don't claim it to be ideal. But it has created an intelligent class of doctors who understand their work and are undoubtedly a success.

Bombay in November last, it was unanimously resolved to take over full control of the Veterinary Dispensaries and also the Veterinary Assistant Surgeons, who are now in Government service, and as such he was unable to do anything until the question was settled one way or the other.

We do not know how our Bombay friends like the proposed transfer. It is just the reverse in Madras. The Government have taken all Veterinary institutions under their control, with a view to their development, from April, 1922. The financial condition of most of the District and Taluq Boards is not all that could be desired. They have various schemes on their hands; but their resources are limited. The profession cannot complain if it comes in for a good share of neglect. Before taking a leap in the dark, we would advise consultation on the matter with United Provinces, where we believe almost all the Veterinary Institutions are still under District Boards. A knowledge of how the system works in other provinces, should greatly facilitate the work of the Committee, specially to be appointed for the purpose. We hope this suggestion will not be left unheeded.

The Honourable Minister was concerned at the "injustice" done to the Veterinary Inspectors in the matter of their pay and had promised to give his "careful and sympathetic consideration". We know that due to the absence of the Deputy Superintendents on executive line, much of the supervision work devolves on the Veterinary Inspectors in Bombay. They are really a hard-working class of Government servants, who deserve much better at the hands of the Government. We are glad of the Honourable Minister's reply and we earnestly hope his promise will materialise itself before long.

We are not convinced of the reply, that the Veterinary Assistant Surgeons cannot claim the same pay as the Sub-Assistant Surgeons, as the latter have a four years' course of study and are generally Matriculates or S. S. L. C. men. If the number of years of professional or technical training is any criterion for standardisation of pay, the Veterinary Assistant Surgeon stands to gain when compared with officers of similar rank with Departments of Agriculture, Forest, Excise, Police, Sanitary, Co-operative, Vaccination, etc. But it is not so. His three-years course is thrown to winds when he is placed on an equal or inferior footing with men who undergo a lesser number of years of professional or technical training. We hope this aspect of the question was well brought home to the Honourable Minister by the deputation. If the minimum standard of general education required for admission

to the Bombay Veterinary College is low, the fault must be laid somewhere else and not on the Veterinary Assistant Surgeons, who have as much social status to maintain, if not more, as the Sub-Assistant Surgeons. But as a matter of fact we know there are many Matriculates and S. S. L. C. men among the Bombay Veterinary Graduates. The Veterinary Surgeon's work is even more arduous than that of the Sub-Assistant Surgeon and his course of studies also is very congested and could have been spread over four years. We do not want to go into the merits of each of these classes of Government servants. Without any disparagement to our medical confreres, we wish to state that our opinion is that the Veterinary Assistant Surgeons must get more than the Sub-Assistant Surgeons even. Hence the Honourable Minister's plea is not well founded.

Again, to say that the pay of the Veterinary Assistant Surgeons was "recently revised" is not meeting the question squarely. The Veterinary Assistant Surgeons are "passing rich" on the magnanimous scale of Rs. 60—4—140. After this who can deny that it meets all ends of justice? In the name of humanity, we appeal to all the authorities concerned to treat the claims of Veterinary Assistant Surgeons with more consideration and sense of fair play than they have been doing till now. When Mr. Maniyar as a last recourse requested the Honourable Minister to institute at least a selection grade of Rs. 150 to Rs. 200, he was confronted with the reply, "I am not in favour of a selection grade, as it is often used for favouritism". Bravo Minister Sahab! Such outspokenness is rare on the part of a cabinet member. Commenting on the Punjab Memorial in our previous issue, we ourselves have said about this very word "selection" as follows: "We know what that word means in official language and how far it adapts itself to the idiosyncracies of individual officers". When we wrote it, we never anticipated corroboration from such high quarters. But "favouritism" there will be till the end of this world. If we are going to wait until it is extinct, to inaugurate any beneficial scheme, we will find ourselves in the unhappy position of the man, who would not start gardening until there was no possibility of weeds abusing his garden. What is wanted therefore is a vigilant watch over such erratic heads of departments, who allow themselves to be swayed by other considerations than by the cardinal principles of justice and equity. We would therefore request the Honourable Minister to reconsider the matter.

We are painfully surprised at the reply given to the question of raising the standard of admission to the Bombay Veterinary College.

The request was made by no less a person than Professor Vakharia, who served on the College staff for a number of years and as such knows where the shoe pinches. "Some of the best men turned out of the College are non-matriculates," said the Honourable Minister. We are thankful to him for such intimate knowledge of the department under his charge. Evidently he had in mind some senior officers of the department, whose standard of general education varies widely from what is obtained in India to-day. It is a common knowledge that the quality of education has been deteriorating in recent years. It is but meet therefore that the standard of admission must be raised, at least to bring it in line with the other Veterinary Colleges. This is a very vital question and we hope the Bombay Veterinary Association will not leave it at that, but try to move their popular Minister once again, through Mr. Hewlett, the Principal of the College, who must safeguard the interests of the institution as much as anybody else.

An account of an interview of the Deputation of The Bombay Veterinary Graduates' Association, which waited on the Hon'ble the Minister for Local Self-Government, at the Bombay Secretariat, on 8th January, 1925.

In accordance with the Resolution No. XV passed by the Bombay Veterinary Graduates' Association at their Annual Conference held at Surat, on the 27th March, 1924, a Deputation consisting of the following gentlemen waited on the Honourable Khan Bahadur Gulam Hussein Hidayatulla Sahib Bahadur, Minister for Local Self-Government, at the Bombay Secretariat, at 4 P.M., on 8th January, 1925 :—

- (1) Professor V. E. Vakharia.
- (2) Rao Saheb P. D. Maniar.
- (3) Mr. P. V. Nagarsheth.
- (4) Mr. Y. N. Marathe.
- (5) Mr. M. K. Samarth.

To begin with, Professor Vakharia thanked the Minister for condescending to receive the Deputation and also for carrying out various reforms at the Bombay Veterinary College, as recommended by the Association. He then placed before him a list of the subjects to be discussed, for which detailed written representations were sent to him in advance, which were taken as read to save time. The Minister desired to know first the arguments for the creation of more posts of Deputy

Superintendents. Rao Saheb Maniar explained to him at full length the urgent need of creating more such posts to efficiently deal with out-breaks of contagious diseases, push on the campaigns of preventive inoculations, and also to introduce and carry on serum simultaneous inoculations against Rinderpest, which is the only means of salvation for this country to exterminate the disease, which carries off thousands of cattle every year. He emphasised the absolute necessity of more intelligent, capable and efficient staff to carry on those duties and to ensure better supervision. The Minister agreed with this view, but said that at a meeting of the Presidents of District Local Boards held at Bombay under his presidentship in November last, it was unanimously resolved to take over full control of the Veterinary dispensaries and also the Veterinary Assistant Surgeons who are now in the Government service. In view of such a resolution, he was unable to sanction any more posts of Deputy Superintendents, unless and until the question of transfer of control was settled, for which he was going to appoint a Committee shortly. The Superintendent, C.V.D. will be one of its members, so that he will be able to safeguard the interests of the subordinate staff, who are likely to be affected by the proposed transfer. Mr. Nagarsheth suggested that Rao Saheb Maniar be also appointed on the Committee, as he was going to retire shortly, and his long experience of the C.V.D. would greatly help the Committee in the matter. But the Minister said that the District Local Boards would not like to have more Government Officers on the Committee.

Next, the question of revising the grade of Veterinary Inspectors was discussed by Rao Saheb Maniar, who said that though they were at present doing the duties of Deputy Superintendents, they were very poorly paid, even as compared with the pay of Veterinary Assistant Surgeons, whose work they have to check and supervise. The Minister who was convinced of the injustice done to them, said that he had received their memorials and the matter would receive his careful and sympathetic consideration.

The question of revising the pay of Veterinary Assistant Surgeons was then discussed by Rao Saheb Maniar with the Minister, who said that their grades were recently revised. It was pointed out to him that their duties were very hard, risky and responsible and they should be treated in the matter of pay equally with the Sub-Assistant Surgeons, but he said that the latter have now got a four years' course of study with the standard of admission having been raised to the Matriculation or School Final Examination. Rao Saheb Maniar then suggested that a

selection grade of Rs. 150 to Rs. 200 may be sanctioned, as it existed formerly and was also in vogue in other departments. But the Honourable Minister said that he was not in favour of a selection grade, as it is many times used for favouritism. At the same time he said that the question could not be considered, until the question of transfer of full control of Veterinary Dispensaries and their staff to District Local Boards was finally decided.

The question of expanding the Department was then discussed with the Minister, who said that he recognised the need of expanding the department and he was very anxious to see it done as early as possible, but the question of transfer of control of Veterinary Dispensaries to District Local Boards came in his way and he was unable to do anything in the matter, until the question was finally decided.

Professor Vakharia urged upon the Minister to raise the standard of admission of students into the Bombay Veterinary College from the Fifth English Standard to the passing of Matriculation or School Final Examination with a view to have a better class of men for training and said that it will help in future in the affiliation of the college with the Bombay University. The Minister did not agree with this view and said that good men cannot be attracted unless the prospects be improved, that even at present only those Matriculates or School Final men who get Government Scholarships joined the College and that the passing of the first examination in Arts was at present obligatory for affiliation of the College to the University, as is the case with all other Colleges. He further said that some of the best men turned out of the College were Non-Matriculates, which showed that it is not the passing of the Matric or School Final examination which turns out better men, but the real test was the aptitude for the profession. He was therefore not in favour of raising the standard of admission, until there was a demand from the public.

The Minister inquired which of the two Post-Graduates' courses, the one at Lahore or the other at Muktesar, was better. Rao Saheb Maniar informed him that a three months' course at Muktesar was better out of the two courses and requested him to continue to send more men for training to the Muktesar Laboratory. The Minister replied that he was going to send eight men there during the next year, and that administrative sanction was already given for it.

In conclusion Professor Vakharia thanked the Minister for his giving a patient hearing and for showing sympathy to the Department.

After the interview was over, Mr. Nagarsheth, as Chairman of the Reception Committee of the Conference held at Surat in March, 1924, presented to the Minister a copy of the group photograph taken at Surat on the occasion, which he was pleased to accept with thanks.

Notes

We publish in this issue two articles taken from a leading newspaper in Madras, concerning the prevalence of epizootics among cattle and the inadequate Veterinary aid rendered by the Government. If there are people who think that the profession has not made itself felt by the public and created a demand for more help from them, these two articles must serve as an eye-opener. Demand there is, but the supply is so halting, niggardly and callous. Of what avail is Veterinary aid, when a village is denuded of all its cattle?



We know of a certain Municipality, which when met with the same reply as Mayavaram referred to in the article, threatened to entertain a private Veterinary Surgeon and run a hospital of their own. This had the desired effect and a hospital was opened there much sooner than it would have been otherwise. Will Mayavaram try the same remedy?



The Government may spurn the Veterinary Department with contempt. Its cry may be a cry in the wilderness; but a discerning public will soon understand which are really useful departments. They will not be slow to call to account those responsible for their management (or mismanagement). Will the Government awake betimes?



In a recent order, the Government of Madras have fixed that 10 per cent. of the cadre of the Health Inspectors may be on the Selection Grade. The percentage fixed in the case of Sub-Assistant Surgeons for the selection grade is 15 per cent. But only ten posts are sanctioned for the Veterinary Assistant Surgeons as selection grade! Will anyone answer why is this invidious distinction?

CATTLE MORTALITY IN NANNILAM TALUK.

NEED FOR URGENT RELIEF.

Kadakam (Tanjore District), May 18th. . . Several villages of this taluk have been subject to frequent visitations of cattle disease. The mortality among them is great. I have heard cases of mortality of sheep in large numbers at Velangudy of this taluk. I have seen twenty cases of death among buffaloes, cows and bullocks at Kadakam of the same taluk. The common diseases that are virulent are Vekkai, (Rinderpest), Komari (Foot and Mouth) and Adaippan (Anthrax).

The Village Munsiff of Velangudy came to Kadakam a fortnight ago and he reported the matter to his superiors. No Veterinary Surgeon has as yet visited this place. Cattle mortality still continues. I hear that many other villages of this taluk and other taluks in this district are attacked with the cattle pest.

Will the authorities concerned take note of the fact and render the necessary help without any further delay?—"The Hindu", dated 20th May, 1925.

CATTLE MORTALITY IN TANJORE DISTRICT.

BY MR. C. S. SUBRAMANYAM, Mayavaram.

A correspondent from Kadakam writes in your issue, of the numbers of sheep and cattle that have died recently of diseases peculiar to these animals. I can also vouch for the fact of such deaths in several other villages in this and other taluks. Last December the Municipal Council and Taluk Board of Mayavaram sent up resolutions requesting the establishment of a Veterinary dispensary at Mayavaram. The reply from the Development Department was that if funds permit the matter will be considered in the year 1926—27. The fact of the matter is that this district does not get as much service from Government as the other districts do, nor as much as its taxes justify it in claiming. The cause of this is not far to seek. The well-to-do land-owner does not care whether there is a veterinary dispensary or an agricultural seed store or a Co-operative Bank at hand. He is able to meet his wants unaided by Government institutions. His knowledge and resources enable him to stand on his own legs. But the smaller land-owner is otherwise. If a single head of cattle dies of some disease it means half his stock is lost and he cannot replace it except by

borrowing at an exorbitant rate of interest. This digression apart, coming back to your correspondent's complaint, I may tell him there is a Veterinary Assistant at Kumbakonam who is to serve Shiyali and Mayavaram also. He gets requisition from half-a-dozen places at once and as he cannot be in six places at the same time, the five places to which he cannot attend go without him and the troubles of these five places are solved like Napoleon Bonaparte's correspondence. By the time he turns up in some of these places the cattle have all died and he has nothing to do. He no doubt instructs the villagers in first-aid treatment and so on but the helpless villager does not care to listen to him. The village officers have to report to the Taluk Office and as the Tahsildar is away most of the days in a month the report gets stuck somewhere and it reaches the Veterinary Assistant who, true to his official designation of touring Veterinary Assistant, is out in some out of the way village. That is the routine as I have been able to ascertain when some cattle in my village were attacked last November with one of the diseases named by your correspondent. I would appeal to the Resident Mirasdar, M. L. C.'s of the district, and other Mirasdar publicists to give some attention to these matters. A Veterinary dispensary at the headquarters of each taluk is a real necessity. Besides this a touring Veterinary Assistant to treat diseases in villages and also to perform castration which is more important from the point of view of preventing the deterioration of cattle.—"The Hindu", dated 23rd May, 1925.

