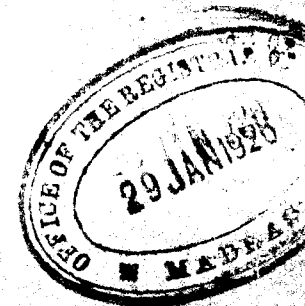


THE
INDIAN
VETERINARY
JOURNAL



Vol. II.	EDITOR : P. SRINIVASA RAO, G.M.V.C., Veterinary Surgeon, MADRAS.	No. 3.
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devoted to the cause of the Veterinary Profession.

Published for the All-India Veterinary Association.

EDITOR :

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

Veterinary Surgeon and Proprietor, Dr. Pangul's Veterinary Institute,
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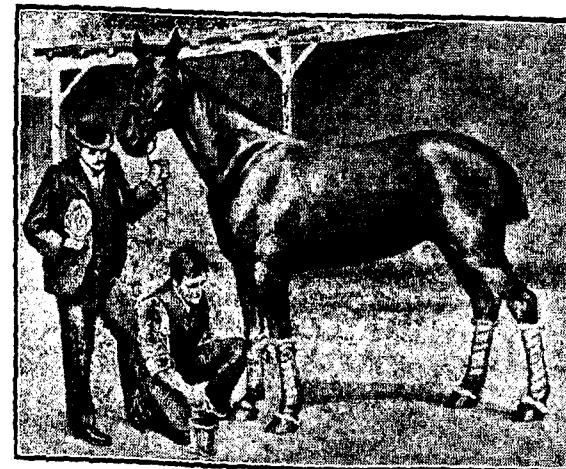
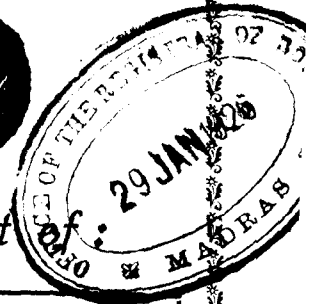
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THE INDIAN VETERINARY JOURNAL

(The Journal of the All-India Veterinary Association)

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Government to take action against that officer individually under the Government Servants' Rules.

It is not fair to penalise a whole set of Government officers for the action of a solitary individual. Are we to presume that such a case had really arisen? We sincerely are of opinion that there had not been any such case and that the Government's recent order is only anticipatory.

Another point to consider, there is the Medical Department whose officers stand on the same footing and status as those of the Veterinary Department with regard to professional or scientific matters. Those medical officers are, to the best of our knowledge, free from any such restraining influence and they are perfectly at liberty to contribute directly articles of a professional or scientific nature, of course with the general promise that they do not disclose any departmental secrets. Is it not therefore in the proper fitness of things that the subordinates of the Civil Veterinary Department of this Presidency are given with confidence that same amount of liberty in this matter which they have been enjoying till now without abusing it?

To sum up, the Government Order is penal in nature, detrimental to the advancement of science in effect and fatally injurious to non-Government publications such as ours, at least in this country. Will the Government condescend to reconsider the matter and remove the ban? May we appeal to the Veterinary Adviser to the Government of Madras to render all that lies in his power to come to the rescue of his subordinates in the matter and incidentally encourage attempts such as ours in the field of Veterinary Journalism?

RAO BAHADUR G. K. CHITALE ON CATTLE BREEDING.

We are glad we have now been provided with a copy of the address delivered by Rao Bahadur G. K. Chitale, B.A., LL.B., at the last Bombay Provincial Veterinary Conference held at Ahmednagar. We give due publicity to it in this issue. On one important question, the report of the conference we published in the last issue differs from Mr. Chitale's address. We regret the error. It is on the question of recent transfer of Control of Cattle-breeding operations from the Veterinary Department to the Agricultural Department.

Mr. Chitale's pious wrath on the claim "that the Veterinary graduate occupies the same position regarding the cattle as the doctor does regarding the men and women in the social world" is really amusing.

"I am sorry" he says, "that in this matter your reasoning is grossly incorrect and can't stand the examination from an expert point of view." Let us see what is the 'expert' point of view. No reasons are adduced to prove that the above "reasoning is grossly incorrect." Mr. Chitale's statement stands as an *obiter dictum*. He begins with a vague assertion that the Cattle-breeding Committee "found decidedly a change in the management of the department when the transfer materialised." Whether the change is for the better or for the worse is not specifically mentioned; but we are left to infer that it is for the better. Let us hope that Mr. Chitale bases his statement on sufficient data for giving public utterance to it. Perhaps when the cattle-breeding operations were under the C.V.D. much spade work had to be done and it is a notorious fact that such works are never appreciated to the extent they deserve or are lost in the speculations indulged at the first sight of small gains.

Mr. Chitale grows warm as he proceeds and asks, "Do you mean to tell me that in your College this course is at all taught in an experimental and practical way so that you may turn out a good cattle-breeder? Then again, what experience have you got as to the best way in which cattle must be bred having regard to the large variety of animals which is found to exist in our Presidency?" Then he tries from the above questions to explain "so you find the Government is right in putting the department in special hands trained practically for the purpose for which they are needed and you will be satisfied with your work of treating the animal when it gets sick and find out the cause of sickness and applying timely remedies." That is a variety of explanation that explains nothing. It is easy to set up a wrong theory and then pull it down heroically.

Mr. Chitale misses the point in the claim of veterinarians for the control of cattle-breeding operations. Their claim is, that with their thorough knowledge of animal physiology, pathology, anatomy, veterinary hygiene, soundness of animals, their care and management, their habits and idiosyncracies with not a little of the knowledge of breeding, they are the best suited to be in charge of cattle-breeding operations. Can any other class of public servants claim the same amount of knowledge of animals as the veterinarians? Would it not be easier for them to run cattle-breeding operations on intelligent and efficient lines than others? Then why deprive them of their legitimate sphere of work? If the cattle-breeding operations are not taught in an "experimental and practical way" in the Veterinary Colleges, it is

because of the many inexplicable conundrums of the Government. What is being taught at special cost with special staff elsewhere may well be included in the course of Veterinary Colleges with probably greater benefit to the country at large. They have robbed Peter to pay Paul.

The present position of the veterinary surgeon in the cattle-breeding field is, to say the least, really anomalous. He is wanted at every turn of these operations, but yet he is pronounced to be 'unfit' to be in charge of those operations! If a cow presents difficulty in calving a veterinary surgeon is needed; if either the mother or her little one suffers the least constitutionally it is the veterinary surgeon that must set them right; if they do not 'thrive' well the veterinary surgeon is expected to make 'elephants' of them; if an epidemic breaks out in the camp the veterinary surgeon is held solely responsible to put an early end to it; if unwanted bulls are to be castrated on the farm it is the surgeon's knife that must accomplish it; in fine, if anything goes wrong anywhere with the cattle-breeding operations the veterinary surgeon must grant his opinion gratis! Where then is he incapable? Is it in the care and management of animals when they are healthy or is it in his capacity to dabble in doubtful experiments of improving the breeds and increasing the milk supply? We mean no offence to anybody; but we cannot allow our cause to suffer for want of proper representation of the question on all its bearings. So far as the veterinary surgeons are concerned with these cattle-breeding operations, the verdict of the Powers-that-be and others of their school of thought, seems to be, "capable but unfit," "useful but doubtful"! Anomalous! is it not? We assert if there is one man under the sun best suited to look after the cattle breeding operations, it is the veterinary surgeon. We do not mean that the surgeon in the daily routine of his tours or hospital work can manage these operations. There must be "special men" and those special men must be veterinary surgeons.

As for "the variety of animals found to exist in the Presidency," surely Mr. Chitale can credit the veterinary surgeons with as much of common sense as any other class of public servants specially trained for the purpose to adjust themselves to the requirements of different cases. Essentials being the same, minor deviations, if any, must be picked up in the actual field by all, whether they are veterinary surgeons or men specially trained for the purpose.

Again, veterinary surgeons are consulted by the patronising public on dietetics, care and management of animals before and after pregnancy, increase of milk supply and such other things. In fact they are

entrusted with the work of maternity and calf-welfare and they do it to the satisfaction of the owners concerned. Then are they 'fit' for such advice and action to the general public and 'unfit' only to the Government or quasi-Government enterprise? We fail to understand how the veterinary surgeon does not occupy the same position in relation to cattle as the doctor does in relation to human beings. If a doctor is good for maternity and child-welfare schemes, a veterinary surgeon is good for cattle-breeding and calf-welfare schemes. We have dealt with this subject somewhat at great length. The importance of the subject is our only excuse. Much erroneous notions exist over this important question. Our merits are not known widely and we are labelled as 'unfit' for the task. We have allowed our cause to suffer by our own default, in not pressing our rights and privileges in the way we ought to. We hope the subject will receive the consideration it deserves at the hands of the Government and public-spirited gentlemen like Mr. Chitale and justice done to the veterinarians. A great avenue of work is lost to them and an opportunity of making themselves more popular and expanding their work is denied them by no fault of theirs. We hope our cry will not be a cry in the wilderness.

PRESIDENTIAL ADDRESS OF THE FIFTH ANNUAL CONFERENCE OF THE BOMBAY VETERINARY GRADUATES' ASSOCIATION.

BY RAO BAHADUR G. K. CHITALE, B.A., LL.B.

MR. KULKARNI, VETERINARY GRADUATES AND GENTLEMEN,

I am conscious of the great honour you have done me in electing me as your president. Having regard to the fact that your two previous presidents could authoritatively speak on the subjects to be discussed hereafter, I feel my responsibility the greater, but I hope with your indulgence I shall be able to discharge it as well as I can.