Original Articles.

HAEMOGREGARINE CANIS.

(A rejoinder to Mr. L. Parameshwara Iyer's criticisms).

BY MR. M. ANANTANARAYAN RAO.

I feel grateful to my friend Mr. Iyer for very kindly publishing his discussion on my paper named above. I am very thankful to him because his views on it have strengthened my observations in many ways.

Mr. Iyer says that "authorities have agreed in placing this parasite under the genus Hepatozoon, etc." I regret he has not mentioned the names of any authorities to support his statement. The first observed and type species of the Haemogregariniform parasites in the leucocytes

was that in the dog by Bently, about 1905, and was named *Leukocytozoon* by James in the year 1906. Therefore *L. Canis* was the type species, and not *H. Muris* of the rat, named by Balfour in 1905-06, nor *Haepatozoon Perniciosum* of the white mice, found by Miller in 1908. Miller did not suggest that *Haepatozoon* should be the generic name. Miss Porter says that "*Haepatozoon* is a monotypic genus and does not hold as a generic name." (Journal of Parasitology, Vol. III.)

James in his paper on *Leukocytozoon Canis* says that this parasite undoubtedly has affinities with the *Haemogregarines* and the fact that it is parasitic upon the *Leucocytes* and that it represents a hitherto unknown mammalian blood infection would seem to justify its recognition as the type species of a new genus.

Patton, at the close of his paper on a similar parasite found in the *Leucocytes* in the palm squirrels in Kathiawar says, "It will be seen that the description of this parasite agrees in every detail with that of a *Haemogregarine*." Christophers and Stephens in their book on *Malaria and other Blood Parasites* call it *Haemogregarine Canis*."

Manson Bahr in the latest edition of *Tropical Diseases* includes this parasite of the dog under the Sub-order *Haemogregarinidae* and calls it *Haemogregarine Canis*.

Castellani and Chalmers in their latest edition of *Tropical Medicine* have still retained the name *Haemogregarine Canis*. Minchin in his book—an introduction to the Study of the Protozoa, 1922—deals with the *Haemogregarines* under *Haemosporidia* and says, "While in other classes they are parasitic in red corpuscles, in mammals they are parasitic in either the red or white corpuscles, but more commonly in the latter as the so-called *Leukocytozoa*, etc. . . . but as yet the complete life cycle is known in so few cases that it is not possible at present to draw up a classification of these parasites that can have any pretence to be natural."

In the foot note page 273 he says, "Finally there are *Leukocytozoa* of mammals for which the generic name *Hepatozoon* Miller and *Leucocytozoon* Porter have been proposed; if it becomes necessary to separate them from the genus *Haemogregarina*, Miller's name has the priority as Wenyon has pointed out. The fact, however, of parasitism in a white corpuscle instead of a red, does not itself supply adequate ground for a generic or even a specific distinction, since in some species, for example *H. Agamae*, the parasites may occur either in white or red corpuscles. (Levaran and Petit.) Under these circumstances, I think, I am justified to continue the nomenclature of this

parasite. The life history of some more of such parasites should be worked out before the "correct zoological status of this parasite" as my critic calls it, is established. The habitat alone of a parasite cannot be a character on the strength of which one should separate one parasite from another when one can see very close agreement in other details between them.

Mr. Iyer wishes to see my slides with free "vermicules in the blood smears". I request him to refer to my paper again. I have said that I found vermicules in fresh blood kept between a coverslip and slide or in a hangdrop. This material was smeared and then stained for study. I had these slides under the microscope on the day my paper was read before the conference and many gentlemen saw them. If he was really in earnest, he could have seen them then. When I was working with this parasite I have shown live vermicules and also stained ones to Messrs. Ware, Cattell and to Mr. R. Swaminatha Iyer who was then the Laboratory Assistant. Perhaps Mr. Iyer doubts my statement because Christophers says that it is not easy to get the vermicules excepting in the gut of the tick.

Regarding the time taken for sporogony in *R. Sanguineus* I request Mr. Iyer to kindly refer to my paper once again. Ticks were allowed to feed on a heavily infected dog and a couple were removed at certain intervals, examined and the actual time taken in the development of various stages in their gut contents was noted. It may differ from the findings of Christophers. Let me remind my friend that eminent scientists have found a variation in the length of time that elapses between the ingestion of infected blood by a cold blooded invertebrate and its completion of the sporogony of that parasite ingested according to the climatic conditions, chiefly thermal, existing then. Hence the variation between the findings of Christophers and myself. More is the reason, therefore, that one should honestly work it out for himself instead of basing his criticisms on secondhand knowledge.

Like Christophers, I had experimented with the eggs, larvae, etc., and even with other insects like the bug, flea and louse and I had likewise failed. I had also tried experiments to see if this parasite could be cultivated artificially. These experiments also failed. These failures I have not mentioned in my paper because I thought they will not help matters.

Regarding the suggestion of transmission of the disease put forward by Christophers and so very strongly supported by Mr. Iyer, I have to say that I have fed infected ticks to dogs and they did not get

the disease. He says that "it is a matter of common observation that pariah dogs with their filthy habits very often eat ticks the ingestion theory seems very probable especially in the face of the positive transmission experiments by the ingestion of infected mites in the case of *H. Muris*." Miller found that *Hepatozoon Perniciosum* was transmitted by mites that were eaten by white mice. I must tell my friend that the mite referred to is an interrupted feeder. An interrupted feeder may change its host any number of times and get eaten up in the end. He also says that it is "quite opposed to nature to find half engorged ticks to bite" and that "it is a known fact that engorged ticks do not bite again." Therefore, according to him a tick is not an interrupted feeder. So, it cannot change a host and cannot be eaten up by other dogs. The chance, therefore, is that a dog "with filthy habits" must pick up and eat an engorged tick that has been lying on the ground for six days so as to give time to the parasite to finish its sporogony and to infect the dog that ate it. But Christophers says in his memoir on the anatomy and Histology of Ticks: "Lonnsbury notes that the dog tick, *H. Leachi* probably in nature, deposits its ova in cracks rather than upon the earth. The same habit is noticeable in the case of the dog tick of Madras, a species of *Rhipicephalus Sanguineus* which climbs to a height of fifteen feet or more in search for a suitable spot to lay eggs." Therefore it is not likely that the tick will remain on the ground for a week, after dropping off, only to be eaten by some dog that chanced to walk in its direction which is "opposed to nature," but there is reason to believe that its instincts make it to climb any "pillar, post or wall" to give its debt to nature by oviposition and its own death. It must be a clever dog, indeed, with its filthy habits, to hunt up and eat these ticks high up in crevices of any post, pillar or wall, just to infect itself. I think my friend has seen the dog ward in the Madras Veterinary College where there is a cornice with a channel above it, round the room, and in which water is always kept, to prevent *R. Sanguineus* crawling on to the roof for oviposition and thus be a source of nuisance. One can see sometimes ticks crawling up to the water and then crawling on the sides of the cornice to seek a crevice. It is a common thing to see ticks leaving the body of a dog immediately after it dies naturally or is destroyed. These ticks are in various grades of engorgement—from a few minutes to 4 or 5 days. What happens, then, to those that had partially engorged themselves? According to Mr. Iyer they do not feed again to finish their repletion. Are they all doomed to die of starvation? The impulse of struggle

for existence is too strong to be overcome and at least some of these ticks do complete their meal on another dog. These ticks, of course, do not get their mouth parts torn, because they leave the body of their own accord and they know how to release their hold. I have seen these ticks actually getting on another dog which happened to be in the vicinity.

Mr. Iyer says that "Even in the case of half-engorged ones if, according to Mr. Rau, they are made to fall by extraneous force, several will lose their piercing apparatus and would therefore be unfit for feeding again". He admits, therefore, that there are still some whose mouth parts are intact and I have said that these half-engorged ones change host and bite, the reason is obvious. I have mentioned in my paper that some half-engorged ticks did not bite for some reason or other. I did not give the reason, because I thought that those who knew it would understand.

My critic assumes that the engorged ticks used by me for making an emulsion could not have given the disease because, according to Christophers, the sporogony could not have been completed in them and doubts the success of the transmission of the disease by injecting the emulsion of ticks into a dog because I have not mentioned whether any parasite was present at all in the emulsion and if so the stage of the same. I have to state here that it was only after satisfying myself that the sporozoites were present in the ticks, the emulsion was given. It was a very easy thing for me to find out by pricking the tick with a needle and taking a small quantity of the gut contents, which were mixed with a drop of saline, between a coverslip and slide and then examined. As a matter of fact every tick that was removed after a certain number of days from the dog contained sporozoites. Mr. M. R. Subramania Sastry, the predecessor of my learned critic, assisted me in conducting these experiments and he had also seen *H. Canis* developing in the blood of these dogs injected.

Mr. Iyer says, "such a transmission, if considered successful, amounts to a mechanical one which is opposed to the findings of the authorities and also those of Mr. Rau." The transmission of this disease by injecting tick Emulsion, cannot be considered to be a mechanical one, because sporozoites were present in the ticks that were used for making the Emulsion. It has been observed that the peripheral blood from a dog harbouring this parasite, when injected in another dog does not give the disease, because only sporonts are

present in it. If the latter thing were possible, as in Surra, then only Mr. Iyer's criticism that the transmission of the disease by tick Emulsion was a "mechanical one" will hold good. Therefore I do not understand what he means by the phrase "which is opposed to the findings of the authorities and also those of Mr. Rau." Who are the authorities, when there is only one other, Christophers, who has done work on sporogony of this parasite before my paper was read?

My critic thinks that a period of fourteen days was not enough for observing the dogs before they were infected by injecting tick emulsion. Within these fourteen days several blood smears and spleen puncture smears from these dogs were examined daily. If the dogs had the disease in them, some form or other of the schizogony of the parasite must have been seen in these spleen puncture smears, even assuming that the sporonts were not thrown in the peripheral blood. It is obvious, therefore, that these experimental dogs were free from infection. This being the case, if a person is not able to find this parasite or its stages in these smears during these 14 days, it would be better for him to leave the microscope alone and do some other work. Again the pups that were experimented upon were with me for over 4 months before they were allowed to be bitten by the half engorged infected ticks, and that time was also enough to declare that the pups were free from this disease before they were experimented upon.

My critic wants to know definitely, "When, where and under what conditions the observations on sporogony were made." I do not think this information will help my friend in any way in dissecting my paper. A scientific fact whether it was discovered in Greenland or in Tasmania must always be the same irrespective of the time, place and conditions and at the same time it does not matter whether that fact was observed in a well-equipped Laboratory or in a humble cottage by either a great "Authority" or an unostentatious student of Nature respectively. However, for his information I may say that this work was begun from the middle of December, 1921, till about the end of June, 1922, in our College Laboratory and then continued in my humble house till about the beginning of April, 1924, when I was able to complete and confirm my observations.

In conclusion I have to say that the study of Biology and especially Bionomics of parasites is as essential for a Veterinary or a Medical man as Mathematics to an Astronomer. In the year 1923, when I read

a paper and gave a demonstration on *Cercariae* from *Planorbis Exustus* found in Madras, Mr. Parameshwara Iyer remarked that it was no use making Veterinarians Biologists by putting such a paper before them and it was enough if they knew the name of a disease, its symptoms and treatment. I hope I have now, in the foregoing lines, shown how very essential it is to know Biology, etc., for any one, if he wants to style himself a Veterinarian or a student of Nature. Unless the life history of parasites and their modes of transmission is understood by those that profess to be Veterinarians much good cannot accrue. It is not enough for a Veterinary Surgeon only to know the name of a disease, its symptoms and treatment, but he must be in a position to take necessary steps towards prevention of the disease. To do this he must know the life history and the mode of transmission of a parasite. The usefulness of post-graduate study in Parasitology, Entomology, etc., which are only parts of Biology, is therefore obvious. On the day Mr. Iyer read out his criticisms on H. Canis to the Conference, one gentleman remarked to him that a critic must be more generous in his criticisms over a paper which is a practical one than to entirely base his theories on secondhand information.

Mr. G. N. Roy Chaudhury in publishing his impressions about the Veterinary Conference held at Madras says that "the originality of my paper was contested by Mr. Iyer". I do not think Mr. Iyer doubts it nor do I think that Mr. Chaudhury himself meant that he doubted my work on this parasite. I hope Mr. Chaudhury will please make his meaning clear through the medium of this valuable young journal.

General Articles

DISEASES COMMUNICABLE TO MAN FROM LOWER ANIMALS. RABIES.

BY RAI SAHIB DEBAKER DEY, P.V.S.,

Assistant Principal, Bengal Veterinary College, Calcutta,

RABIES OR HYDROPHOBIA IN MAN.

This dreadful and fatal disease in man and animals is mistakenly called "Hydrophobia" or fear of water. There is no fear of water throughout the course of the disease—on the contrary—the affected subject works into a fit, owing to the spasms of the muscles of deglutition, hence a misnomer to this disease has crept in.

It is a highly fatal acute infective disease, which usually occurs in canines and less frequently in felines, who generally transmit it to other animals and man by biting them. It is always propagated by inoculation and all animals including human beings are subject to it.

Rabies is a disease of the nervous system. It is characterised by pain at the site of inoculation, great irritability and excitement, restlessness, a disposition to bite, clonic spasms, nervous prostration, paralysis and death without appreciable post-mortem findings.

Rabies has been known since the 4th century B.C. In the eighteenth and nineteenth centuries the disease extended all over Europe and America. In India, it has existed for centuries. Graphic account of the disease may be found in early Sanskrit books on medicine. The disease was studied and described by many Continental writers such as John Hunter, Vibrog, Wololinger, Hertwig and Pasteur. We owe a great deal for the present about this disease to Pasteur, Nocard and Roux. It exists throughout the world except in Australia and England owing to strict repressive measures.

Etiology.

The specific microbe of Rabies has not yet been definitely ascertained, but it exists in saliva, brain and spinal cord, pancreatic secretions and milk of rabid animals. Although the ordinary mode of infection is the bite of a rabid animal, the disease may be transmitted by accidental inoculation with virus in Laboratory or while making biological experiments. Some people are in the habit of permitting dogs to lick their hands and face. This practice is very bad and unsafe, as a rabid dog displays an extra fondness to his master, long before the unmistakable signs of the disease are manifest. If the person in question has even a trifling scratch on his hands or face, he runs the risk of contracting rabies. Although the etiological factor of the disease is shrouded in mystery yet, recently Negri of Pavia, has discovered some protozoa like bodies, in the Purkinje cells of the cerebellum and in the large ganglion cells of the Ammon's horn. They are spherical or ovoid and the former vary in size from 5 to 23 microns in diameter while the ovoids vary from .5 micron to 1.5 micron to 5 to 27 microns. They may be found singly or in numbers; in or out of the nerve cells. They are small in the early stage of the disease and larger in the advanced stage. The virus on entering the body, either by bite or accidental inoculation, remains localised for a time, then it goes through the nervous tissue into the spinal cord, and ultimately reaches the brain. Dessication destroys

the virus in 4 to 5 days but when protected from light it dies in 14 to 15 days, and when it is exposed to direct sun-rays it dies in about 2 days. For staining the Negri bodies the sections or smears should be placed in saturated solution of Eosin from 10 to 30 minutes after which they are counter-stained with alkaline methylene blue. They are best stained by Eosin and Methylene blue. Various methods have been suggested from time to time but I find the Frothingham's method is the best; although by this method the field may be patchy in parts yet one can easily discover a good field and detect the bodies.

The procedure is as follows:—

1. Remove the hippocampus.
2. Place it in absolute alcohol for an hour.
3. Transfer it to fresh alcohol for two hours.
4. Quickly transfer it to clove oil and place it in an incubator at 60° C. for one hour.
5. Transfer it to Xylol for 10 minutes.
6. Put this in paraffin bath at 60° C. (the melting point of paraffin being 60° C.) for 2 hours.
7. Set in a mould and cool.
8. Mount and cut sections.
9. Float section on warm water and catch on glass slides coated with albumen of egg and dry.
10. Fix incubator at 37° C. from 5 minutes to 12 hours or more.
11. Remove the paraffin with Xylol for 2 minutes or so and dry with blotting paper.
12. Put the slide in Xylol for 2 minutes or so and dry with blotting paper.
13. Put it in Rectified Spirit for 2 minutes and then
14. Distilled water for 2 minutes.
15. Transfer it to Gram's Iodine for 1 to 3 minutes and bolt carefully.
16. Again distilled water for 2 minutes.
17. Stain 5 minutes with the following stain.
18. Wash with ordinary tap water.
19. Then again with distilled water for 3 to 5 minutes.
20. Rectified Spirit one second and blot and watch the colour. If too heavily stained decolourise with Rectified Spirit for ½ a second or so and blot.
21. Xylol from 4 to 6 minutes.
22. Canada balsam and cover slip.

Stain Solution :—

Solution I.—Saturated alcoholic solution of basic Fuchsin.

Solution II.—Saturated alcoholic solution of Methylene Blue.

(N. B.—This solution must be fresh. It must be made up once a week.)

Stain Solution :—

Solution I—0.3 c. c.

Solution II—2.0 c. c.

Distilled Water—30 c. c.

I must admit that the methods of staining Negri bodies, as discovered by Otto Lentz of Berlin gave very picturesque slide, but they are rather a bit tedious and require a considerable practice and the examiner will have to stain many slides before he can get a good one.

Period of Incubation.

The period varies considerably, depending upon the seat of bite and the potency and quantity of the virus. In all animals the longest period of incubation is 2 months, but in man in rare cases, it may go up to 12 months or more. The average period, however, in man is 40 days, in dogs 21 to 40 days, in horses 28 to 56 days, in cats 14 to 21 days, in sheep and goats 21 to 28 days and in birds 14 to 40 days.

In general, the period becomes shorter if the subject is bitten nearer the face, head or neck than on the body and extremities. Intracranial or sub-dural inoculation of virus in rabbits produce Rabies in from 12 to 60 days and the duration of the disease in those cases is shorter than natural infection, the experimental animals die within 3 days after the manifestation of first symptoms.

Symptoms.

Rabies appears in two different forms, viz. "Furious" and "Dumb." The introductory symptoms are, however, common to both. The earliest indication of the disease in dogs is the change of general habits. It becomes restless, separates from its companions and prefers a dark, sequestered place such as under a table or a chair or a dark corner of room. If of an affectionate nature it now becomes snappish; on the other hand a bad-tempered dog, sometimes, will often show excessive fondness for those he knows, by fawning and licking their hands. The appetite becomes depraved and it satisfies its hunger by taking substances, such as, dung, straw, pebbles, hair (sometimes his own hair), leaves, rags, etc. There is a distinct alteration of its

voice and a slight cough. It generally bites at a stick if offered to it and snaps at imaginary objects. The bark soon becomes hoarse or husky. In some cases after a day or two, the dog may break its chain, escape from its master's house and wander away with a peculiar swinging or jog trot with the head and tail carried lower than usual. The tongue hangs out of his mouth with a profuse flow of saliva. The animal becomes ferocious and bites or snaps at any object that comes before it or moves in its immediate vicinity. It may wander away for miles from its home, usually keeping a straight course and biting animals or human beings that come in its way, it generally gives one bite and goes on again. The eyes have a peculiar staring vacant appearance and roll about. Deglutition which was at first slightly affected soon becomes very difficult and finally any attempts to swallow, especially fluids, produces severe convulsive fits. The inability to swallow is due to spasms of the pharyngeal muscles, but there is no actual fear of water, but there is great thirst and it plunges its muzzle into the water being unable to lap it. As the disease progresses the paralysis of the legs becomes more marked and the animal becomes soon paralysed and dies asphyxiated unless its sufferings are humanely put an end to.

In the dumb or tranquil form, the symptoms are much the same as in the furious Rabies with this exception, that the lower jaw becomes paralysed and drops. As in this form, the throat is more severely affected, it is unable to bite, the nervous excitability is modified and there is absence of voice and hence the name "Dumb Rabies."

From the symptoms described above, the kind reader will find that essentially the two forms of the disease are the same, but probably owing to the parts of the brain attacked or the acuteness of the attack or both, paralysis appears much sooner in the dumb or tranquil form than in the other.

The average duration of the disease is 4 or 5 days but it may be as short as 2 days and as long as 10 days.

SYMPTOMS OF THE DISEASE IN ANIMALS OTHER THAN DOGS.

Rabies in horses :—Cases sent to our hospital presented same premonitory signs of nervous excitability and in a day or two became quite unmanageable, had to be firmly secured, became extremely excited, tore objects to pieces, fractured the shank bones and tore bits of his own muscles, foamed at the mouth. Later the lower jaw dropped, breathing became stertorous and very difficult, probably owing to severe contraction of the muscles on or around the diaphragm and finally death took

place from asphyxia. There was increased sexual desire throughout the course of the disease.

Rabies in cattle:—Great restlessness, excitability, depraved appetite, foaming at the mouth, champing of the jaws and grinding of the teeth, difficulty in swallowing, injected and wild starting eyes, convulsive twitching of the muscles, great sexual excitement, (this is very marked in bulls) charging at and mounting upon other cattle and occasionally even attempting to bite them, great fury and violence followed by paralysis of the hind quarters, exhaustion and finally profound coma and death.

Rabies in man:—The general symptoms and duration of Rabies in man are much the same as in dogs. For convenience of description, the symptoms are divided into 3 stages, viz., (a) Premonitory or Initial stage, (b) Excitement stage and (c) Paralytic stage. **The Premonitory stage:**—In this stage the patient complains of great irritation at the site of the wound, pain or sometimes anasthesia of the part. The patient is melancholy and complains of severe headache and loss of appetite. He is very irritable and sleepless and has gloomy forebodings. Like Tetanus there is hyperaesthesia and he cannot tolerate splash of light or any sound, difficulty in swallowing, altered voice and sore throat, slight rise in temperature and frequent pulse. **(d) Excitement stage:**—Great restlessness, profound hyperaesthesia, a draught of air, sudden noise or a bright light disturb the patient much and excite the spasms. Spasms of the muscles of deglutition and of muscles on or around the pharynx and larynx are very great and therefore pronounced signs of dysphagia and dyspnoea. Attempts to swallow fluids cause severe dyspnoea and fits. If an attempt is made to drink water the spasms of the muscles of the throat take place, violent spasms ensue if a drink is offered or suggested. In this stage very careful tracheotomy may give relief in a few cases. The temperature in this stage varies from 100° F. to 103° F. There are periods of painful and painless moments with intervals. The patient may make unusual sounds owing to the ineffectual effort to remove the sticky mucus from the throat. It is these sounds which have been compared to the bark of a dog, the patient seldom attempts at violence in this stage. This stage lasts from a day to three days and gradually passes on to the paralytic or final stage. **(c) The Paralytic stage:**—This stage lasts on an average for about 12 hours. The short is about 6 hours and the long is about 24 hours, the patient becomes quiet, unconscious and gradually death closes the scene by syncope.

Differential Diagnosis.

Rabies may be mistaken for a variety of nervous disorders and vice versa.

A correct diagnosis can only be made by

1. Biological experiment.
2. Finding of "Negri bodies" in the brain.

1. **Biological experiment:**—Obtain a rabbit or a guinea pig and inject brain or spinal cord suspension of the suspected animal under the dura-mater of the experimental animal. The suspension is made with a bit of spinal cord or brain thoroughly grounded with water or broth.

The technique is as follows:—

Shave the head from the ears to eyes, paint the part with Tr. Iodine, anaesthetise the rabbit or guinea pig with chloroform, ether A.C.E. mixture, make a crucial incision, cut the skin and subcutis and trephine a portion of the skull and expose the dura-mater. Inject a drop of the brain suspension under the dura-mater by a hypodermic syringe, close the skin by a few interrupted stitches.

The effects of the operation soon pass off and the wound heals within a week or so. The injected animal does not show any sign of inconvenience until a fortnight to a month elapses after the inoculation. In some cases the specific symptoms appear earlier than a fortnight and take a longer period than 30 days and it extends to even 3 months.

Symptoms in inoculated rabbits:—Ordinarily they do not show furious symptoms. In some cases they may show some nervous excitement for a day or two and soon become affected with ascending paralysis, great prostration of strength, slow respirations and death. In rare cases there may be tetanic symptoms and in others profound coma preceding death.

Finding of Negri bodies in the brain is very accurate and a certain means of diagnosis.

The Negri bodies are present in the large nerve cells of the brain of a rabid animal. They are found in large numbers in the hippocampus major.

Smears or sections show the Negri bodies.

"The plexiform ganglion, which is found near the foramen lacerum basis cranii may also be removed, hardened with Flemming's fluid or in a standard aqueous solution of Corrosive Sublimate for a few hours, washed in water, carried through the alcohols and sectioned by the

paraffin method and stained with iron or Delafield's hematoxylin; when stained in this manner the "Rabic Tubercle" of 'Babes' are found in brain affected with Rabies. These tubercles, when examined under a microscope, one finds many nerve cells become surrounded by a large zone of embryonic cells, and when the nerve cell has completely degenerated, these occupy the cell area. There is also pericellular accumulation of embryonic cells, degeneration of nuclei of bulbar cells and various stages of chromolysis, total disappearance of nuclei and dilation of perivascular spaces. Physiologically, this ganglion is composed of a fibrous capsule from which a supporting fibrous tissue extends into the interior, holding in its meshes the nerve cells, each of which is enclosed in an endothelial capsule."

Note:—"Street Rabies," is Rabies as seen in dogs from natural infection and the poison of such animals is known as "Virus of Street Rabies," and when this is put under the dura-mater of a rabbit the symptoms of Rabies appear within 3 to 4 weeks. A reduction of the period of incubation of the disease has been noticed to happen, when a series of rabbits are inoculated one from another. After about 100 passages, rabbits will die with certainty on the 6th or 7th day after inoculation.

Differential diagnosis:—Rabies in cattle may be mistaken for impaction of the Omasum, Abomasitis Meningitis and Encephalitis. But the detection of Negri bodies in the brain of rabid animals is the positive diagnosis.

Rabies in dogs may be mistaken for worms in the stomach and intestines, sore throat, presence of bones or other foreign materials in the pharynx, "Distemper Meningitis" or pregnancy. But biological experiments and finding of Negri bodies in the brain and "Rabic Tubercle" of 'Babes' settle all doubts.