Your chairman of the reception committee has rightly laid stress on the improvement of the Veterinary College and the establishment of a post-graduate course. As sound education is the basis of all progress, I think you are right in complaining that your college courses have not been changed for the better, for about a quarter of a century and in fact the syllabus is more retrograde than before. The desirability of improvement is already admitted by the Honourable the Minister but he feels his inability on account of financial stress. I know this financial difficulty is often put forward but is not always true. I do not

believe that Government is unable to find a lac of rupees for non-recurring expenditure and Rs. 30,000 recurring. I know where there is a will there is always a way. Do we not find that lacs and lacs are being spent by Government on several objects which it pleases them to consider as urgent? The truth is that if there is enough pressure from right quarters I know that Government is always willing to spend. I must say that in this matter you do not appear to have enlisted the sympathies of some local councillors and I would advise you to ask somebody to interest himself in this question and bring forward a suitable resolution for discussion in the open council. This is one of the ways of bringing pressure and I hope you will kindly accept my advice and do the needful in the matter.

The next question in importance which I would like to touch upon is your horror at the impending transfer of your department to local boards. I am sorry I do not share your feeling nor do I think that you are wise and prudent in your attempt to thwart the inevitable. At present you appear to pride yourself needlessly in the fact of your being Government servants and you do not appear to have realized the spirit of service which is implied in serving the public. You feel that the local bodies are such monsters as would devour you if your services are transferred to them. Let me assure you that this is neither a fact nor true and your fears are perfectly groundless. It may be that the communal feelings which are at present needlessly complicating administrative matters may be at the root of your fears but even this is a passing phase and Government is strong enough to curb it at the proper time if the communal considerations alone were to wrench the utility of your services. I regret to think at present there is some ground on this score for your fears but I hope you will be manly enough to bear up all this for some time to come and, loyal and devoted servants as you are, let me hope that you will be able to come out of the ordeal successfully even while serving the local bodies, and what greater reward do you expect than the contentment and good wishes of your own people whom you will have the honour of serving in the right spirit. Of course you are right in asking for proper safeguards and here again I may assure you that Government will have no doubt to keep careful watch on this and is not likely to give you away and your interests without proper safeguards. Lastly let me tell you that the local bodies are not so independent masters as you think them to be because government holds the rod in its hand which I know it will use if an occasion for it arises. Under these

circumstances I appeal to you to drop out your resolution in this matter and be willing to accept the change when it comes.

Next in order is your complaint about the inadequacy of your salaries and even though the cadre has been recently revised you do not appear to be satisfied with the way in which you have been treated. It has to be remembered that your educational status is certainly lower than that of your sister service like the Sub-Assistant Surgeon. Naturally you appear to suffer in comparison with the pay which the Sub-Assistant Surgeons at present get. You are right in pointing out that entrance examination to the college should be brought on a par with that of the entrance examination to that of a medical school so that you may be well equipped by education to imbibe better the college courses. I am agreed here that you have a good ground for complaint and take it from me that unless and until this stigma of lower education is removed the general public will not rate you at your proper value and your demand for equality of pay with that of the Sub-Assistant Surgeon will naturally remain unrealised. Moreover you have to remember that your present cadre of appointment which is about 107 is much below what it should be; and here again the question of adequate finance comes in your way but I hope when you come to discuss this particular resolution on this matter you will no doubt consider it from all these points of view and pass a suitable resolution. I will not anticipate your judgment in the matter but hope that by your sweet reasonableness you will discuss all criticism and then face the issue boldly by having it ventilated if necessary in the local council.

I find that one of the reasons which is given by the Hon'ble Minister for not reconsidering this matter was your impending transfer to the District Local Boards. I may utter a word of warning here. I know that the local bodies are generally averse to give more pay than what they give to their staff. They wrongly think that the present scale of salaries is lavish and some of them go to the extent of thinking it necessary to curtail them if possible. Personally I am entirely opposed to this view and have been always maintaining that the experiment of entrusting more powers to local bodies will prove disastrous unless and until they are efficiently and properly staffed in several departments under their control so that the administrative machine may be in efficient and good hands. In no country in the world public services are inadequately paid and the moment you try the experiment which has the result of disappointing a large number

of staff which will breed discontentment the local bodies will find out their mistake when perhaps it will be too late to mend. I know that many of my friends on the local bodies differ from this view and it will be to your interest to see that your vested interests are properly safeguarded by rules and regulations so that you may not suffer in the least in your prospects. Let me assure you once again that if you properly approach the Government in this matter before the transfer of your service is effected I know the Hon. Minister will do his best to watch your interest and give you proper safeguards.

I now turn to the necessity of improving and expanding your department to the furthest possible limit. At present there are only 99 dispensaries in the whole of the Presidency which work to about 4 per district. If we omit from this one dispensary which usually exists at the headquarter town there remain only about 3 which are supposed to be sufficient for catering to the wants of the whole agricultural community. I find that total expenditure of your department is Rs. 4 lacs 66 thousands in Presidency proper and 1 lac and 26 thousands in Sind; having regard to our resources I do not think that the present expenditure is at all adequate. If we remember that the object of the department is the relief of the cattle in general, the problem is so immense that the present expenditure cannot be considered to touch even the fringe of it. Perhaps the ambition of having one dispensary in every taluka may be too extravagant at this stage but there is certainly enough room for gradual expansion by having an annual programme of adding a definite number of dispensaries every year. This will I hope give you an ample scope for your services. While on this subject I must say it is certainly a matter of congratulation that in your service there is no unemployment problem, as I find that about 16 graduates who annually pass out of your college every year readily find out service either in Government or in Indian States. I hope that you do not suffer in your prospects by over production and unless and until the number of dispensaries is likely to be increased the annual out-put ought not to be allowed to grow in numbers.

Lastly I have to turn to your complaint of the recent transfer of the cattle breeding department from the veterinary to that of the agricultural department. You observe that it is against the interest of veterinary science inasmuch as a veterinary graduate certainly knows more about cattle than an agricultural officer and you emphasise the point that the veterinary graduate occupies the same position regarding the cattle as the doctor does regarding the men and women in the

social world. I am sorry that in this matter your reasoning is grossly incorrect and can't stand the examination from an expert point of view. I had the opportunity and good fortune of looking into these problems first hand when I was a chairman of the Cattle Breeding Committee. While the committee as a whole was on a tour of inspection we found decidedly a change in the management of the department when the transfer materialised. I am speaking in a responsible manner and wish you to understand the problem on the first point of view. You will remember that even an indigenous cattle breeder as is found to exist in several parts of our Presidency has got some impartial knowledge of the necessities of the case and has got his own indigenous way of cattle breeding. For instance take a Rabari in Guzarath or a cattle breeder on the Krishna banks in Satara or a cattle breeder in Mysore. Do you mean to tell me that in your college this course is at all taught in an experimental and practical way so that you may turn out a good cattle breeder? Then again what experience have you got as to the best way in which cattle must be bred having regard to the large variety of animals which is found to exist in our Presidency? You will, I hope, so find that Government is right in putting the department in special hands trained practically for the purpose for which they are needed and you will be satisfied with your work of treating the animal when it gets sick and find out the cause of sickness and applying timely remedies. I feel that this is your legitimate sphere of usefulness and even if I differ from your view let me assure you that I do so honestly and in the best interest of science itself. I shall advise you in not giving an important place to your complaint in this matter but I have no objection to your discussing the matter in detail in your meeting of the Subjects Committee.

In conclusion I think I have already detained you too long and as you have heard me patiently I hope you will pardon me for any extravagance of language or thought from which you may differ. I have spoken to you as frankly as I can. Let me assure you that I had to do so in full sympathy with your legitimate aspirations. I thank you once again and ask you to proceed with your work of electing a Subjects Committee.

Notes.

1. The Administration report of the C. V. D., Madras for the year 1924-1925 has been recently published. In the words of the Government "A regrettable feature of the year was the large increase in cattle mortality consequent on outbreaks of rinderpest in Kurnool, Ganjam, Kistna, Cuddapah and South Kanara." The toll from this disease alone was 9,681.



2. Let not our readers think that it is too insignificant a figure for a period of 365 days and that for a whole Presidency! The figure, we emphasise once again, represents the mortality under rinderpest. The total cattle mortality for the year was 57,289, the highest for the last five years! Contagious diseases claimed no less than 29,654 heads of cattle.



3. The Government in their review of the report admit that "the number of dispensaries is still inadequate to the requirements of the Presidency and in this respect, the organisation of the veterinary relief in Madras compares unfavourably with that of certain other provinces."



4. Is it any wonder then, that in the Madras Legislative session of November 1925, when the Honourable the Minister for Development moved for the grant of an additional sum of Rs. 245 under 'Agriculture-Transferred,' a token motion to reduce the allotment by Rs 10 was moved by Mr. J. A. Saldhana, who drew the attention of the Council to the neglect of vocational agricultural education in villages and *also to the inadequacy of the establishments and pay of veterinary officers?* [Italics are ours].



5. We said in our previous issues that public opinion will soon assert itself and demand of the Government the cause or causes for non-development of such an useful department. What we expressed is merely a natural sequence of the general awakening that pulsates the nation now. We are very glad that the Honourable member for South Canara, drew pointed attention to this matter. There is yet time for the Government to make good all occasions lost and opportunities neglected. Will they do it? Time alone must answer.

We take the following from "The Hindu" dated 6th October, 1925 :—

VETERINARY AID IN MYSORE.

(From Mysore Publicity Officer).

6. Bangalore, October 3.—The Government have sanctioned the proposals of the Director of Agriculture to carry on an effective campaign against rinderpest and also a grant of Rs. 120,000 for the following purposes :—

Rs. 100,000 for the purchase of serum; Rs. 10,000 for the purchase of cattle and other charges in connection with the production of virile blood; and Rs. 10,000 for the purchase of instruments, etc.

A temporary additional staff has also been sanctioned. Government have ordered that Veterinary Dispensaries be opened at Chamarajanagar, Thirthahalle, Hosadurga and Anekal as early as possible during the current year.



7. May we know if in similar circumstances any temporary additional staff were employed in the Presidency of Madras, when rinderpest was carrying away nearly 60,000 heads of cattle during 1924—1925? Apparently not and we should like to know the reason for that. We fear the current year is no better. Is this item less important than deputing an agricultural officer to undergo "a course of instruction in animal husbandry and dairying" at the Bangalore institute for whom an additional grant has been sought for? We leave it unanswered.



8. Rao Bahadur G. K. Chitale said at Ahmednagar that the Agricultural Graduates know more about cattle-breeding than Veterinarians; that at any rate is the impression one gets after a perusal of his speech. The Hon'ble Diwan Bahadur T. N. Sivagnanam Pillai, the Minister for Development in moving for an additional grant referred to in the above paragraph said "there is now no one in the department (agricultural) who had any sound training in dairying." These two statements coming from two prominent men in Bombay and Madras are very contradictory and difficult to be reconciled. Speaking for ourselves, we can confidently assert that veterinarians with the same training will prove themselves invaluable for the purposes required.

9. In other respects the report of the Madras C. V. D. shows a good record of work. We know that the Officers and men of that Department are really hard-working people.



The members of the veterinary profession who are subscribers and readers of this journal will note with considerable interest a full page display advertisement of The Denver Chemical Mfg. Co., of New York City. This company manufactures a preparation called—ANTIPHLOGISTINE—which is one of the most extensively employed remedial agents in the world and is manufactured in their own laboratories in most of the principal countries.

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A liberal sample and literature will be sent to any of our readers who will mail a request to the Denver Chemical Mfg. Co., 20-24 Grand Street, New York City, or to their agent, Muller and Phipps (India) Ltd., 21 Old Court House Street, Calcutta.

General Articles.

VETERINARY JOURNALISM.

(A composition on the art of writing Professional Papers.)

By R. N. NAIK, G.B.V.C.,

Veterinary Asst. Surgeon, Kumta, Bombay Presidency.

Introduction.—We have made a happy beginning by starting our own Veterinary Journal and it behoves us to give ready response to the appeal that appeared in the Editorial of the First Issue of this Journal. The responsibility of running it does not rest on the editor alone but it mainly depends upon us, the members of the All-India Veterinary Association. We, by virtue of our noble vocation have a

life mission to serve, to promote and to elevate the Veterinary Profession in India and should, therefore, we patronise and contribute papers in accordance with our ability and experience thus showing that we are not a lifeless body on the surface of this intellectual and progressive world. In order to befit ourselves to write first class papers there is an urgent need of studying the art of writing professional papers and in the following pages an attempt has been made to supply this need so far as our present requirements are concerned.

The writer desires to express deep obligations to the authors whose works he has referred to in preparing this composition.

JOURNALISM.

"The chief asset of the press is influence, and this can be acquired by the public confidence. There are three essentials for the good repute of the press and for its inspiring confidence. It must be clear; it must be honest; and it must be free. And it must have three objects—to inform, to interest and to guide." MR. J. C. WALTERS, EDITOR, MANCHESTER CITY NEWS, *January 11, 1924.*

Journalism is the circulation of information in a printed form to command a wide publication and it is a material published with an object. When any matter is given for publication it is given to the public and not to individuals. The object of being a well-trained journalist is to draft a first class communication of original matter. Unfortunately competence of work and felicity of expression are not many a time combined in one man. It is of little use to possess knowledge without being able to expound the same either by conversation or by writing.

The cardinal rule in writing a paper to the press is "have something to say and say it." You should not rush to the press if you have nothing to say; but wait till you have something which will be of real benefit to the reading public. The paper to be published should be written in accordance with the modern usage and be interesting and tasteful.

A journal is not merely a collection of words; it is an intellectual centre. It contains a number of parts and the following are important ones.

- A. Original matter.
- B. Reviews and Notices of books.
- C. Abstracts.

- D. Annotations.
- E. Editorial comments.
- F. Clinical records.

Original Articles.

Original contribution is the recording of all that one has seen, investigated and experimented upon. It deals with new facts which have not been recorded previously. It is ordinarily divided into following outlines :—

- I. Title.
- II. Introduction.
- III. Historical Notes.
- IV. Body.
- V. Results.
- VI. Summary.
- VII. Conclusion.
- VIII. Bibliography.

TITLE.

“Four rules for the preparation of an article for a journal will then be :—

1. Have something to say.
2. Say it.
3. Stop as soon as you have said it.
4. Give the paper a proper title. ‘*Billings*’

All scholars and interested readers are busy people. They first look at the title and should it happen to attract their attention they go through it. If a paper is carelessly or irrelevently titled, no matter how valuable the contents may be, the busy reader simply passes it over without reading a single line. The title of the paper should, therefore, set forth the character and indicate the contents and scope of the article. It should be significant and brief. Compare and contrast the following two outlines.

1. A note on Tuberculosis in cattle in Bombay Presidency by Mr. A.B.C.
2. Tuberculosis in cattle in Bombay Presidency. Prevalence and morbidity, by Mr. D.E.F.

The first title “A note on etc.” does not indicate the exact contents of the article and, therefore, troubles the reader to find out the

same himself. The second title is an exact one as it indicates what is being treated in the article and, therefore, it creates a good impression. First impressions are strong impressions; a title ought therefore to be well studied and to give as far as its limits permit, a precise indication of what is to come.

The writer should also know that the title can correctly be classified in general index for the convenience of future reviewers and bibliographers.

INTRODUCTION.

It is the introduction which actually begins the paper and also introduces the scope of the article at the first instance. Manifesting apologies, wayward or fanciful approaches or any kind of skirmishing, shows ungraceful beginning and confused understanding of the subject matter. One who writes a long “explanation of the honour conferred upon him by the request to contribute and other platitudes” comes in the category of apologetic writers. Introduction if copied from other writers loses in exactness, dignity and clearness.

“All writers even the most skilful, are, in the degree of their skill, at some care how to begin. Any unpracticed writer, for sheer helplessness, at the outset, may never begin; he may abandon his work in despair. A witty beginning is something like a liberty; for an emphatic beginning the reader is not yet attuned; nor is he attuned to a ponderous introduction. To begin naturally and interestingly is no mean art”—*Maud*.

A good introduction begins with promptness and dignity and touches the keynote of the subject in order to engage the attention of the reader by the arguments easily and directly.

HISTORICAL NOTES.

Views of contemporary workers and the author's previous studies, if any, are briefly stated here in order that the reader may become acquainted with the views already expressed on the subject.

BODY.

The body of the paper contains all that you have to say on the subject. The observations and the results of investigations and descriptions of interesting cases etc., come under this part of the paper or, in other words, it includes an exact statement of what you have seen, done and found, operations and devices used and experiments made. You may record concrete facts, advance theories and discourse upon facts.

RESULTS.

Results of the investigations, operative procedures and *experiments* are discussed in detail. All findings need to be stated irrespective of their significance; but those which prove the author's working may be given the first place.

SUMMARY.

This embodies an outline of what you have stated in the body and results.

CONCLUSION.

In two or three short paragraphs conclusions drawn from the results are to be stated.

Here it will be interesting to note that all scholars do not always read the whole paper from the beginning to the end. Summary and conclusion are the only things read at first and should these happen to interest them they will be inclined to read other parts. Summary and conclusion should, therefore, be exhaustive, comprehensive and worth taking as an abstract for publishing in other journals if desired by their editors.

BIBLIOGRAPHY.

When preparing any kind of professional paper it is always necessary to make references to the standard literature, contemporary authors, investigators and research workers. Journal of the American Medical Association has well said the importance of references in the following quotation:

"There is hardly any one detail of a well prepared and well written article that will give a better and clearer idea of a writer's methods, or foster a greater confidence in the accuracy and soundness of his views, than well chosen, well arranged, absolutely correct references."

Bibliographies are arranged alphabetically according to authors and numbered consecutively. Each reference should give the following in the order arranged.

1. The author's name and initials.
2. The title of the book or article.
3. The properly abbreviated name of the periodical or book in which it appeared.

4. The year of publication.
5. The volume number.
6. The inclusive paging.

Example:

- Witford, W. Physicians as speakers.
 Jour. Am. Med. Assn. 1900, Vol. xxxv, P. 699.

B. Reviews and Notices of books.

They are the criticisms or a faithful, comprehensive and truthful exposition or summary on any publication.

C. Abstract.

Information which is considered to be important and useful to the reader is summarised in the form of an abstract from good and responsible journals or publications. Care is to be taken not to mutilate or misrepresent the meaning of the author.

"To re-construct a text" says Anatole France "is always a delicate task upon which even the most practised minds may often be at fault." As an example of best abstracts on veterinary matters one may refer to the Tropical Veterinary Journals especially when they were being edited by Mr. J. T. Edwards, the present Director and First Bacteriologist I.B.L., Muktesar.

D. Annotations.

These are a collection of very instructive notes on various subjects, which are newly investigated or new and interesting to the reading public.

E. Editorial Comments.

The task before an editor is indeed not very easy. He is required to be in touch with the modern world and the up-to-date development of the veterinary and allied sciences. His *motto* should be "to interest, to inform and to guide." His arguments should be sound, opinions clear and conclusions impartial and worth considering. Editorial comments play as much part as that of good articles in enhancing the value and usefulness of the journal among the public and Government.

F. Clinical Records.

The primary object aimed at in publishing case reports is to make public a new line of treatment that is comparatively more effective than what we have already and possibly cheap and easy. Science is always progressing and any treatment that is said to be the best to-day may be discarded to-morrow. Case reports are also written to record some curious history, symptoms, pathological, anatomical or any other uncommon phenomena. Any article on this subject that does not substantially serve any purpose to the practical veterinarian is no better than waste paper.