A bad tempered dog when tied up and encaged may be very savage and resent handling. A bitch immediately after pupping may also be very ferocious. In the absence of a microscope, microtome, requisite stains and laboratory animals, a careful history of the case and anti and post-mortem informations may lead to a correct diagnosis:—

Post-mortem appearances:—Emaciation, lacerated lips and mouth, broken teeth, congested pharynx and larynx, stomach containing some dirt, hair, glass, stones, wood, etc., or empty and congested, intestines empty or nearly so; congestion of brain and meninges and so on.

Unfortunately, at the post-mortem examinations naked eye lesions described above are inconspicuous in the internal organs in some cases. In these cases we will have to give the benefit of doubt after carefully judging the history of the cases.

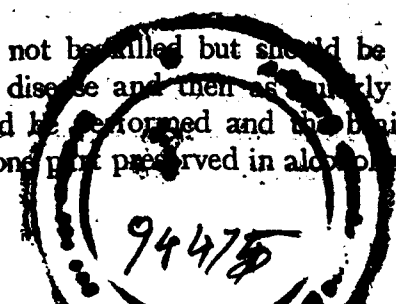
Therapeutics.—The treatment is entirely preventative. It is fortunate that the disease has a comparatively long incubation. This gives the bitten man or animal time for anti-rabic treatment. Men bitten by a suspected or a rabid dog should at once proceed to Kasauli, Coonoor, Shillong or Calcutta for treatment. The bitten parts should be scrubbed well with Iodised Phenol (equal parts of Carbolic acid and Tincture of Iodine) or be deeply cauterized with red hot irons after disinfecting thoroughly the surrounding parts with Biniodide of Mercury Solution (1-1000) by using a pretty hard brush. The hot iron should be inserted into the wound to the depth the teeth have penetrated, otherwise it will not be effectual. The application of caustics such as Caustic Soda or Potash or Nitrate of Silver, Nitric and Carbolic Acid alone are usually recommended in these cases but it is difficult to ensure their reaching the full depth of the punctures, whereas a hot pointed iron can easily be pushed in even deeper than the teeth have penetrated. Besides, if these chemical caustics are not always at hand, Lemon Juice is said to be good.

MEASURES TO BE ADOPTED.

When Rabies has been suspected the following measures should be adopted:—

An unmistakable case of Rabies should at once be destroyed humanely, as far as possible—an ounce of fresh Prussic Acid saturated in some absorbant cotton wool be fastened on to one end of a stick which should be offered to the rabid animal. He in his fury, swallows it down and dies within 5 minutes, or less than this period. If a lethal chamber is available he should be put into the chamber. Suspected cases should be firmly secured by double chains and strong collars and be kept in strong closely fitted iron-barred cages and carefully watched. Rabid animals must die within a week from the date of exhibition of suspicious signs of Rabies, rarely the duration may extend up to 10 days.

The suspected dog should not be killed but should be allowed to die a natural death from the disease and then as early as possible after the death, autopsy should be performed and the brain removed and divided into 2 parts and one part preserved in alcohol absolute for



sections and staining, and the other part for making animal experiments. When the diagnosis has been confirmed the person or persons bitten by a rabid dog should not waste time, but should proceed to Kasauli, Shillong, Coonoor or to the Tropical School of Medicine, Calcutta, for anti-rabic treatment. Dogs and other animals bitten by a rabid dog should at once be sent to the nearest Veterinary hospital for anti-rabic treatment.

When the disease appears in man, the best thing should be to keep the patient in a dark room, to give careful administration of chloroform or subcutaneous injection of Morphia, to cocain the throat very carefully to enable the patient to drink plenty of Glucose water and juice of lemon and pineapple, and rectal injection of supportive diets, such as milk, eggs, etc., should be given. Perfect quietitude should be enjoyed in every case throughout the course of the disease.

ANTI-RABIC TREATMENT.

Pasteur discovered that the virus of Rabies, if passed successfully through some generations of rabbits, the virus becomes virulent and if that virulent virus be dried in a jar with bits of caustic potash at a certain temperature for a period of 12 to 15 days and be injected into a dog and subsequently injected with stronger virii it becomes immune to this destructive disease. Working upon these experiments in lower animals he began to protect men, using on successive days, material from spinal cords in which the virus was of varying degrees of intensity. The whole treatment extends over a period of fourteen days.

"In the case of bites that are supposed to be especially dangerous—i.e., when the wounds are extensive and deep, or inflicted about the face a modified and more intensive form of treatment is practised.

Until quite recently it was assumed that the unmodified "Fixed virus" present in the fresh cord of rabbits would, if used straight away without previous attenuation, prove fatal to human beings by subcutaneous inoculation. It is further presumed that the inoculated person acquired a gradually increasing immunity from day to day from the daily inoculations, so as to enable him to withstand inoculation with vaccine prepared from a cord of only three days' desiccation at the end of the first or second week according to the method of treatment.

The explanation that inoculation on one day could confer immunity against inoculation with a stronger vaccine on the following day was always unsatisfactory.

Pasteur supposed that part of the protective effect of early cords was due to the presence of products of the rabic virus in the cord substance.

It is now admitted that desiccation has no attenuating effect on the cords.

- The method of vaccination is one inoculation with minimum doses of the fixed virus.

Cords desiccated for fourteen days either contain no living virus or else living unmodified virus in very minute proportions.

The "fixed virus" is not an intensified virus for man, but only for rabbits. For man and other animals it is a highly attenuated form of virus.

This has been proved by experiments on animals and by different methods of treating human beings involving the use of fresh rabbits' cords.

The methods consist in taking the cord from rabbits infected with the "fixed virus" and making dilutions of varying strengths 1 in 100 to 1 in 10,000. Treatment is commenced with 1 in 10,000 emulsions, the strength of the emulsion being gradually increased up to a 1 in 200 emulsion. Even the 1 in 10,000 emulsion is fatal to rabbits by subdural inoculation.

The results obtained by this method appear to be practically the same as those obtained under the original Pasteurian method, and are probably better in the case of persons severely bitten about the head.

Attempts to obtain an anti-rabic serum have not been successful. System of Veterinary Medicine. (Edited by E. Wallis Hoare).

Measures to Stamp out the Disease in India.

In India, where this disease is so common, it is the duty of the legislators to enact at once a law to enforce :—

- (i) Muzzling of all dogs.
- (ii) Destruction of all ownerless and stray dogs and jackals.
- (iii) Taxation of all dogs.
- (iv) Treatment of men and dogs bitten by stray dogs and rabid animals.
- (v) Compulsory notification of the disease or suspected of the disease.
- (vi) Strict isolation of suspected case by the owner, attendant or Veterinary Preventive Police Force controlled by the Principals or Veterinary officers of the Veterinary Colleges of Provinces.

- (vii) Registration and taxation of all dogs owned by citizens.
- (viii) And finally names and residences of the owners impressed upon collars of dogs as is done upon the handle of licensed guns.

In conclusion, I appeal with all the emphasis I possess to my more fortunate countrymen, legislators, Indian clergy and laity to eradicate this fell disease by adopting such repressive and preventive measures as they may deem expedient and save us from the grip of this malignant and fatal, but preventible and exterminable disease as was done in England, Australia and elsewhere.

Ed. At present, in the Madras Presidency, anti-rabic treatment is given at the District Head Quarter's Hospital and persons bitten by rabid dogs need not go to Coonoor.

BOVINE SURRA AND ITS TREATMENT.

By MR. BABU J. N. MUKHERJI.

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During the month of September 1923, an outbreak of cattle disease in village Sirwar in Dinapur subdivision of Patna district was reported by the police to the touring Veterinary Assistant Surgeon of Dinapur, who visited the village and took blood smears from a buffalo that was found suffering at the time. Trypanosomes were found in the smears at the Civil Veterinary Department Laboratory, Patna. Captain G. G. Howard, I. V. S., accompanied by the Circle Inspector proceeded to the village with microscope and Tartar Emetic solution for the treatment of the affected animals. The buffalo from which the smears were taken had already died but Trypanosomes were discovered in 3 other animals, 1 bullock, 1 bull and 1 buffalo. Symptoms of surra had not yet developed in these animals except a slight rise of temperature. Each was given an intravenous injection of 10 c.c. of 3 per cent. Tartar Emetic solution.

I was deputed to the village with orders to stay there, visit other villages in the locality, examine blood smears from the suspected animals and treat the affected ones with intravenous injection of Tartar Emetic solution. I attended the outbreak with the help of another Veterinary Assistant Surgeon from the 20th September to 5th October, 1923, during which time 27 villages were visited, of

which only 7 were affected, when 34 seizures and 34 deaths had taken place from that disease. It may be that some other animals had the parasite in their blood and did not show any clinical symptoms but the mortality was cent per cent among those naturally infected except among those treated with tartar emetic injection. I examined 297 blood smears from cattle and ponies in the villages I visited, out of which only 4 ponies and 2 cows were found with Trypanosomes in their blood. In one pony among these, the disease was much advanced and he died before injection could be given and the remaining 3 ponies and 2 cows were so treated. Of these again two ponies whose condition was hopeless at the time of injection, subsequently died. Thus out of 3 ponies and 5 cattle treated with intravenous injection of tartar emetic, 2 ponies died and one pony and 5 cattle recovered; no trypanosomes were discovered in their blood and no complaint has so far been heard of those 5 cattle so treated but the pony died 2 months after injection. Rainy season being over the outbreak subsided.

The important feature in this outbreak was, that the affected cattle suddenly died after showing clinical symptoms somewhat resembling those of Anthrax or snake-bite. The disease affects cattle of all ages. The affected animals might have Trypanosomes in their blood but show no sign of ill health and while feeding in the stall or grazing in the pasture or working in the field suddenly become ill and with a staggering gait for a distance of about 20 or 30 yards fall down on the ground and die in convulsion in about 2 to 4 hours. The only other symptoms marked were salivation and frequent urination. Temperature rose from 103° F. to 105° F. Muzzle was dry and in some cases tympany was observed; on examination of blood from such cases under microscope by cover glass preparations numbers of parasites were seen. They are quite similar in appearance to those of Equine Surra but smaller in size.

Treatment for Bovine Surra was conducted in Madras, extracts of which have been published in this issue. The results obtained with tartar emetic varied considerably. The treatment with Vitez Nigundo seems to be more successful and requires further trial. The treatment with the extract of neem leaves (*Melia Azadirachta* Lini) has also been effective. It would be worth while to try these indigenous drugs which we can get every where in the villages. The editor appeals to those that have opportunities to carry on with this experimental work and publish their results through the columns of this Journal.—
[Editor.]

TREATMENT OF SURRA AMONG HORSES WITH TARTAR EMETIC.

By MR. UBADULLAH KHAN.

Veterinary Inspector, Sohawa Laboratory, Punjab.

Since the discovery of Surra and its parasite "Trypanosoma Evansi" called after its discoverer, many learned Veterinary Surgeons have been trying to cure the disease by using different kinds of medicine and many have claimed success. The arsenic compounds, such as atoxyl and soamin were once known to have a good curative effect in the treatment of Surra cases but the regular and methodical experiments with these drugs in the Muktesar Imperial Bacteriological Laboratory and other laboratories failed to give a satisfactory result.

So in the absence of a curative treatment, many of the infected animals (camels, horses, asses and mules, etc.) succumbed to the disease causing great loss of money to the owners, and the Government also had to lose many hundreds of thousands of rupees from the deaths of Surra-stricken animals-of-burden in the military department. Thus no alternative was left except the destruction of the affected and suspicious animals.

At last, after long incessant and hard experiments in 1920, an effective cure with the use of Tartar Emetic in Surra-affected camels was discovered by Captain H. E. Cross, I.V.S., Camel specialist, while working as such in the Sohawa Laboratory. During the Great War, the above-named officer saved many thousands of Surra-stricken animals of the camel corps thus saving many lacs of rupees to the Government. The treatment besides being very cheap, does not throw the patient off its feed and condition, as arsenical compounds do, and so was generally adopted in case of camels. The military department welcomed it and had it introduced in many cantonments.

I fully remember that in 1921, when I went to Dera Ismail Khan cantonment under order of Captain Cross to treat the Surra patients in the camel corps, the Assistant Director of Veterinary Service was under the urgent necessity of sending the camels to the field. But the camels at that place were either diseased or suspected and their despatch to the field was sure to spread Surra far and wide, so the Assistant Director was anxious as to how the camels could be sent abroad without the risk of spreading the disease. At that moment this treatment with tartar emetic was the only effective remedy known, one injection of which was given to each camel, and they were prevented at least for 2 weeks from giving the disease to others, so they were sent to

the field. The Assistant Director was much pleased and the services rendered by the camel corps in that Government expedition ended with ease and success.

The Sohawa Laboratory in 1922-23 made a survey of the whole Punjab regarding Surra among horses, which showed that in the low and damp country many horses, mules, and asses of the value of many lacs of rupees die of Surra every year, causing much pecuniary loss to the people. Accordingly in 1923, it was thought to give a trial to the treatment with tartar emetic among the Surra-stricken horses as well.

Captain Cross had not carried out the experiment both on camels and horses at a time, on account of lack of sufficient staff and of space as well. Had he done so, the work would have remained half done, so he gave his whole attention to the perfection of the work in the treatment of camels alone. The Captain had left sufficient material for us to work on similar lines after him, so we had no fear of failure in the treatment of Surra horses with the new method.

TREATMENT OF SURRA-AFFECTED HORSES.

Fourteen animals (horses and mules) were inoculated subcutaneously with 1 c.c. of virulent blood each and as is evident from the table attached herewith, the trypanosomes appeared on the 4th, 6th, 9th, 12th day and in some cases on the 41st day of inoculation, this difference of incubation period was certainly due to the variations in susceptibility among the animals and the virulence of blood given hypodermically. The treatment was begun directly the trypanosomes appeared in the blood. To start with 50 c.c. of $\frac{1}{2}\%$ solution of tartar emetic was given intravenously. Later 75 c.c. of 1% solution of tartar emetic was given every third day for sometime and then raised to 100 c.c., 125 c.c. and 150 c.c. in some cases. These cases were under treatment from 36 to 46 days. On finishing the treatment 1 c.c. of blood was taken from each of these animals and injected into rabbits, whose blood was found free from trypanosomes. Thirteen cases failed to infect rabbits. Cases No. 4, 5 and 6 after being under observation at Sohawa were sent to Lahore Veterinary College, where they were observed for a long time and were found free from trypanosomes. The only one case No. 1 which had a very small dose of the medicine and treated again on the reappearance of the parasites, did not recover. The parasites were always present in its blood. The remaining 13 cases had full dose of the medicine given in one continuous treatment and had been cured. An abstract of the treatment is attached herewith.

THE TREATMENT OF SURRA-HORSES WHICH NATURALLY CONTRACTED THE DISEASE.

Having been successful in the treatment of artificially infected Surra cases with tartar emetic, the next step taken was to try the same treatment among the naturally infected Surra cases. In 1923, the Laboratory managed to bring the experiment to perfection at Shaikhupur, Punjab and the whole work was entrusted to me. In the district of Shaikhupur there are many damp villages rendered such by the "Upper Channel" canal and an aqueduct called the Deeg, which presents a suitable place for the activities of the Surra-carriers and numerous animals die here from Surra every year.

On 20th September, 1923, I reached Shaikhupur with my staff and commenced the treatment of the cases in the Veterinary hospital there. Before my arrival, there were already a few cases of Surra and gradually more were coming in, thus there were 26 cases under treatment. Three months had passed since the commencement of the Surra season and we could get only chronic cases. They were in a bad state of health and each of them more or less showed the following symptoms:—

General debility and weakness, oedematous swelling on legs and under the belly, perspiration and rapid fatigue while working, mucous membrane pale and petechiated, some showed inability of control on the hind legs; all these symptoms are the signs of advanced cases. In order to arrive at the right conclusion, only those cases were kept under treatment which showed trypanosomes. Injections of 30 or 50 c.c. of $\frac{1}{2}$ per cent. solution of tartar emetic was given intravenously to each patient in order to remove the parasites from the system. Afterwards 50 c.c. of the 1 per cent. solution of tartar emetic on the third day, and 75 c.c. on the fifth day was given, and later, every third day, 100 c.c. of 1 per cent. solution of tartar emetic was injected. Cases No. 1, 2, 3, and 5, had the last two doses of 125 c.c. of the solution each. The total amount of tartar emetic given to each case, according to its age, size and weight, was from 10 grams to 17.75 grams; the utmost period of treatment did not exceed 38 days.

Out of these 26 cases, six (Nos. 6, 14, 15, 16, 17 and 18) died of complications during the treatment and 3 patients (Nos. 13, 21, and 26) were taken away by the owner before completion of the treatment, the remaining patients 17 in number (Nos. 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 19, 20, 22, 23, 24 and 25) underwent the full course of treatment. Of these 17, eight died of paralysis, one of colic and three of strangles. The

remaining 5 patients (Nos. 3, 5, 9, 19, and 22) completely recovered. About 2 months after the treatment 1 c.c. of blood was taken from each and injected in 5 experimental dogs; (The blood of these dogs was microscopically examined for a month with negative result). No symptoms of Surra were seen in any of these dogs. The table attached herewith shows an abstract of treatment of the said 26 cases.

We had to contend with many difficulties in the experimental treatment of the twenty-six cases at Shaikhupur. The patients were in chronic stage; there was no proper arrangement for their feeding, because the owners believed the cases to be incurable and did not care much about them. Green grass which is an essential thing for the Surra cases in this treatment could not be obtained. The District Board at the last moment had given two grass cutters who were not able to cope with the work of grooming and exercising the large number of horses. There was no proper protection to the patients from the adverse effects of cold in the hospital stables, consequently they had to suffer from the bad effects of weather, after recent incessant rains.

Notwithstanding these difficulties the recovery of five patients out of twenty-six fills us with hope regarding the success of our treatment. In the year 1924, the Sohawa Laboratory, for the sake of gaining complete and correct information, has commenced Surra treatment in five places of the Punjab, namely at Shaikhupur, Bhera, Murudke, Montgomery and Ferozepur. Up to this time the work done by the ~~trained~~ Veterinary Assistant Surgeon from the Laboratory appears to be satisfactory and encouraging. A sufficient number of patients is under treatment in Shaikhupur and Bhera and the work is being done on correct lines. In Shaikhupur out of fifty-six cases thirty-four have recovered completely and the remaining under treatment are improving. In Bhera about twenty cases have recovered. After finishing the treatment of the affected horses in all the centres, a detailed report on this new treatment will be issued from the Laboratory which I hope will be interesting and useful.

Directions Regarding The Treatment To Be Generally Adopted:—

1. The patients in chronic stage when their hind legs are very weak or when brain is affected should not be put under treatment.
2. The owners should not be allowed to take away their animals before the completion of the treatment.

3. During the treatment the nursing and feeding of the patients should be carefully looked to. Green grass should be provided. Walking exercise should be given daily.

4. It is necessary to protect the patients from the effects of bad weather as the depressant effect of Tartar Emetic combined with that of cold will produce paralysis.

5. Each day fresh solution of Tartar Emetic should be prepared in distilled water and filtered subsequently. Before injection the solution should be warmed to blood-heat.

6. At the time of injection if the trypanosomes are not present in the blood 30 or 50 c.c. of 1 per cent. solution of T. E. should be given but if the trypanosomes are present the solution should be in the ratio of $\frac{1}{2}$ to 100, the quantity of dose being regulated according to the age, size and weight of the animal, as the solution of full strength destroys the parasites at once and with it lowers the body temperature and for some reason or other syncope and death ensues especially among debilitated animals.

7. The injection should be made in the jugular vein under antiseptic precautions. A single drop of the solution if infused in the wall of the vein or in the subcutaneous tissue will cause phlebitis or abscess. It would be safe to secure the animal by casting down before operation.

8. The dose of the solution should be according to the age, size and body weight of the animal, in horses it is generally 50 c.c. at the outset, 100 c.c. is the usual dose and the last finishing doses are 125 and 150 c.c. In a colt few months old, the dose would be 30 c.c. in the beginning and might be gradually increased to 80 or 100 c.c.

9. If the patient shows any weakness in the hind legs or paralysis during the treatment, $\frac{1}{2}$ or 1 grain of strychnine hydro-chloride may be given subcutaneously.

10. The patient should be given mag. sulph. dissolved in drinking water.

11. If complications appear during this special treatment, these should be treated.

This treatment is cheaper than other treatments and costs only about annas 4 per head.

An abstract statement of the treatment of Surra-Horses with tartar emetic (The controls being made by injecting the virulent blood).

No.	Kind of animals.	Age.	Weight in lbs.		How many days after injection of 1 c.c. of V.B., the disease appeared.	Number of days of disease before treatment.	Number of days the trypanosomes were present in the blood.	Number of paroxysms in the course of the disease.	Number of injections.	Number of days the case was under treatment.	Quantity of tartar emetic given.	Number of days the case was under observation after finishing the treatment.	Result.	Remarks.
			Before treatment.	After treatment.										
		YRS.			DAYS.					DAYS.	GRAMS.	DAYS.		
1	Colt ...	2	287	307	21	143	34	14	18-1st time	36-1st time	7.5	30	Disease re-appeared	Probably from natural traction.
2	Mare ...	12	635	820	4	4	1	...	14-2nd time	28-2nd time	11.5	70	Healthy	
3	Do. ...	13	615	758	6	5	1	1	21	46	18.3	239	"	
4	Do. ...	15	717	841	9	8	1	1	18	41	16.25	239	"	
5	Do. ...	15	574	697	6	8	2	1	20	43	20	233	"	
6	Do. ...	17	615	779	12	21	5	2	17	37	16.75	239	"	
7	Mule ...	7	656	779	22	27	4	2	16	36	15.25	236	"	
8	Pony ...	12	656	717	41	33	8	5	18	42	19.5	213	"	
9	Mare ...	17	512	615	9	33	12	4	18	36	19.25	157	"	
10	Do. ...	12	656	779	10	35	9	5	18	36	19.25	157	"	
11	Mule ...	15	471	594	6	33	8	5	18	36	20.25	155	"	
12	Pony ...	16	697	738	15	33	8	4	18	36	19.25	157	"	
13	Horse ...	5	820	902	6	33	7	4	18	36	19.25	157	"	
14	Pony ...	15	574	697	8	33	12	5	18	36	20.75	157	"	

These three animals were under observation 1st at So-hawa and then at Lahore Vet. College and their blood was pure.

TRAUMATIC PERICARDITIS IN CATTLE.

BY MR. ASA SINGH,

Vety : Lecturer, Agricultural College, Lyallpur.

A paper read in the General meeting of the Pb : Subordinate Veterinary Service Association,
(Lahore.)

Mr. President and Gentlemen,

I am going to read a paper before you on an interesting case of Traumatic Pericarditis in a bullock which was under my treatment at the Agricultural College Farm, Lyallpur, Punjab.

Traumatic Pericarditis is an affection of comparatively frequent occurrence in cattle and depends on the entrance into the Pericardial sac of a sharp pointed foreign body proceeding from the reticulum which not only sets up pericarditis but also by puncturing the myocardium brings about cardiac lesions as well. It is more commonly met with in stall-fed cattle on account of—say broken umbrella wire, broken knives, packing needles or other sharp pieces of wire becoming mixed up in the fodder. Cattle being careless feeders are particularly liable to swallow foreign bodies of this kind.

Foreign bodies may be reckoned to be of two kinds—penetrating and non-penetrating substances:—

Here I will chiefly describe the case of a penetrating or pointed foreign body.

Penetrating or pointed foreign bodies are of two kinds:—

(a) Those possessed of a head or so shaped at their non-penetrating end that their egress (act of going or issuing out) from the stomach is for a time at least delayed—such as nails, hair-pins, pieces of wire with one end hooked or bent, etc.

(b) Those which in shape present no material impediment to their passage through the tissues such as needles, pieces of wire of all kinds, knitting wires, portions of umbrella ribs, broken nails, broken hair pins, sharp pieces of iron, knives, forks, sharp flint stones, and pieces of glass, wood or bones, etc.

There are many influences that determine the action of a foreign body which having been swallowed, now lies free in the cavity of the reticulum. In the first instance the reticulum itself presents very favourable conditions.

(1) Its capacity is small and its contents semifluid and for these reasons materials of greater density than the aliment are in almost continuous contact with the walls of the viscus.

(2) Its peculiar internal surface is an important factor, being composed of numerous polyhedral cells, the thin walls of which consist of raised folds of mucous membrane, so that each cell constitutes a possible mechanical trap for the extremities of foreign bodies moving or lying in contact with mucus in the same fashion as the depressions in a thimble when in use, arrest the head of tailor's needle.

(3) Because the reticulum is closely related to the diaphragm.

(4) Violent straining from whatever cause arising is an important factor.

(5) Violent exercise, tiresome journeys on foot including laboured respiration during which forcible action of the diaphragm and abdominal muscles, etc., exert an undue pressure on the abdominal organs.

(6) Stall slopes markedly in the wrong direction. Stalls should be so constructed as to give a slight slope from the feeding trough backward.

Morbid Anatomy.—The proximity of the reticulum to the posterior surface of the diaphragm, and of the pericardium to the anterior surface of the structure facilitates in a marked manner the passage of the foreign body from the stomach to the heart. Sharp pointed foreign bodies such as needles and pieces of wire may in some cases pass very rapidly from the reticulum to the pericardium without producing any serious lesions in the stomach or surrounding tissues during their migration. If, however, the foreign body is of unequal diameter or provided with a head such as a large pin or a nail the process of migration is much delayed and the course taken is variable.

The reticulum may be adherent to the posterior surface of the diaphragm and the anterior surface of the latter may be adherent to the pericardium; on section of this fibrous band or growth fistulous track is observed through which the foreign body has passed from the reticulum to the pericardium. The fibrous band occurs only in cases where the foreign body is of some length and the period of migration is delayed. In most cases the original opening in the reticulum becomes filled up by the granulation and is cicatrised. In some cases when the foreign body has met with some obstruction to its migration or when a number of foreign bodies are present, multiple fistulae are formed. The walls of the fistula may be greyish-red or even of a blackish colour and hard in consistence, while in long standing cases they may become calcified. Sometimes a large abscess develops causing compression and giving rise to symptoms simulating those of pericarditis. In some cases it may leave the pericardium and become lodged

between the latter and the thoracic wall or an abscess may form in an inter-costal space and the foreign body escapes from the thorax by this route. This type is not serious and most of the cattle affected recover. During the last ten years out of 12 cases that were brought to the writer for treatment all but one recovered. Again in other cases, the symptoms are that the animal begins to lose flesh, feeds badly, rarely chews the cud, the belly tucked up and sides dropped in, the breathing short and slightly quickened but the confirming symptom is the jugular vein being greatly enlarged with a wavy pulsation in it. As the case progresses watery swellings are seen under the jaw and the lower side of the neck and dewlap, while the pulse is so small and quick as to be scarcely perceptible. This type is fatal. On applying the ear to the chest or bottom of the sternum just behind the elbow, the heart can be heard splashing in the water with a peculiar tinkling grating sound. This sometimes may be due to some foreign body sticking in the pericardium or to the chronic inflammation of the pericardium from other causes.

Again the foreign body may not enter the pericardium but if composed of metal may become oxidised and finally disintegrated that it cannot be discovered or it may become enclosed in jelly-like capsule and remain in the animal system without giving any trouble at all.