The following are the important outlines on which a case report deals with :

1. History.
2. Symptoms.
3. Diagnosis.
4. Treatment.
5. *Post Mortem* appearances.
6. Conclusion.

The writer has no room to state his opinion or guesses that were not well conceived. The reading public is a wise set of people and all of them can not be deceived or led astray from sound reasoning and conviction. Interrogating the reader to explain any common findings shows the lack of professional knowledge. Should you find any curious or uncommon findings refer readily to the standard literatures which will help you to produce a successful article.

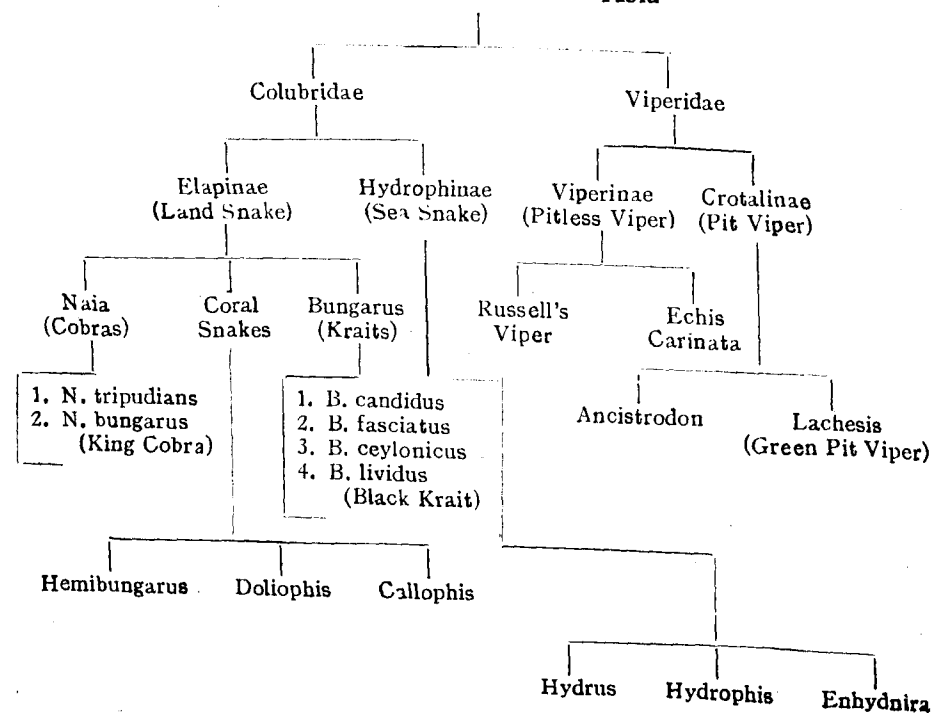
Case reports must be clear and unambiguous and are written not in a telegraphic language copied out *verbatim et litteratim* from case sheet but in the form of an interesting story without exaggeration.

" SNAKE-BITE IN INDIA."

By DR. S. R. HASSAN, P.V.S.

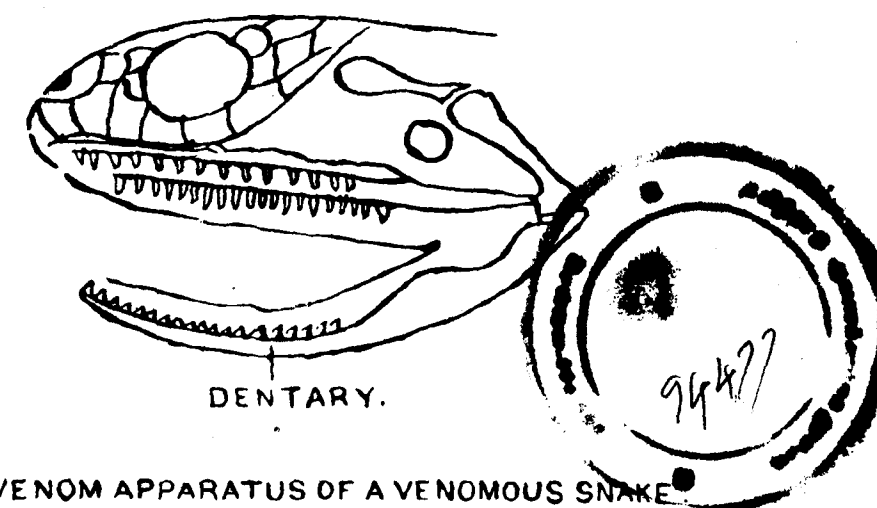
Offg. Prof. of Pathology and Bacteriology, The Punjab Veterinary College, Lahore.

Poisonous Snakes of Asia



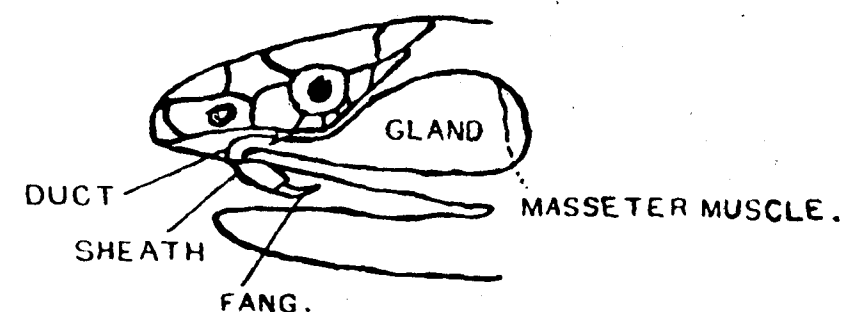
HARMLESS COLUBRIDAE SNAKE'S SKULL.

FIG.No.1.



THE VENOM APPARATUS OF A VENOMOUS SNAKE.

FIG.No.2.



The casualties in animals due to the snake-bite are not so common as in human subjects, yet by no means the subject of snake-bite in Veterinary Medicine can be called less important. During the last 12 years of my experience, I recorded 18 cases of snake-bite in animals in various parts of India, out of which 12 proved fatal. The loss sustained by the owners through these casualties amounted to Rs. 5,000 as 2 of these animals were valuable District Board Arab Stallions. Considering the data supplied by the Medical Department reports, we can easily see that in India and other countries undoubtedly cultivators of soil and men engaged in mining are the persons who run great risk from snake-bite. So under these circumstances, the risk run by the domesticated animals from snake-bite can in no way be considered less,

though as in the case of various other diseases nothing has been done as yet. In the case of human beings various experiments have been made by competent observers, though unfortunately so far as these experiments go, no internal medicine or a reliable antidote has been discovered.

The chances of escaping from snake-bite and of survival after being bitten are the same in animals as in human beings except that the former are naturally provided with a comparatively much thicker and hairy skin, through which the fangs of the reptile sometimes cannot pierce. Besides, all the species of snakes are not venomous. So in the case of human beings sometimes death may occur by fear, but there is not this danger in the lower animals, because they on account of their comparatively less developed brains are not much susceptible to shocks.

In cases of snake-bite it is of course very important to find out whether the snake inflicting the injury is poisonous or not, because, in case of innocuous ones, it would be unnecessary to give treatment. Up till now, there have been discovered 1,700 species out of which 300 are venomous, while 300 more have grooved teeth of some sort and these though not commonly regarded as venomous can instil saliva in the bite to cause suspicion or even dread.

These 1,700 species of snakes are divided into 9 families 2 of which include the venomous species, but in India the snakes which concern human beings and domestic animals are not more than 7 or 8 and these remain underground for more than 5 months.

Roughly speaking, the non-poisonous snakes are generally less active, dull and bigger in size and have no fangs and venom vesicles. Their teeth are arranged in rows along each jaw and when such a snake bites, it leaves two rows of small punctures at the seat of bite as shown below.

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The venomous snakes are divided into two families, Colubridae and Viperidae. The further sub-division is given above in a tabular form.

Colubridae are divided into 3 sections according to the form of the teeth. Most of them lay eggs and some of them are harmless. Of these that are poisonous the Sea-snakes are intensely so.

Coral Snakes.—These are slender snakes 12 to 30 inches in length with yellow bands or spots on the head. They are found in hill stations such as Shillong. Their venom is intensely poisonous for human beings and animals, but fortunately a very small mouth they possess and thus cannot bite.

Naga or Cobras.—These are well known in India in almost all the provinces and there are various stories relating to them in the Hindu Mythology. They are called Nagas and are intensely poisonous. They can easily be distinguished from their appearance. Their fangs are stout and large. In both *N. tripudians* and *N. bungarus* the upper third labial scale touches the eye and the nostril, but the King Cobra or *N. bungarus* has on the head an additional pair of large shields behind the parietals. *Bungarus* or *Kraits* are also highly venomous, of which *B. candidus*, the common krait, and *Bungarus fasciatus*, the banded krait, are the important ones in India.

Viperidae.—These do not lay eggs. There are about 110 species of which all are more or less poisonous. They have narrow neck, broad head covered with small scales and a stumpy tail. The only teeth in the maxilla are the fangs connected with venom glands; one or two of these are large and tubular and ankylosed to the bone and the rest form an unattached bunch and are called Reserve Fangs. They are divided into 2 sub-families: A. *Viperinae* or pitless vipers which have no loreal pit. There are about 45 species but in India only 2 are important. (1) *Viper russelli*, Russel's Viper, (2) *Echis Carinata*. B. *Crotalinae* or pit-vipers which have a large loreal pit between the eye and the nostril. There are about 65 species of pit-vipers 2/3 of which are American and the rest, Asiatic, the rattle snakes being American.

Venom Apparatus of a venomous snake.—It is composed of a pair of glands regarded homologous to parotid glands of mammals. A short duct proceeds from each of these glands and its end is only applied (not attached) to the base of the fang. Some portion of this gland is covered by fibers of Masseter muscle and there is close correlation (communication) between the gland and the motor mechanism of the jaw so that when the snake bites the gland is compressed, the duct is stretched and the poison squeezed out into the wound through the grooved fangs. The venom is forcibly injected through the fangs by the act of biting. In some snakes the gland itself is contractible and thus a snake can spit its venom. Some of the Indian and African snakes spit their venom in this way.

Amount of venom injected in one act of biting.—This is a very important point to be considered in the treatment of snake-bite. Actually it depends upon the size of the individual and its condition *i.e.*, fresh, exhausted, fasting or full, long captive, etc., but roughly it ranges from 3 to 30 drops. In experimental work it is pressed out of the gland from a living snake, dried and weighed. From one snake 200 m. gms. of poison was removed, a quantity sufficient to kill 8 average men.

Physical and Chemical Character of the Venom.—It is clear, sometimes opalescent, slightly viscid fluid, of yellow colour. It is odourless and tasteless but sometimes bitter and has a normal acid reaction and a very high specific gravity. Its virulence depends upon the soluble proteids of which it is rich. The poisonous property is commonly destroyed by prolonged boiling and by pancreatic juice, though in viperinae venom, it becomes coagulated and impaired by heat below the boiling point and destroyed by gastric juice. Snake venoms usually give proteid reaction and are rendered inert by various chemicals, as strong caustics, oxidising agents as Potassium permanganate, Hypochloride of lime, etc., whose venom properly dried keeps indefinitely, and is soluble in water or normal saline solution. The solutions prove fully potent if injected into animals.

The Nature and Action of Venom.—The venom is essentially regarded as a part of digestive mechanism and its action is identical with toxins and enzymes which act upon nervous system and blood.

Neurotoxins.—These are common in venomous Colubridae and have special action on the respiratory centre in Medulla Oblongata. The toxins which act on blood preponderate in Viperidae and are classified as follows:—

1. Haemolysins, or those which destroy red blood corpuscles.
2. Haemorrhagins, or those which destroy cells of the capillary walls and thus cause hæmorrhage.
3. Fibrine Ferments. These act on plasma and increase the coagulability of blood.
4. Those that act directly upon heart and vasomotor system.

Effects of Venom upon Animals.—Recently while undergoing a Post Graduate course at the Calcutta School of Tropical Medicine and Hygiene I had the chance of studying closely the experiments made on snake poison by various workers. The data supplied were as follows:—

1. The effect of the venom differs according to species,
2. Condition of the venom at the time of use,

3. The amount of venom injected,
4. The manner of injection.

Indian Cobra Venom.—In animals, after giving a lethal dose, this venom causes symptoms of gradually increasing paralysis, beginning with hind limbs until the animal lies in drowsiness with twitching, nodding and jerking of the head. Breathing becomes laboured and at last fails rapidly. The animal expires after exhibiting a few convulsions, though the heart beats continually for a time. The blood clots and at the site of injection there is extravasation and infiltration of blood. In animals salivation is common. Death takes place from 30 minutes to 30 hours. Desiccated Cobra Venom can kill a rat in 10 minutes.

Russel's Viper Venom.—This venom after intravenous injection causes general clotting of blood in blood vessels. The animal shows a few convulsions and heartbeats stop rapidly. After subcutaneous injection the symptoms are shivering, staggering and finally the animal lies down. If death does not occur at once, the wound and various mucous membranes begin to bleed owing to the destruction and abnormal fluidity of the blood owing to the dissolution of the capillary walls. Locally there is no inflammation spreading from the wound but an enormous gangrene, destruction of the tissue which provides a chance for the pyogenic organisms and an abscess may form. Death takes place in 3 to 7 days.

Echis Carinatus.—The effects of the venom of this snake upon animals are the same as Russel's Viper, except that in the former the bite is very painful and there is intense local reaction. The victim may apparently look better, but after the lapse of several hours there will be continued hæmorrhage from the wound and mucous ulcers with the same result as in the case of other Viperidae. The animals bitten by sea-snakes show the same symptoms as in the case of cobra bite and the death is caused immediately by the failure of respiration. The venom of Rattle snakes of America acts like that of other Viperidae and the symptoms are syncope, alarming collapse which may end in death, or recovery may take place.

Immunity.—The venomous snakes themselves are naturally immune from the venom of their own species and in some cases from that of other species. Some non-venomous snakes show great resistance or even a complete immunity against snake venoms. Some mammals like mongooses and pigs and snakes which eat other poisonous snakes do not show any bad signs after eating the prey. As has been

described by various workers, an active immunity can be acquired against the venom of certain snakes by injecting the venom in small doses and then increasing it gradually. Sewell (in 1887) immunised pigeons by this method and Colmette (in 1892-94) immunised horses to such an extent that they were able to stand individually a dose probably sufficient to kill 80 horses. Snake charmers immunise themselves probably by this method. The serum prepared by Colmette was in the beginning considered to neutralise the venom of all snakes but now it is believed to be a specific anti-toxin to neutralise the same venom as is used in its preparation. So far as the experiments I mentioned go, these antivenom sera prepared in this country against the venom of cobra, and Russel's Viper are not of practical value. Since the actual dose injected in a bite varies up to 200 m. gms. at least 2000 c. c. of anti-venom serum has to be injected intravenously as in Vitro one m. gm. of the venom is neutralised by one c. c. of antivenom serum notwithstanding the actual titre being 1 c. c. of serum for 0.65 m. gm. of venom which in the case of intravenous injection should be ten times the titre of vitro experiments. The amount of serum indicated above is actually impossible to use intravenously notwithstanding the price one has to pay for it.

Treatment.—So far as the generally accepted medicines go the results of various investigators of the Australian and Indian snake venoms are discouraging. Prof. Martin, late of the Melbourne University, says that for all poisonous snakes a ligature should immediately be applied and the same is the advice given by other workers of this branch. The whole treatment recommended by competent workers and successful practitioners can be summarised as follows :—

1. An attempt for prevention or delay in absorption of the venom.
2. An attempt to destroy the venom.
3. To help the rapid elimination of the venom.

The ligature must be applied at one or two places above the part bitten if possible. If a sufficient time has elapsed and the part be an extremity it would be better to ligature sufficiently high up, and then some more ligatures between the bite and upper band. The ligature should be of a very strong twine and be twisted with the help of a stick to make sure that it stops the blood circulation. It would be absolutely useless to tie a ligature at a part where there are two bones.

The ligature must be kept till the next steps in the treatment are gone through. Dr. J. Thompson, Chief Medical Officer of the Government, Health Department, of New South Wales has also advised the use of ligature which is to be loosened for 5 minutes after the first half hour; then tied and screwed up again. At the end of the half hour, the ligature may be removed altogether. He further advises that in place where a ligature cannot be tied as on the neck or face, pinch up the bitten part between the finger and the thumb and cut it out with a sharp knife. His last advice may be useful in human practice, but not so in case of animals. A bullock was bitten by a cobra at Rohtak where my friend Mr. Ishar Diyal, Veterinary Assistant Surgeon, was present at the spot and a sufficiently big portion of the bitten part was at once cut out but no material benefit was derived as the animal died after 10 hours showing typical symptoms of cobra venom.

The use of permanganate of potash and other oxidising agents can also be tried. My kind teacher Major R. Knowles, B.A., M.R.C.S., L.R.C.P., I.M.S., Professor of Protozoology of Calcutta Tropical School of Medicine and Hygiene who is a very keen observer, in the course of a lecture on poisonous snakes recommended an injection of 5 c.c. of 5 per cent gold chloride solution. An effort may be made to inject the patient in the cavity where the venom should have gone, though unfortunately it is not easy on account of the shape of the fangs. Palladium di-chloride has also been recommended as having a special neutralising effect on all the venoms. If no remedy be available, the bitten part may be freely cut and sucked by the mouth. This can be done without danger by any person whose mouth has no ulcers or wounds.

It is needless to say that the animal must be put in a warm hygienic stable and kept at rest. Stimulants such as brandy or country wine may be given but in the cases the anti-venom serum has been used, Calmette thinks that these interfere with its action.

Strychnine has been considered to be useful both in stimulating the respiration and increasing the blood pressure. Sir Lauder Brunton suggests the use of nicotine, and Sir Leonard Rogers, adrenaline, to raise the blood pressure. In Colubrine poison artificial respiration should be carried out, if necessary. In Viperine poisoning, precaution should be taken to avoid septic injection. The vinegar treatment has been strongly recommended by Australian workers. Prof. Krafft, a well known authority on Australian snakes, recommends that the wound should be sucked if possible, a ligature applied at once, the puncture

lacerated and the part washed with water or urine and make it keep moving. In the end I convey my hearty thanks to my kind teacher and officer, Mr. Taylor, M.R.C.V.S., D.V.H., I.V.S., Professor of Pathology and Bacteriology, Punjab Veterinary College, Lahore, who has always very kindly given me chances to work in other institutions and to my senior and co-worker Mr. Kareem Ellahé, P.V.S., Professor of Parasitology, who has recently come back from England after taking D.P.H. course at the school of Tropical Medicine and Hygiene, London, for valuable informations regarding this work and to my friend and colleague, Mr. Muhammad Alum, for typing out the manuscript and rendering other possible help.

Clinical Articles

GUINEA-WORM IN A HORSE.

BY N. K. BARSIKAR, G.B.V.C.,

Veterinary Assistant Surgeon, Islampur.

(A paper read at the last conference of the Bombay Veterinary Graduates' Association.)

To-day I shall give you a description of a peculiar case, of which I think, most probably you have not heard before. As far as I remember, I am sure I have not come across such a case in the Veterinary literature. It is about "guinea-worm in a horse." There are only three or four cases reported about guinea-worm up to this time and they will be found in the numbers of the now defunct Indian Veterinary Journal edited by Captain Dawson, one of the reporters being I myself. This is the second case I am reporting to you. The first case of guinea-worm I had reported was in a dog owned by the then Postmaster at Sholapur, in 1910, when I was in charge of the Pratt Free Veterinary Hospital there. Two guinea-worms were found in that dog and one of them was sent to the Bombay Veterinary College, to be kept as a specimen in its museum. If you wish, you can find the description of the case in the old Indian Veterinary Journal.