Symptoms.—These vary according to the nature of the foreign body, its penetration, and the nature of the work taken from the animal.

However the following symptoms may generally be observed :—

A false appetite, a tendency to remain in the standing posture for long periods, grunting when forced to move, tympany every now and then, constipation followed occasionally by diarrhoea, general loss of condition, shallow, quickened and catching respiration owing to the puncture of diaphragm and the adhesion of its posterior surface to the reticulum. When pericardium becomes involved fever may be noticed associated with respiratory and digestive symptoms. Coldness of the surface of the body and extremities may be observed. The degree of the fever varies and its intensity is believed to depend on the virulence of the infection introduced by the foreign body. The sharp foreign body will eventually introduce less infection than a blunt one, which takes a longer time in penetration. Sometimes the temperature is seen up to 105° or 106° F. even before cedematous swellings are manifested. The pulse is quickened, continuous, strong, until effusion takes place in the pericardial sac. The pulse may be irregular as well. The respirations are irregular accompanied by a moan or grunt, and if the animal

be forced to move, dyspnoea is produced. Short intermittent cough may also be observed and irregular rumination. The animal looks to be surprised, when in standing posture the elbows are turned out, avoids recumbent position and likes to be down on the right side. Oedema of the intermaxillary areolar tissue and pharyngoal region and of the inferior aspect of the neck extending to the dewlap is a prominent symptom. In advanced cases it may extend to the abdominal wall and involve the udder and hind limbs. When Myocardium and Endocardium are involved complications arise such as paralysis, embolism, etc.

Sometimes the foreign body escapes the reticulum and gets enclosed in some fibrous tissue, making an abscess which may remain for a long time or may burst causing pyæmia and septicæmia and sometimes it causes traumatic pneumonia, pleurisy, pleuro-pneumonia and their symptoms are observed which need not require here any detail.

Treatment.—Treatment is very difficult, although in the very early stages if it can be ascertained that the foreign body has been taken in, surgical operation for its removal may be performed if possible; otherwise there is no successful treatment except fattening the animal for disposal to butchers and this is generally done in the Western countries. If, however, an abscess is found near the elbow it can easily be treated by opening followed by ordinary dressings.

After this brief description of Traumatic Pericarditis, its symptoms, diagnosis, etc. I will now invite your attention to the case of a bullock, which died on 15th October, 1924, at the Agricultural College Farm, Lyallpur, Punjab, from this disease. The history of the case is as given below :—

The animal was about 12 years old, of the Hissar Breed, and of a good size. He had worked on the Lyallpur Farm till the end of June, 1924, when he showed some signs of traumatic indigestion, such as absence of fever, the apparently causeless occurrence of periodic, shallow, catching respiration associated with grunting, together with the colicky pains, restlessness, careful and stiff movements, a tendency to keep standing and an inability to obtain comfort when recumbent. This lasted for about a fortnight or so.

After 20 days the animal to all appearance had completely recovered and he was given a rest for one week and then was put on to work, but the animal now seemed to be losing condition and when put on work very quickly became exhausted. On the 10th of August, the animal again became very uneasy and was groaning with shallow

colicky pains and the temperature of the animal was 100.4. When the animal looked to be very uncomfortable, I used to give the animal Indian hemp 3 oz. every day mixed with the Tonic powder made up of Ajwain (Omum) Aniseed each 3 oz., Nuxvomica Pulv 2 drams and black salt 4 oz.

I noticed that the Indian hemp was giving good relief to the animal. On a very few occasions I had to add Potassium Bromide and Ammonium Bromide 1 oz. each but as the trouble was a chronic one Indian hemp was the cheapest. This was continued till the end of July and the animal's condition then was sufficiently weak, he was taking fodder when there was no or very little pain and noticed that the colicky pains were more frequent after the animal had taken sufficient food. I advised the Farm Manager to give green fodder and sufficient amount of concentrated food to keep up the strength of the animal. On certain occasions the animal showed some tympany which disappeared as soon as a dose of unslaked lime about 2 oz. dissolved in about 8 oz. of water with 8 oz. of ordinary rape oil was given.

From the last week of August till the middle of September the animal had practically relief and if any trouble happened it was only for a day or so and the animal improved in condition.

On the 20th of September the animal again became very uneasy and was groaning. The movements were more stiff than on the first attack and the animal took nothing except some linseed tea, gruel etc., which were administered to the animal. The pulse in these days was about 100-105 or so and was very weak.

I used to give Ammonium Bromide 1 oz. and Mag. Sulph. 2 oz. every 6 hours for 3 days.

After 3 days the animal appeared to be in a little relief as the animal passed sufficiently loose motions. The animal looked to be desirous of green fodder which was given to him about 8 or 10 lbs. with 2 lbs. of gram. The animal again used to take fodder as before but every now and then he was showing some colicky pains although not very severe. I also observed that the animal liked to lie down on the right side only and avoided to be in recumbent position. On 7th October the animal was reported to be very much uneasy again and I gave the same Ammonium Bromide dose with 8 oz. of Mag. Sulph in one day, the next day I was reported that the animal had passed a very offensive motion, but they could not show me the stuff passed by the animal. The other day I myself noticed that some dark pus

was coming along with the dung which indicated the presence of some abscess in the digestive system.

The dark-coloured pus associated with the passing continued on up to 11th October, i.e. 3 days in all, but the animal's condition was becoming very serious and the pulse was very weak. The temperature of the animal was 101.4. I gave Spt. Amon, Aromatic 1 oz. with Tr. cardamum 2 oz. and Tr. Digitalis 30. m. every 5 or 6 hours, yet the animal was going down. On 13th the animal moved for about 50 yards in the verandah of the cattle shed getting the support of the wall so much so that a friction mark of his side and horn was very prominent in the Kacha wall of the said verandah and the animal fell down and could not get up again till the next morning when he died at about 7 A.M.

POST MORTEM.

On opening into the abdominal cavity no exudate was found.

The rumen and reticulum were opened, where nothing but the ordinary contents were found. On opening the third stomach I found the dry stuff in one half towards the reticulum. While there was a semiliquid dark-coloured pus with stuff to the other half towards the true stomach. The pus induced me to make a minute search and I found a fistulous-like hole in the wall of the Omasum in a portion thickened due to the presence of an adhesive tissue. The fourth stomach and the intestines were opened which were found to be normal except for the presence of some dark pus material mixed with the contents. Liver, spleen and kidneys etc., were normal.

Then I opened the chest cavity where I found a very big fibrous tumor adhering to the anterior surface of the diaphragm and the base of the chest as well as to the pericardium. The whole fibrous tissue with the heart was taken out and a cut was made to separate the heart when a wire piece was seen penetrating the heart. The needle was 3 inches long, $\frac{1}{2}$ of an inch thick and pointed on both ends and appeared to have been partially attacked by stomach juices.

The tumor was opened and about $\frac{1}{2}$ a lb. pus escaped. When I saw the needle I wanted to trace its passage from the reticulum from which generally the foreign bodies penetrate. After a minute search I could only find a scar-like mark around which there was fibrous thickening about the size of half an inch in diameter. I had taken casual leave to proceed to Lahore to see the Chief Superintendent, Civil Veterinary Department, but anticipating an early death, I decided to

postpone my leave to make the post-mortem myself. I did the post-mortem examination and was very glad to see my diagnosis confirmed. I got the heart and the tumour preserved in 10 per cent formaline solution and have brought them with me for your observation.

Those of you who care to see the specimen can see it after the paper is finished. I also got the specimens photographed, (slides prepared) which you may just now see.

From the history of the case and of the post-mortem it appears that the first colicky pains were due to the wire piece pinching and piercing the reticulum and diaphragm. Though the P.M. examination did not reveal any fistula in the reticulum except a little scar and a little thickness in its wall, but still the colicky pains were, I imagine, due to the piercing of reticulum by the wire. The second attack in which the colicky pains were very severe, I think, were due to the piercing action of the wire in the pericardium and the heart proper as the pains were then accompanied by the high rate of pulse (100-105).

The intervening periods of relief in my opinion were due to the wire piece remaining in the pus of the tumour when no essentially vital organs were affected.

The third attack was due to the wire piece penetrating the tumor, the diaphragm and the third stomach as is evidenced by the first discharge and the fistula in the Omasum. It is just possible that the foreign body might have again gone back into the tumour due to the pressure of getting up or sitting down or some other cause.

The final attack which resulted in the death of the animal, in my opinion, is due to the needle's going back into the heart proper, on account of the fall which the animal had one day before its death, when probably the wire piece went further into the heart. As stated in the post-mortem, even though the needle was found piercing the heart appendix to a length of about 2 inches, the animal did not meet with a sudden death, which would have been the case if the needle had pierced a little higher up in the ventral region. Then the animal would have bled profusely and died instantaneously. The tumor which was formed at the bottom of the chest cavity, prolonged the life of the animal, as in its absence the needle would have pierced the heart much earlier.

"MANDAGUDI" AND ITS TREATMENT WITH TINCTURE OF IODINE.

BY MR. K. S. PRAKASA RAO, G.M.V.C.,
Veterinary Assistant Surgeon, Vizagapatam.

It is an affection mostly of working animals and is characterised by jerky movements of one or both stifles. According to the investigations recently made by Mr. M. Anant Narayan Rau, Acting Officer in charge I Circle, Vizagapatam, the cause is chiefly due to tethering of calves by the hind limbs, when they are young.

The value of the animal affected with Mandagudi is very much reduced. The ryots to conceal the disease, dose the animal with a tola of opium, which masks the affection for 12 hours, which is quite sufficient to dispose of the animal in a fair. Good food, rest, and blisters and even firing around and above the joint were done, but they were all found useless.

About 150 animals were injected with 10 c.c. of Tinctura Iodi Mitis and most of them were cured.

The technique is simple. The animal is thrown with the affected hind limb upwards. Both the hind limbs and the front limbs above are secured together. The patella is held with the left hand. Immediately behind the bone there is a depression into which the needle is thrust deep enough to touch the bone underneath. About 5 c.c. of Tincture of Iodine is emptied, the needle is afterwards removed and about two inches below the first prick the needle is inserted again and another 5 c.c. is injected. The same process is repeated if the other limb is also affected with Mandagudi. Almost all the animals will get well with the first injection and a small percentage may require another injection.

No after-treatment is necessary except fomenting the part when there is excess of inflammation. Complete rest should be given till the swelling subsides a little and then walking exercise is recommended for a few days before it is put to work.

I request my colleagues to kindly give this method of treatment a trial and report to this valuable Journal.

A SUSPECTED CASE OF CANINE TYPHUS.

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

Veterinary Surgeon, Madras.

An Australian bitch aged about 4 years was brought to me at 11 o'clock on the 15th March, 1925. The owner told me that she was quite all right till the previous evening. But on the next morning she looked dull and was vomiting blood-stained matter and won't mind any food given to her. He suspected her to be suffering from some irritation of the bowels and wanted me to treat her. The bitch was very weak. On taking the temperature it was found to be 98°F. On examining the mouth, ulceration of the mucous membrane of the cheeks and the gums with necrotic patches here and there was seen, emitting a very unpleasant odour and dark brown saliva was dribbling. I gave 3 doses of Bismuth mixture and asked the owner to restrict her diet to milk and a little of brandy. Sponged the mouth and gums with Hydrogen Peroxide solution.

Next morning the bitch was brought again with worse symptoms. The owner told me that he would not retain any food given, was unable to stand and there was profuse discharge coming from the mouth.

I got the consent of the owner and kept her as an inpatient. There was marked depression. The temperature was 97°F. The gangrenous inflammation of the cheeks and the gums was severer than that on the previous day, the forelimbs and the chest being coated with offensive discharge dribbling from the mouth. She was straining frequently and was passing a little of mucus stained with blood occasionally, but no urine. I casually diagnosed the case to be one of peracute form of Canine Typhus, from the experience I had in treating a similar one, but of mild form in a pup one year ago. After mopping out the lesions in the mouth with Hydrogen Peroxide solution the following powder was prescribed.

R

B Naphthol	...			10 gr.
Bismuth Salicylas	...			10 gr.
Powdered Charcoal				4 gr.

mft pulvis 4, one every three hours.

As for diet, I gave small quantity of milk at a time and Bovril, which she vomitted in half an hour. The temperature at 12 noon came

down to 96°F. The extremities became cold, the pulse was slow and infrequent. Gave subcutaneous injection of normal saline and a table spoonful of milk mixed with 15 minims of brandy every two hours.

In the evening at about 6 P.M. the temperature came down to 95°F. and there was pronounced coma. She died at night.

• Since it is stated that Canine Typhus is very rare in India, I give the symptoms below that I observed during the day and also post-mortem findings, for the benefit of the profession and request such of those in the profession that have had an occasion to treat such cases, to give their opinion, through the medium of this Journal.

The symptoms observed.—Greatly depressed, extreme weakness, unwilling to move and when made to do so moving with great reluctance and tottering gait, trying to lie down at the earliest opportunity; the ears, mouth and feet very cold to touch; a dirty blood-tinged saliva dribbling from the mouth, total suspension of appetite and the Bovril that was given was vomitted out in half an hour with stinking smell; the faeces was sticky and bloody in appearance with foul smell, and the dog always drowsy. The pulse at the femoral artery was weak and thready. The temperature was going down gradually. When the mouth is opened for pouring in the medicine, muscles of the cheek and those of the fore and hind limbs, were seized with tetanic convulsions. The mucous membrane on the inside of the cheeks and lips and around the teeth blackish with gangrenous patches here and there. When those necrotic lesions were removed while sponging, there was no bleeding.

The eyeballs were drawn back into the sockets, pupils dilated, nose cold and dry. The animal did not urinate the whole day. The dog died at night.