Now I am going to give you the description of the present case of a guinea-worm found in a horse at Islampur.

On the 24th morning, June 1922, the owner of the horse came to me and told me that his horse was uneasy and was rubbing its chin against the head rope. I asked him to bring the pony to the dispensary to have a look at it and to treat it. This he did immediately.

Symptoms.—The pony is a C. B. Entire, aged and in good working condition. Feeding, digestion and action of bowels were all right. The animal was uneasy and was trying to rub its chin or lower lip against the head rope or its forelegs constantly. On examination of the lower lip a small unhealthy sore about the size of a pie was found about three inches behind the border of the lower lip.

The sore had a circumscribed swelling round it, about the size of a betel-nut. It was dirty with mud dried on its surface. It was washed, when a dried black threadlike thing was found protruding through a small hole in it. Then the threadlike thing was gently pulled out and to my great astonishment I found it to be a guinea-worm.

Diagnosis.—Guinea-worm.

Treatment.—The animal was twitched on the upper lip and the sore was washed clean with carbolic lotion. The swelling was pressed between the index finger and the thumb of the left hand and the worm was gently pulled out catching hold of the outer extremity. The sore was painted with tincture iodine and dusted with boric acid. The owner was supplied with boric acid for external application. As there was no further trouble, no further treatment was required. The horse is still in good working condition.

Description of the worm.—It measured about six inches in length and about 1/16 inch in diameter. Its colour was yellowish white. One extremity of the worm was broken off during the rubbing of the sore due to the irritation produced by the worm. This extremity was black and dried due to exposure and heat of the sun and also dirt. The other extremity that was inside the swelling was pointed, from which it seemed that no portion of the worm was left in the swelling. The present worm is not a whole worm but it is a part of it.

General remarks.—The village of Islampur is situated on a high level sloping in all directions and is noted for scarcity of water. Generally every other year there is scarcity. The average rainfall is 20 to 25 inches a year. The climate is dry and healthy. In the year 1921 rainfall was 16½ inches i.e. about six inches below the average and so the scarcity of water was extremely felt. At Islampur and at surrounding villages where the water supply is either from tanks or from wells both having steps to get in for water, it is generally observed that a great many of the villagers suffer from guinea-worms. The water supply gets contaminated from the discharge oozing from the foot wounds of the persons as they dip or wash their feet in that water.

supply. These wounds are caused by guinea-worms which are torn while being pulled for removing the worms. In the year 1917 I saw two persons suffering from guinea-worms each one having 40 worms on his person in different parts of his body. I think if the contaminated water be given to animals the spores of guinea-worms may get into their system and these spores may get matured and developed into worms.

During the current year I was shown a dog by its owner when it was brought to the dispensary for treatment for some other disease. The animal had suffered from guinea-worm. Similar symptoms as those in the above mentioned case of the horse were shown by the dog. The worm was pulled out by the owner and when the dog was shown to me there was only a white scar at the exit. It was about an inch below the left eye of the dog.

From these two cases I can arrive at the conclusion that animals are also liable to get guinea-worms, the infection being carried from water through abrasion on the body. The body of the animal is not so very fertile for the development of guinea-worms, otherwise many animals would suffer from guinea-worms at Islampur as well as in the surrounding villages where the outbreak of guinea-worms is so common.

AN OUTBREAK OF PLAGUE AMONG PRIMATES AND SUBCUTANEOUS INJECTION OF HAFFKINE'S ANTI-PLAGUE VACCINE AS A PROPHYLACTIC.

By D. S. LAUD, Esq., G.B.V.C.,
Veterinary Surgeon and Asst. Superintendent, Zoological Collection,
Victoria Gardens, Bombay.

Before proceeding to the clinical notes on the 3 cases of plague in the Baboons (Dog-faced monkeys) it would not be out of place to mention what plague is, how the infection is spread, its causes, etc.

Plague is a specific, inoculable or otherwise communicable epidemic disease, common to man and many other lower animals. The symptoms of this disease are fever, adenitis, crisis and a very high percentage of mortality. A specific bacterium, "Bacillus Pestis" is found in the lymphatic glands, viscera and blood. In a majority of cases, buboes form in the glands of the groins, axillae or neck. It is primarily a disease of the rat and its communication to man may be said to be accidental. Under favourable circumstances it is communicated to man from rats by means of rat-fleas. The association of

human beings with rats is dependent on the mode of living of the former and on the habits of the latter. If rats could be exterminated then there would be no plague. If this is considered impossible, then we have two alternatives to choose from (1) either the dwelling-house should be evacuated or (2) to obtain protection against the disease by inoculation of a prophylactic vaccine.

The rat-flea *Pulex-cheopis* feeds on a number of animals. It acts as a passive carrier of the *Bacillus Pestis*. The *Bacillus* multiplies in the stomach of the flea, retaining its virulence for seven or eight days and is passed out in its faeces. Therefore the flea not only acts as a carrier, but also supplies nidus for the multiplication of the bacilli. In the absence of the rat the flea will bite men, especially when it has been starving for 2 or 3 days; but when rats are available it will prefer to be on rats.

Thus the presence of an epidemic of plague in rats is followed by the epidemic of plague in men.

Out of the three baboons located in the cage in the park one got ill on 7th May, 1925. It was removed to the infirmary in the gardens for treatment. The only symptoms then shown were dullness, fever, off-feed and great prostration. The animal was prescribed stimulants and diuretics. It died on 9th May, 1925, no autopsy was held. On 11th May, 1925 noon, another baboon got ill and was removed to the infirmary.

Symptoms shown :—Vomiting, off-feed and high fever.

It was given the following treatment :—

Bismuth Subnitras	....	Grs.	5
Sodi Bicarb	....	"	10
Spirits Etheris Nitrosi	....	m.	15
Tincture Card Co.	....	m.	20
Gum Accacia	....	Q.S.	
Aqua.	....	oz.	1
M. ft. mix.			

Give Pot. Nit grs. 5 in drinking water.

The animal declined all food and milk.

On the morning of 12th May, 1925, vomiting stopped, but the animal was weak and lying down. It was given the usual stimulants with Jamaica rum; but it died in the evening. The carcass was sent to

the Bombay Bacteriological Laboratory at Parel for microscopical examination and the following report was received.

"Plague bacilli seen in the smears of spleen, liver and heart blood." The carcass was burnt in the incinerator at the Laboratory and the 3rd baboon from the cage in the Park was removed to another cage, and both the Park cage and the cage in the infirmary were disinfected with Solution of Hydrargyri Perchlor 1 in 1000 and fumigated with Sulphur Candles and Country Dammar.

On 13th May, 1925 the 3rd baboon got suddenly ill in the noon. It had taken only Papai fruit in the morning, but was hale and hearty prior to this. During my rounds in the garden at 3 P.M. the animal was found to be in a prostrated condition. It was removed to the infirmary where it died in the evening.

On the evening of 30th May, 1925 a baby campbell monkey suddenly fell, headlong, from the top of the cage, located in the monkey house in the garden, and died the next morning. The case was considered to be suspicious and the carcass was sent to the Parel Laboratory for microscopical examination of its blood, etc., but it was reported to be free from plague. No rats were found dying in the garden; but it is possible that the source of infection was from a dead, infected rat, which might have escaped our notice and was removed with the garden sweepings. However, as a precautionary measure it was decided that all the monkeys in the garden be inoculated with Haffkine's Plague Prophylactic vaccine, prepared at the Bombay Bacteriological Laboratory at Parel. The human adult dose is 4 c.c., but if the vaccine is fresh *i.e.* (used within three months of the date of preparation) it is 3 c.c. As no information could be had as to the dosage for monkeys, great precaution was exercised and doses given were from $\frac{1}{2}$ c.c. to $1\frac{1}{2}$ c.c. according to the size and age of the animal. The monkeys were divided into three lots and each inoculated after interval of about 10 days so as to watch the results. But all stood the doses well.

The following are the details of doses used :—
Date of inoculation.

2nd June, 1925.

Lot No. I—Infirmary Animals

Particulars of monkeys, etc.	Technical name and habitat	Number of animals	Dose for each	Remarks
Lemun (Juvenile).	Lemun Mangoz (Madagascar) ...	1	C.C. $\frac{1}{2}$	Fresh Vaccine Brew No. 1672, No. 27 of 12-3-25.
Pigtailed ...	Macacus Memestrinus Malay Peninsula.	1	1	
Malbrouck ...	Cercopithecus Cynosurus West Africa.	2	1	
Rhesus ...	Macacus Rhesus India ...	3	1	
Baboon (Dog faced).	Cynocephalus Hamdrias Abyssinia.	1	1	
Bonnet ...	Macacus Sinus India ...	4	1	
Campbell (from monkey house).	Cercopithecus Campbelli West Coast of Africa.	2	1	

Lot No. II—Monkey House

Date of inoculation 11th June, 1925

Particulars of animals, etc.	Technical name and habitat	Number of animals	Dose for each	Remarks
Bonnet (Juvenile).	Macacus Rhesus India ...	1	C.C. $\frac{1}{2}$	Old Stock Brew No. 9489, No. 5 of 1-7-20.
Bonnet ...	Do. ...	7	1	
Bengal (Rhesus).	Do. ...	2	1	

Lot No. III—Monkey House

Date of inoculation 22nd June, 1925

Particulars of animals, etc.	Technical name and habitat	Number of animals	Dose for each	Remarks
Coral Eating ...	Macacus Cynomolgus Malay Peninsula.	3	C.C. 1	
Malbrouck ...	Cercopithecus Cynosurus West Africa.	1	$\frac{1}{2}$	
Do. ...	Do. ...	1	1	
Pigtailed ...	Macacus Nemestrinus Malay Peninsula.	3	1	
Do. (Aged)...	Do. ...	1	$1\frac{1}{2}$	
Campbell ...	Cercopithecus Campbelli West Coast of Africa.	1	1	
Skyes ...	Cercopithecus Albigularis East Africa.	1	1	
Lemun ...	Memun Mongoz Madagascar ...	3	$\frac{1}{2}$	
Bonnet (new in the infirmary).	Macacus Siricus India ...	4	1	

With regard to the immunity I have to draw the attention of my readers to page 24 of the Bombay Bacteriological Hand Book issued by the Bombay Bacteriological Laboratory wherein it is stated as follows :—

"The amount of protection conferred on an individual by inoculation depends on :—

- (a) the dose of vaccine used.
- (b) the power the individual has of reaching to a certain dose of vaccine.
- (c) The circumstances in which the individual is found at the time he is subjected to injection.
- (d) The dose of the vaccine which he receives.