Post mortem Lesions.—On opening the abdomen, the abdominal wall was found congested in many parts. The peritoneal covering was all a jammed mass. The external surface of the stomach and intestines was very much congested. The stomach contained no food but dark red fluid, resembling in appearance prune juice. The folds of the stomach were thick and swollen. The intestinal walls were of purple colour and the contents, just like the stomach contents, contained dark-red and greenish fluid. The abdominal lymphatic glands were swollen.

The liver was friable. Blood in the organ tarry and stained the fingers. The gall bladder contained a thick greenish bile to the full.

• The pancreas congested. The kidneys swollen and enlarged. The whole thing appeared like a dark mass, the medullary substance very much congested and of dark colour.

The bladder was full of urine. The colour of the urine was a little reddish.

The lungs congested in parts.

The heart presented boiled appearance. No blood in the heart cavities and no clots of blood also.

This case being one of peracute form, there was no difficulty in diagnosing the case correctly. The sudden appearance of the illness, repeated and obstinate vomiting, subnormal temperature, stiff gait and great mental depression and prostration and the gangrenous ulcerative stomatitis, were the chief points to diagnose the disease as Canine Typhus.

Association News

BIHAR AND ORISSA VETERINARY ASSOCIATION.

"The Government of Bihar and Orissa in the Ministry of Education, have been pleased to accord their recognition to the Bihar and Orissa Veterinary Association. The first meeting of the Association was held on the 16th June, 1924, under the presidency of Rai Sahib P. N. Das. Mr. D. Quinlan, Director, Civil Veterinary Department and Veterinary Adviser to the Government of Bihar and Orissa, is the Patron of the Association."

P. N. DAS, *President,*
Bihar and Orissa Veterinary Association.

Extracts

THE RADICAL OPERATION FOR TRAUMATIC PERICARDITIS IN CATTLE (PERICARDIOTOMY).

By L. P. PUGH, F.R.C.V.S., *Sevenoaks.*

INTRODUCTION.

Once the diagnosis of traumatic pericarditis has been made, it is the usual procedure to recommend immediate slaughter in the hope of salving the carcass. If left to "nature" death is sure to supervene.

It is an unfortunate fact that traumatic infection of the pericardium is most prone to occur as a result of the excessive straining in connection with the act of parturition, and therefore at a time when a cow should be becoming most profitable. There is also the point that a cow may be worth several hundred pounds as a breeding or show animal, but may only be worth a few pounds when slaughtered.

Moussu recommended the removal of fluid from the pericardial sac by puncture with a trocar and cannula, starting from the direction of the xiphoid cartilage. This procedure is intended to allow salvage of the carcass for human consumption, and it does not aim at the complete restoration of the beast to utility. It was decided, therefore, to attempt a radical operation by opening up the pericardium freely in order to allow good drainage and to remove the offending foreign body (if still present). It is necessary to put in this latter qualification, since a piece of wire can puncture the wall of the stomach, the diaphragm, and the pericardium, admitting infection into the latter, and yet be withdrawn by movements of the gastric contents. It is a recognised point that foreign bodies are often impossible to find, although the damage is only too apparent.

TECHNIQUE OF OPERATION.

Morphia is administered subcutaneously half an hour before operation. The lower half of the left chest-wall is shaved and painted with tincture of iodine.

The cow is put down by Rouff's method on to her right side, and an assistant placed at her head to restrain movements. The upper fore leg is drawn forward and tied by a rope to a peg fixed in the ground. The hind legs are tied back in a similar manner.

The heart should be auscultated, as its position will depend on the amount of fluid and gas in the pericardium. Having settled this point it is necessary to choose the rib overlying the heart, choosing the more anterior one if two are in question. A line is drawn along the course of the rib starting from the costo-chondral joint and extending upwards for about 8 inches. The skin and underlying tissues along this line are then injected with cocaine. As soon as the latter has had time to anaesthetise the area, a bold incision is made along the above-mentioned line, using a sharp-pointed scalpel. The incision should be deep, and should go right down on to the rib and down to the level of the joint. A large retractor is inserted on either side and held by an assistant, whilst the muscular attachments are severed from the rib. The upper extreme of the exposed portion of rib is then sawn through, using the flat side of a Hey's saw. The sawing should stop immediately the bony tissue is severed. A sharp hook is inserted into the upper end of the lower segment of rib and slight traction is exerted, whilst the intercostal muscles are severed near to the bone. By inserting the blade

of a small scalpel into the costo-chondral joint the lower segment of rib is soon detached and removed.

The wound is cleansed with normal saline to which has been added perchloride of mercury (1 in 1,000), after which the exposed surfaces are dried and B. I. P. P. paste rubbed in. A trocar and cannula is now inserted into the pericardium, and the nature of the contained fluid ascertained. If the latter is copious, it should be allowed to flow out for a time in order to reduce the pericardial pressure slowly. As soon as it is considered that the pressure is sufficiently lowered a blunt pointed curved bistoury is inserted alongside of the cannula and the pericardial wall incised down to the lower level of the wound. The remaining fluid or pus escapes rapidly. A hand is now inserted into the pericardial cavity, and is moved about carefully in order to detect the foreign body if present. Any loose masses of consolidated pus or fibrin are removed. Without removing the hand a long rubber catheter is inserted and the cavity thoroughly flushed out whilst the hand agitates the fluid. These flushings are made with normal saline solution to which a small amount of perchloride of mercury has been added (1 in 6,000).

The cow is allowed to stand up in order that the fluids in the sac may drain away. It is found that the cardiac movement facilitates this, although there is always a little liquid remaining in the most dependent part of the cavity. The wound is plugged lightly with boracic gauze, and the whole operation site covered up with a clean round towel.

After-treatment consists of bi-daily flushings of the pericardial cavity with the same strength solution as used in the operation, and the external wound is treated with B.I.P.P. paste. This treatment can be carried out by any intelligent herdsman. It is, of course, necessary for the veterinary attendant to keep a watch on the case, and if necessary to re-explore the pericardial cavity for necrotic material or retained discharges.

Three cows have been so treated by the writer, and as all rallied from the actual operation, it is proposed to give a few brief details of each case.

Case I will be given in more detail, because this cow was operated on ten months ago, and has made a perfect and complete recovery, as far as can be detected.

Case 1.—Pedigree Guernsey cow. Freshly calved and sold, subject to her passing the Tuberculin Test.

It was found that a normal pre-inoculation temperature could not be obtained. On the twenty-second day following parturition the cow became very ill. Temperature 104.5° F. Pulse rapid and small. Blood-coated faeces in little amounts. Eyes sunken and a purulent discharge from the inner canthus. Cow standing persistently, and when moved reeled slightly.

Auscultation of the heart revealed a rapid "jumpy" action and rather indistinct. Decided friction sounds could be detected in connection with the heart beats. The jugular furrow full and a jugular pulse present. There was no oedema under the jaw nor under the brisket. There was complete anorexia. As the cow was obviously soon going to die if left, permission was obtained to attempt an operation.

About half a gallon of turbid fluid was removed through the cannula before incising the pericardium. Even so, there was a somewhat violent rush of fluid on opening the sac. The inner surface of the pericardium was covered by a thick layer of purulent looking material. The heart was similarly covered. There was a firm adhesion between the myocardium at the lower third of its posterior surface and the pericardium. It was not considered wise to interfere with this, although there was the possibility that the foreign body might be embedded in it.

Forty-eight hours after operation the wound appeared in a very septic condition, and a foetid discharge coming away from the pericardium. A good deal of necrotic material was curetted away from the external wound. Otherwise the treatment was as indicated.

At the end of ten days the wound appeared quite healthy, and the patient feeding, drinking and coming up in her milk yield.

At the end of a month the cow was turned out with the rest of the herd, and seven weeks after operation the scar had dried.

The cow has milked well since recovering, and at one time was giving over three gallons daily. She is now well on in calf and appears in excellent health.

Case 2.—Young Jersey cow in poor condition. She was noticed to be ill ten days after parturition. Examination revealed the cause to be traumatic pericarditis associated with oedema under the jaw and brisket. Temperature 102.5° F. Complete anorexia.

The operation was performed as indicated. The pericardium contained about half a gallon of greyish yellow pus with a very foetid odour. A piece of wire 2½ inches in length was found and removed

from the lower posterior part of the sac. The wire itself was identified by the owner as being the same kind that he had used for putting up a wire surrounding his tennis court, and he recalled the fact that the cow had been grazing near him whilst at this work.

The cow rallied from the operation and did well for ten days maintaining a good appetite. At this time, however, she developed pneumonia and died in three days. Post-mortem examination revealed the cause of death to be septic pneumonia of left lung and septic pleurisy. There were extensive tubercular lesions in both lungs, and it is possible that they may have predisposed to this complication.

The inner surface of the pericardium showed a number of irregular ulcerated surfaces covered by soft necrotic material. The heart itself presented no obvious abnormality.

Case 3.—Crossbred *Friesian* Shorthorn cow. Found acutely ill eight days after delivering her fifth calf. Temperature 106.2° F. Unable to rise. Groaning and apparently at the point of death. Very distinct "splashes" could be heard on auscultating the heart.

It was decided to operate immediately. The udder was inflated with oxygen, and half an ounce of posterior lobe pituitary extract given intramuscularly.

The pericardium contained about half a gallon of very foetid greenish fluid.

The cow could not be made to stand up, and so she was placed on her chest and supported on either side with trusses of straw. At the time of operation air seemed to be inspired into the chest through the wound.

The following day there was apparent a most remarkable change in the cow. She was standing up and feeding. Her coat was "set" as in good health. Her eyes that had appeared sunken the previous day now looked bright and healthy. Yet at the same time a foetid frothing sero-sanguineous discharge was escaping from the wound. The temperature was 104.2° F., and on no occasion for six weeks did the temperature go below 102° F. During this period the cow continued to feed well and to graze when turned out. The wound, although now half closed up, continued to emit a discharge. The latter was unpleasant until soap pessaries were placed into the pericardial sac. The owner at this time developed the peculiar idea that the continual discharge from this wound would so contaminate his buildings that the other cows would surely abort, and he had the beast butchered.

When the carcase was examined, the right pleural sac contained about a gallon of clear watery fluid. The left pleural sac was normal, but adherent round the wound.

The inner surface of the pericardium showed a number of discrete ulcerated areas which were the cause of the continual discharge through the chest wound. In other respects the carcase was normal. In treating this case, the heart was palpated every third day during the first fortnight in removing necrotic material from the pericardial sac, and the only restraint necessary was to hold the cow's horns in order to prevent her from turning round.

CONCLUSIONS.

That the pericardium of the cow can be opened up freely, its interior carefully examined and the heart palpated with comparative safety. The complete recovery may follow such a procedure as in Case 1, and that even if this happy result is not obtained the operation may allow the beast to recover sufficiently to be of use for butchering purposes.

The operation is that one from an economic point of view is of use chiefly in valuable pedigree stock, and even though time may show it to have a comparatively high mortality rate, yet it does at least give the animal a fighting chance for life and subsequent utility.

LITERATURE.

The literature on operative interference for pyopericarditis in animals is very scanty. Moussu (1) described an operation for draining the pericardium through a puncture from the direction of the xiphoid cartilage. This procedure was intended to allow the animal to recover sufficiently to be butchered. Liegnaux recorded a recovery by this method, although it is not clear that the case was one of traumatic pericarditis.

There are several references in medical literature on this subject. Barie and Lebert (2) record a case of pericarditis resulting from oesophageal, mediastinal perforation, caused by a broken down tuberculous gland ulcerating into the pericardium and the oesophagus with formation of a fistula. Periostiotomy performed, but death occurred. Boidin (3) recorded a suppurative pericarditis treated by puncture and pericardiotomy. This, however, terminated in death. Roby (4) recorded a recovery following resection of fourth and fifth cartilages in a

case of purulent pericarditis following pneumonia. Davis (5) demonstrated a case one year after pericardiotomy, pointing out complications due to adhesions, etc. The infection in the pericardium followed as a sequel to a septic bone process. Williamson (6) recorded a pericardiotomy performed under local anæsthesia (novocain) with temporary improvement, followed by death after seventeen days. Camac and Pool (7) record a case showing marked improvement until a septic phlebitis supervened. Death on the thirteenth day; operation performed under local anæsthesia. Guillermo and Montoya (8) describe a pericardiotomy under chloroform in a boy of eight years followed by complete recovery. Albrecht (9) describes a case of traumatic pericarditis in a young soldier followed by complete recovery.

The foreign body was not found. Jones (10) records an interesting case of traumatic pericarditis in a soldier of thirty-eight years of age, following two shell wounds of chest. Pericardiotomy performed under ether. Twenty-two ounces of offensive fluid and much gas evacuated from the sac. The cavity of the latter flushed out with iodine solution. Subsequent recovery apparently complete, the patient showing no undue sequelae in cardiac region or elsewhere. Klose (11) reported four cases of traumatic pericarditis in soldiers. One recovered after extra-pleural pericardiotomy performed under local anæsthesia. Crabtree (12) described the removal of a bullet from the myocardium of a soldier. The pericardium contained a large amount of thin pus. Recovery was uneventful. Noble and Vine (13) recorded a case of traumatic pericarditis following the passage of a bullet through the chest of a soldier. Pericardiotomy under chloroform and ether resulted in recovery. Pool (14) describes in detail a case in which pericardiotomy was performed with recovery. Resection of the fifth, sixth and seventh cartilages performed under ethyl chloride ether anæsthesia. Brooke (15) records a series of cases of pyopericarditis secondary to osteomyelitis of bone. Early pericardiotomy resulted in the recovery of two cases.

REFERENCES.