With such a number of varying factors affecting the degree of immunity conferred by inoculation, it is impossible to lay down the exact period during which the protection lasts. Some statistics are available, however, to show that while protection is most marked during the six months immediately following inoculation, immunity is still marked at the end of one year, and the degree of protection remaining during the second year after inoculation is only slightly less than the first year ; and even after 5 years some trace of protection remains. While this is so, it is very desirable that persons should be inoculated during each successive plague season so as to acquire as high a degree of protection as possible.

We may, however, safely take that the average period of immunity is from 6 to 9 months.

In conclusion, I may state, that these were the first cases of plague I had seen in monkeys and this was the first occasion on which I had used Haffkine's Plague Prophylactic vaccine amongst primates. I should feel glad to know the experience of my brother veterinarians on such an important subject as this.

DENTAL ABNORMALITY IN A HORSE.

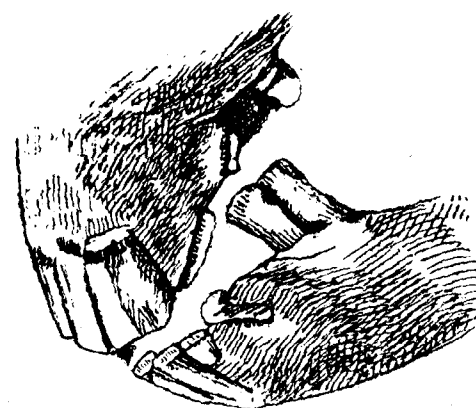
By A. C. AGGARWALA, B.Sc., M.R.C.V.S.

Prof: of Hygiene and Dietetics, Punjab Veterinary College

*Subject:—*Bay country-bred entire, age 4 years, height 13-2.

The animal was brought to the Outdoor Clinic of the Punjab Veterinary College on the 14th of April 1925 for treatment. Examination revealed abscesses in the sub-maxillary and sub-pharyngeal regions due to strangles infection.

OFF SIDE VIEW.



NEAR SIDE VIEW.

The upper jaw had 7 incisors, the accessory one just making its appearance behind the corner incisor on the near side. There was a wolf tooth on either side and the gums were considerably retracted. The incisors of the lower jaw showed irregular wear of their dental tables and the near corner incisor was directed posteriorly instead of upwards. The tushes had appeared in the upper jaw, but in the lower one an abnormally prominent tooth of the characters of an incisor was seen in the position normally occupied by the near tush. The tush on the off side was absent and showed no sign of appearing. The photograph and the drawing show the anomaly.

FILARIA EQUI.

BY A. MOBERLY, G.M.V.C.,

Palace Veterinary Asst. Surgeon, Sivaganga S. India.

Subject:—Bay Waler Gelding, age 4 years and 3 months.

History:—On the morning of the 20th of April 1925, watering of the off eye attracted my attention. On examination I found a filaria equi moving in the aqueous humour.

Operation:—Arrangements were made for operation, which was performed in the evening, when a very slight cloudy appearance of the eye was noticed. The operation was quite successful.

Treatment:—Washed with boric lotion and bandaged. This was continued for a week and by the end of the week there was a diffuse opacity of the cornea. The treatment was adopted more or less in the following order:—

1. Zinc sulph. solution (1 week).
2. Pot. Iodide solution (1 week).
3. Argyrol 2 to 5 per cent solution (a fortnight).
4. Mere washing with normal saline (10 days).
5. Yellow oxide of Mercury ointment (3 weeks).
6. Sub-conjunctival injections of normal saline (15 injections within a month).
7. Calomel powder (about 10 days).
8. Silver Nitrate solution (1 week).
9. Perchloride of Mercury solution 1 in 5000 to 1 in 2000 (10 days).

10. From this time for the last two and a half months yellow Oxide of Mercury ointment is being applied both morning and evening with slight friction as advised by Dr. Kugelberg, M.D., a famous eye specialist (human).

* **Progress:**—There was a slight clearing of opacity around the circumference of the cornea during the beginning of the sub-conjunctival injections; but there was no marked change when the injections were continued and after.

Will any of the readers of this valuable journal kindly suggest any other method of treatment? A few of the senior officers of the Madras Civil Veterinary Department are of opinion that the opacity may persist in some cases. The animal is a valuable one and therefore I am anxious to have a remedy. Dr. Kugelberg said he would suggest the strength of the yellow oxide of Mercury ointment if the exact thickness of the cornea of the horse is known, which information I could not get from any of the books I had access to. This information also may kindly be supplied through the columns of this journal.

[We are of opinion, that if subconjunctival injection with normal saline was adopted in the very early stage, the corneal opacity would have cleared itself early. Ed.]

A PRESCRIPTION FOR INCREASING THE QUANTITY OF MILK IN CATTLE.

BY V. P. GOKHALE, G.B.V.C.,

Veterinary Inspector, Perak, Federated Malay States.

Practice versus Theory.

As far as I am aware no specific or any special drugs are prescribed for increasing the quantity of milk. Wallis Hoare in *Veterinary Therapeutics* writes on Galactagogues:—"There are no drugs which are of practical value in this respect. Jaborandi increases the secretion of milk, but only in a temporary degree, and is not employed as a galactagogue. A healthy condition of the dam and good feeding are necessary for the production of milk, and a liberal milk diet assists lactation in animals nursing their young" (third edition).

I have tried the following prescription in four cases with success :—

R

Tinct. Jaborandi	....	....	....	1 ounce.
Tinct. Nux Vomica	....	....	....	$\frac{1}{2}$ ounce.
Water	....	....	....	1 pint.
mft. haust	....	....	....	

Sig.—to be given morning and evening for 10 days.

The cases I treated had no trouble with their udders and were in good condition. The complaint in these cases was that the cows gave scanty milk and two of them would not even allow the calves to suckle. Under the above treatment within less than a week the quantity of milk was appreciably increased and remained so for some months. No special diet or any change in diet was ordered.

I hope the profession will give a fair trial to the above prescription when there is an opportunity in these cases not due to diseased condition of the udder, and publish the results. If the diminution in quantity of milk is due to poor appetite and condition, that of course should be corrected first and also attention should be paid to diet.

TREATMENT OF SOFT WARTS IN CATTLE.

BY V. P. GOKHALE, G.B.V.C.,
Veterinary Inspector, Perak, F.M.S.

Occasionally one comes across cases in which the whole body particularly the face becomes covered (studded) with soft warts which are about the size of a pea. When plentiful on face they look ugly but do not seem to cause any inconvenience to the animal.

Treatment.—Application of copper sulphate solution 1 in 8 with a small camel-hair brush to the warts once daily will cause them shrink and disappear in a few days time. If they are of large size they should be dissected out and the Cu SO_4 solution be applied over the raw surface for a few days so that they may not reappear.

A medical practitioner had recommended application of Cu SO_4 sol. of the strength 1-10 followed by application of table salt. The table salt does not stick so as to produce any action and its use does not appear to be essential in cattle practice at least and furthermore the strength of the sol. (1-10) seems to be rather weak as it takes longer time to cure.

On the other hand a sol. of 1-8 strength not only is quicker in action but does not seem to produce any bad effects at the seat of its application.

Therapeutical Notes

Sunlight.—Sunlight is another natural remedy that reaches the cause of the trouble. For instance, cases of bone tuberculosis that formerly gave much trouble to the physician are now handled with complete success by the open-air and sunlight treatment, applied direct to the skin. This reaches the cause of the disease, by enabling the body to wage a successful warfare against the germs. And rickets, a nutritional disease, is prevented or greatly relieved by a proper application of sunlight. The fact is, that rational or physiological treatment, begun early, before the body has undergone irreparable damage, is the only successful method of restoring health, for it is the only method that gets at the cause. It differs from the usual sympathetic methods in that the results do not appear at once, but may take considerable time. Any so-called remedy that gives immediate results such as head-ache powder, or a sleeping powder, or any remedy that gives immediate relief, may well be suspected of being not a cure but a masker of warning symptoms.—(*Practical Medicine, July 1925, Page 136*).

Asafoetida in Abortion.—Dr. Turazza quotes several Italian authorities who have claimed successful results in the treatment of abortion by asafoetida from 1895 till the present day. Out of the thirty-seven recent cases in thirty-three, abortion was prevented by drug. Turazza has found that the gum resin has not been wrongly praised. He follows the prescription of Dr. P. Negri of Venice: asafoetida 6 grammes, to be made into sixty pills. Directly pregnancy is suspected, one of the pills, (about a grain and a half) should be taken twice a day; the dose is then slowly increased to ten pills daily and then gradually reduced till confinement. Turazza adds short notes of four successful cases. In two, there had been three and five abortions respectively without any objective local cause. In the third, the patient had aborted five times; after the last miscarriage parimetritis occurred and lasted two months; there was also catarrhal endometritis; ten months after miscarriage she became pregnant again.

Asafoetida was promptly administered and the patient was delivered at term. In the fourth case no mention is made of previous miscarriages, abortion at sixth month was threatening when the gum resin

was given. The danger passed over and delivery occurred at term.—(*Secret of Health, Practical Medicine, July 1925, Page 140*).