1. Moussu : Quoted by Hutyrá and Mareck, Spec. Path. Domest. Animals i. 1132.
2. Barie and Lebert : Bull. et. Mem. Soc. Med. Hop. de Paris, 1915, xxxv. 1042.
3. Boidin, M. : Presse Med., Paris, 1916, xxiv. 523.
4. Robey, W. H. : Jr. Amer. Journ. Med. Sc., 1917, cliii. 529.
5. Davis, C. B. : Surgical Clinics of Chicago, 1917, i. 375.

6. Williamson, C. S. : Medical Clinics of Chicago, 1917, ii. 907.
7. Camac and Pool : Amer. Journ. Med. Sc., 1917, clvii. 509.
8. Guillermo, M. L., and Montoya, J. M. : Report de Med. y Chirug., Bogtoa, 1917, x. 115.
9. Albrecht, P. : Wiener Med. Wochenschrift, 1920, i. 35.
10. Jones L. : Brit. Journ. Surgery, 1916, iv. 103.
11. Klose, H. : Beitrage zur, Klin. Chirurgie, 1916, ciiv. Kriegschirurg, iv, 556.
12. Crabtree : Med. Press, London, 1919, cvii. 472.
13. Noble, T. P. and Vine, A. C. Lancet, London, 1919, i. 107.
14. Pool E. H. : Annals of Surgery, New York, 1921, lxxiii. 393.
15. Brooke, R. : Lancet, London, 1924, ii. 319.

TRYPANOSOMIASIS IN CATTLE.

By C. R. VENKATARATNAM CHETTI, G.M.V.C.,
Chief Superintendent, Cattle Depot, Madras.

I shall enumerate below, for the information of the profession, some of the cases of Trypanosomiasis among bullocks, which I have come across in the recent outbreak among the Corporation bullocks—Nellore and Alambadi—1921-1922. There were a total number of 111 attacks and 101 deaths, *i.e.*, nearly 90 per. cent of mortality. Blood smears were submitted from every animal and the results were positive for trypanosomes in almost all cases that died exhibiting the symptoms enumerated below.

In this article, I intend to group the cases according to the different sets of symptoms observed in the outbreak and the treatment adopted in cases that I had the opportunity to treat.

I. The first set will then be those seen in the worst affected Depot *viz.*, the Basin Bridge depot. Bullocks—middle aged—apparently in the best of health and condition and thoroughly examined before sent out for work, as per orders—dropped down dead while working, thus exhibiting no symptoms of indifferent health whatsoever previously—smears revealed trypanosomes.

Post-mortem appearances :—Tympány, prolapsus recti, and rectal bleeding, frothy discharge from mouth and tongue protruded.

II. In this the second variety, the bullocks having completed their daily round of work quite satisfactorily, returned, took their feed after grooming—but fell down dead within a few hours after, or were found

dead next morning in the manger, or I was told on enquiry in some cases by the night guard, that the bullocks bellowed most loudly—behaved like mad ones, broke the ropes, ran aimlessly about and dropped down. As usual blood smears revealed trypanosomes.

• III. Next set corresponded to the symptoms of omasitis (impaction, of the omasum) *viz.*, colicky pains, muscular tremors, delirium, staring eyes, insensitive to light, staggering gait or wild rushing about, temperature ranged between 103° F. and 105° F, lying down, struggling and straining, neck-stretched and curved outwards, dung in hard pellets and coma followed by death in 2 or 3 days.

IV. In the camp (Fiji Emigration Depot) among the bullocks segregated for multiple abscesses and trypanosomes:—The course of the disease was a few hours to 4 days—Dullness, off-feed, sleepy, unconscious condition, head resting on the manger and leaning against the wall. The animal moves about groggy or aimlessly, loses its balance, has uncertain tottering gait, temperature 103° F to 106° F., coma and death.

V. Symptoms similar to that of Anthrax,—sudden onset, high fever, swelling of the dewlap, salivation, hurried and laboured breathing, weakness of the loins, rapid course, falls down, stretches the limbs, kicks about, struggles and dies. (Results of microscopical examination, positive for trypanosomes.)

Post-mortem appearances. Bleeding from natural orifice extreme tympany immediately after death, prolapsed rectum.

VI. In a few cases, the disease started with palsy of the hind quarters suddenly in strong well-built adults (giving room to suspect the driver for mal-treatment) could not get up or stand even with help (knuckling of the fetlock), no fever, appetite almost normal till death, rapid emaciation, finally death in 2 to 3 days.

VII. Lastly symptoms resembling Surra (Equine). A mild course of the disease—gradual loss of condition, progressive anæmia, dullness, irregular feeding and fever, inability to get up, flinching on pressure over the loins and back, œdema of the legs, ulcerative keratitis, etc., watery, foul smelling diarrhoea and death from exhaustion.

Treatment:—A. Patients which showed sets of symptoms enumerated under paras 1, 2, 3 and 5 gave no opportunities for treatment on account of the sudden onset and rapid fatal termination.

Of the rest, *i.e.*, animals which showed symptoms related in the 7th para, two Nellore bullocks (B. 107 and B. 299) were treated with atoxyl and arsenic treatment. Under instructions from the Principal,

Madras Veterinary College, 90 c.c. of 4 per cent. solution of atoxyl was given on the first day subcutaneously (body weight 900 lbs.) followed by arsenious acid in solution every alternate day commencing with 1 gramme and raising the same by gramme every fourth day, until two grammes were reached when the full course was completed. B. 299 was discharged cured with B. 107 injected with 60 c.c. of atoxyl subcutaneously on the first day and followed by a similar course of arsenic treatment; on the 22nd day after commencement it was off feed, and very weak; its dung was loose and it died on the 27 day; (Post-mortem could not be conducted, as I had gone to Ongole to buy bullocks).

B. Simultaneously Bullocks B. 95, B. 130, B. 142, B. 149, B. 176, B. 178 and B. 195 (Symptoms as per para 7) were given on alternate days intravenous injection of Tartar Emetic 100 c.c. of 1 per cent. solution (body weight 600 lbs.) and the dose was increased by 20 c.c. every fourth day. But bullock No. B. 176 was given in a concentrated form 2 per cent. solution. None of the bullocks underwent the full course of the treatment. B. 95 received two injections only—showed rise of temperature—could not repeat injections, as it developed multiple abscesses and died of rapid anæmia and exhaustion.

B. 130 and B. 178 received three injections, and had huge swellings at the seat of injection. No further injections were given. They are alive, free from Trypanosomes. The swellings were operated on and the bullocks are now alright. B. 142, B. 149 and B. 176 received three injections. No swelling at the seat of injection. Died. Post-mortem revealed cardiac lesions endo-carditis.

B. 196 received one injection only but showed rise of temperature and died 20 days later with cardiac lesions.

C.—The Chief Superintendent, Civil Veterinary Department, Madras, was consulted and under his instructions the following were treated with rectal injections of Tartar Emetic on alternate days: B. 53, B. 201, B. 27, and B. 118.

B. 53 was treated with 30 grains to commence with and on the second day with 40 grs., and the dose was raised by 10 grs., every third day until 120 grs. were reached. Showed no Trypanosomes but had to be destroyed from an economic point of view. (Very poor condition and not fit for work.)

B. 201 and B. 118 went through treatment fully, and are now quite healthy and fit for work. (No Trypanosomes).

B. 27 was commenced with 60 grs. raised by 20 grs. every fourth day but it showed Trypanosomes again and was becoming emaciated, hence destroyed.

D.—B. 19, B. 38 (Symptoms as per set VI), B. 69 and B. 130 were put under a course of Inf. Chiratta mix. 10 ounce dose in the mornings, and in the evenings Nochalia (*Vitex-Negundo*) chutney of the size of a tennis ball with an ounce of pepper were given. The first two showed numerous Trypanosomes. These four bullocks are now alright and going for work.

The treatment D was suggested by M. R. Ry., C. Singaravelu Mudaliar, Assistant Health Officer, Madras Corporation.

(For medicinal uses of *Vitex Negundo*, vide pages 442 and 443 of "useful plants of India" by Drury.—Ed.)

TRYPANOSOMIASIS IN CATTLE.

By MR. M. ANANTANARAYANA RAO, G.M.V.C.,

Senior Lecturer, Madras Veterinary College.

After reading the splendid article on Trypanosomiasis in Cattle by Mr. C. Venkataratnam Chetti, I am prompted to write a few observations on an attempt at treating this disease. At the suggestion of Mr. G. T. D'Silva, an extract of Neem leaves (*Melia Azadirachta Limi*) was tried as a drug for treating this disease. The method adopted to obtain the extract was as follows: 50 grammes of mature leaves were taken in a litre of distilled water and heated till it reached boiling point and allowed to cool. The extract was then filtered and autoclaved.

Experiments were conducted in Vitro, to see if this extract had any effect in either hastening coagulation of blood or causing a precipitate. It was found that it did neither. In order to find what action it had on animals when injected, intravenously or subcutaneously, a condemned dog from the Lethal Chamber was obtained for the purpose. The dog weighed 19 lbs. and it was given 38 c.c. of the extract intravenously, the jugular vein being selected for the operation. The dog stood the dose very well, no ill-effects were observed. After a couple of days the same dog was given 30 c.c. of the extract subcutaneously in the thigh, but it produced an abscess almost similar to the one often obtained after a subcutaneous injection of Trypanblue, but the area of reaction was bigger and the reaction more severe. A guinea pig was also tested with the same result. So it was proof enough that the best method

of administration was intravenously and a moderately large dose could be tolerated by an animal without ill-effects. In order to test what action the extract had on Trypanosomes, blood containing numerous Trypanosomes was freshly drawn from a bullock from its jugular vein. The blood was citrated to prevent coagulation and it was mixed with the extract in various proportions—viz., one drop of the extract to 1 c.c. of blood, 2 drops to 1 c.c., 3 drops to 1 c.c., 4 drops to 1 c.c. and 5 drops to 1 c.c. Two sets of hanging drops of these as well as the citrated blood were made as controls. One set was kept in the incubator at 30° c, and the other set was kept at room temperature in the Laboratory (average about 100° F). The experiments were conducted at the beginning of April, 1922. In both the sets of the mixture of blood and extract it was observed that after the lapse of 5 minutes the movements of the parasites grew sluggish and at the end of half an hour they were all apparently dead, whereas in the hanging drops made from citrated blood they were as active as they were at the beginning. It is also interesting to note that rosette formation of the Trypanosomes was observed in blood containing the extract after the lapse of 10 minutes. Opportunity was taken to inject the extract intravenously in experimentally infected dogs and also bullocks infected naturally. Two dogs were obtained and after observing for 3 days to see if their blood was free from Trypanosomes, they were infected with the organisms from a guinea pig which had been inoculated with the disease. One dog developed the disease in 10 days after inoculation and the other developed it in 7 days. The first dog weighed 16 lbs. and the second one weighed 20 lbs. Both these were given intravenous injection of the extract, the first one was given 32 c.c. and the second one got 40 c.c. Within 10 hours after injections, the Trypanosomes were not seen in the peripheral blood. Next morning also they were free from parasites in their peripheral blood. On the third, the second dog which was in an emaciated condition, developed convulsions and died. On Post-mortem examination, a large number of Ankylostomes were found, the blood smears from all the internal organs and bone marrow were negative for Trypanosomes. Daily examination of the blood of the remaining dog was conducted after the first injection and on the sixth day two Trypanosomes were seen in a hanging drop in a series of three taken for the purpose. Immediately another injection of 50 c.c. was given intravenously. The Trypanosomes disappeared by the next day and the daily examination for three weeks afterwards proved negative. A fortnight after the first injection, a guinea

pig was inoculated with a small quantity of blood from the experimental dog with negative results. Simultaneously experiments on bullocks were conducted. Mr. Venkataratnam Chetti was pleased to permit me to do it on some of the animals condemned, because they were suffering from Trypanosomiasis and were in a debilitated condition.

Bullock No. B. 180.—This was obtained on 4th April, 1922, from one of the depots and admitted as an inpatient. It was in a very poor condition and on the very day it was admitted its blood was found to contain fairly numerous Trypanosomes. It was given an intravenous injection of 250 c.c. of the extract. The Trypanosomes were not seen on 3rd day, it was given another injection of 350 c.c. and on 10th day it got 1500 c.c. of the extract. All along no Trypanosomes were seen in its blood. The animal was kept in the hospital for over 7 weeks and the blood was free from parasites. It was discharged on 24th May, 1923, and I am told that this bullock is still alive and is being worked regularly. It picked up condition during its stay in the hospital. One month after the 1st injection, the blood of this bullock was injected into a guinea pig, but it failed to develop the disease.

Bullock 1. P. No. 14 of 22.—This was obtained on 16th April, 1922, and was in an advanced state of debility and had sores on its body. The blood contained very numerous Trypanosomes. An initial dose of 350 c.c. was given to it. The Trypanosomes disappeared from the blood by the next day. On the 3rd day it was given 500 c.c. On 25th April, 1922. The animal died. No Trypanosomes were found in the blood till its death.

Bullock No. B. 167.—This was obtained on 13th May, 1922. The animal was in an advanced state of debility. Parasites were fairly numerous in its blood. On the 1st day 250 c.c. of the extract was given intravenously. On the 5th day and the 10th day it was given 350 c.c. and 500 c.c. respectively. The Trypanosomes disappeared on 7th June, 1922. I am told that this bullock was destroyed on 8th June 1922, because it was in a very poor condition and would not pay for its upkeep till it was fit for work.

Because the number of cases treated are very few, it is premature to say if Neem leaf extract has a curative property. Those that have facility to perform such experiments may continue them if they like to do so. Mr. Venkataratnam Chetti says that leaves of *Vitex Nigundo* given internally have a curative effect and it would be worthwhile trying intravenous injection of an extract obtained from these leaves.

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EDITED BY

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