Magnesium Sulphate and Glycerin in Local Infection.—The author, Dr. E. M. Freese, came to use a mixture of saturated solution of magnesium sulphate and glycerin in equal proportions for the cure of infections, knowing that saturated magnesium sulphate was used in sprains and inflammations to allay pain and abate swelling, and that glycerin has been used for years in the form of tampons in pelvic troubles. He reasoned that a combination of the two drugs might reduce swelling, stimulate lymphatic circulation, and perhaps cause increased phagocytosis. He reports a series of fourteen cases of wounds of various kinds, infected blisters, felon and cellulitis in which the measure referred to was employed. In the latter condition the arm was packed in the hot solution from fingers to shoulder. All the infections were controlled in an unusually short time.—(*New York Medical Journal, Practical Medicine, February 1925 Page 37*.)

Treatment of Inoperable Cancer with Liquor Potassæ.—Dr. Gall reports that there is improvement in these cases on administration of liquor potassium: Liquor Potassæ, Potassium Nitrate, Aqua mixture 15 minims to one half-ounce. Of this mixture one half dram is given three times daily. The results generally, and the almost starting relief after the first dose of liquor potassæ, have led Gall to consider whether there may not be some specific effect of potassium on cancer growths. It has been shown that "The potassium content of the red corpuscles of cancerous patients is approximately double that of healthy persons", and "chemical analysis of 300 tumors showed preponderance of potash salts and nucleoprotein content, associated with high virulence and rapid development". The question arises whether potassium is a natural agent used by the body to control the perverted metabolism of tumor cells, and if so, whether its administration is not indicated in these cases.—(*Practical Medicine, January 1925 Page 16*.)

Extracts

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

(Some Points of General Importance in the Hygienic Maintenance of the Domesticated Animals.)

1. ATMOSPHERIC FACTORS.

The theoretical basis of the science of ventilation has undergone profound modification as a result of the findings of recent authorities (Leonard Hill, Flügge and others), and the most notable direction in which this has occurred would appear to be that the modern conception of the principles of ventilation involves the abandonment of the belief—a belief that has been held until very recently—that the noxious properties of the air are mainly attributable to the amount of carbon dioxide present in it. The results of these researches, on the other hand, point in the direction of the conclusion that the relative proportions of the chemical constituents of the air are amendable to considerable alteration without any harmful effect being produced upon living beings, the so-called "hygienic" quality of the air being, in reality, determined by such purely physical factors as the temperature, humidity, and movement of the air, or, collectively, what has been termed the "cooling power" of the air. The formulæ that have been taught to veterinary students in the past for the computation of housing space and rate at which an interchange of air is required inside a building must, in the light of our present knowledge, be abandoned. Finally, our present knowledge in regard to the spread of infection by air shows that it is of much less significance than what was believed to be at one time, and, also, that the genesis of specific infectious diseases, such as tuberculosis, is not attributable to bad hygienic conditions, such as "bad" ventilation, but entirely to the proximity of infective materials in "carriers" of the disease. "Bad" hygiene may contribute towards the spread of diseases of this kind, but their eradication must depend entirely upon the detection and elimination of all "carriers." It would seem that the main reason why the incidence of tuberculosis in cattle in India is low is because the conditions in which they are maintained preclude the spread of infection, and not because the infection that does exist in the country is necessarily of a very mild nature. It is not improbable that, with the adoption of intensive methods of domestication, as at the government military dairies, and with the establish-

ment of conditions for the ready spread of infection from animal to animal, the problem of tuberculosis infection may become a serious one in time. One is rather struck with intensification that takes place in analogous conditions in the common form of contagious bovine abortion in India.

2. SOIL FACTORS.

In the diseases of the domesticated animals the rôle played by the soil as a medium for the conveyance of infection assumes a position of paramount importance on account of the intimacy with which they come in contact with the soil in the course of their ordinary habits of life.

In German writings on animal disease one encounters frequently the term *Stallseuche* ("stall" or "housing" disease) and *Weideseuche* ("pasture" or "meadow" disease). To the former category of diseases belong such affections as tuberculosis and diseases of the newborn, the propagation and the intensification of which are facilitated by the opportunities for passage from one susceptible animal to the other.

To the second category belong :—

(1) Affections in which the transmitting agents or vectors are intimately associated with certain types of soil. For example, red-water in cattle is associated with uncultivated lands covered with herbage favouring the development of the transmitting agent, the tick. Fluke disease in sheep is connected with low, dampy, marshy-ground in which abounds the species of freshwater snail in which the fluke parasite must pass a certain phase of its life-cycle.

(2) Affections in which the causal organism of the disease develops or finds conditions favourable for its survival within the soil, for example :—

(i) Black-quarter of cattle. In this affection the causal spore-bearing anaerobic bacterium arises from restricted areas of uncultivated soil.

(ii) "Lamziekte" of cattle in Africa. An interesting example of an incurable paralytic affection of cattle which, according to the researches of Theiler and his colleagues, appears to be set up by the ingestion of a very powerful toxin generated by certain spore-bearing anaerobic bacteria which are found in restricted areas of *veldt*. In certain areas of this grassland the soil is very markedly poor in phosphorus, and ingestion of pasture grass consequently sets up "pica"

in the cattle, *i.e.*, a craving to chew strange objects, notably bones lying about on the *veldt*, which, as has been stated, may contain the powerful toxin generated by the soil bacteria. We understand that a similar condition occurs in cattle in certain parts of India (Bihar) and is probably set up by the same chain of circumstances.

(iii) Tetanus ; gas-gangrene (malignant œdema). The spore-bearing anaerobes which cause these diseases are particularly abundant in richly cultivated soil, though it is doubtful if they actually propagate in the soil.

(iv) Hæmorrhagic septicæmia in cattle ; swine erysipelas. The causal organisms of these diseases are believed to propagate in the soil in the form of relatively harmless organisms. When an animal of more than ordinary susceptibility is infected with large numbers of these organisms, perhaps through a lesion in the bowel the microbes may become powerful enough to set up the disease, and having overcome the defences of the first animal they become greatly exalted in virulence, and when voided in the discharges of the animal they are in a position to invade readily the tissues of a second animal. Subsequently the disease caused takes the form of a veritable outbreak during the season of the year when the opportunities for propagation from animal to animal are best.

(3) Affections of a nutritional character caused by some chemical defect in the soil. From the researches, notably of Per Tuff in Norway, we know that outbreaks of a skeletal disease known as osteomalacia may occur in cattle due to a lack of phosphate in the soil, a supply of which is essential in the foodstuffs for bone formation and for the correct regulation of nutrition, as has been stated above in dealing with "lamziekte." Affections of this kind can be prevented by the administration of substances rich in phosphorus, such as bone-meal or bran.

Finally, in addition to the above two broad epizootiological categories, it is ventured to suggest a third, which may be termed "paddock" disease, in which outbreaks of infectious diseases find the conditions necessary for their intensification and rapid spread in the congestion that occurs when considerable numbers of animals are grazed in small areas of pasture, which, in popular language, become "sick" (horse "sick", sheep "sick", cattle "sick" etc.). Examples are :—

(a) Johne's disease in cattle. The organism, an acid-fast bacillus, resembling the tubercle bacillus, and causing a very chronic enteritis with wasting of the affected animal, is voided with the fæces. In

sunlit open countries sparsely populated with cattle, it would soon be destroyed by the effects of sunlight or washed by rain into the ground before it got opportunities to infect massively fresh susceptible cattle. In the small areas of pasture land near farmsteads kept for grazing or exercising of house-fed cattle at all seasons, and probably well sheltered from the sun in many places, the infection finds, on the other hand, admirable opportunities for propagation.

(b) Contagious abortion of cattle. We now know that the disease is transmitted usually by the ingestion of pasture grass or other foodstuffs freshly contaminated with infective discharges of cows that have aborted. In India, it has been found that infection and clinical abortion are very high indeed when animals are kept in conditions of intensive domestication, as at the Government military dairies, where as infection is low, and clinical abortion negligible in the ordinary conditions of cattle life, in the open.

(c) Many verminous infestations—although, perhaps, these diseases might be more appropriately considered under the second category, “meadow” diseases. What is required for the propagation of infection in most of the commoner diseases of the domesticated animals due to worm parasites is for the egg, or any other stage that is excreted, to be voided into a suitable environment as regards moisture, temperature, and protection from sunlight until the young worm that emerges reaches a stage in its development when it is ripe to infect a fresh host. As will be readily seen, intensification of spread will be facilitated by congestion of the pasture with “carriers,” and in this respect worm diseases are notable in that adult animals are highly resistant although they are frequently carriers, while very young animals are highly susceptible. Hence, in pastures where these conditions obtain, large mortality may be experienced among lambs or calves, due to the so-called “stomach worms,” which to the adult animal are relatively innocuous. Likewise, young horses may suffer from anaemia due to infection of the large intestine with small worm parasites.

In the study of hygiene as it affects the health of the domesticated animals there are therefore many factors of the highest importance to be considered, which are of relatively small significance in the hygiene of man, and the potential qualities of such, as a vehicle for the spread of infection must rank as a study of first-rate importance in determining the factors that are of hygienic importance as concern the domesticated animals.

3. THE DRINKING WATER SUPPLY.

In the case of the domesticated animals, the hygiene of the water supply is of much smaller importance than it is in case of human beings. The chemical tests and bacteriological examinations carefully prescribed for the examination of a water supply for human beings are aimed at determining whether there is any evidence of recent contamination with faeces, which, if there is, may be the faeces of “carriers” of serious infectious diseases—such as typhoid, bacillary dysentery, or cholera. *Prima facie* faecal contamination ought to be of small importance for the domesticated animals, for wild animals in a state of nature are not beset with any ever-present risks due to drinking water which is almost invariably contaminated in this manner. Moreover we know now that our animals are not infected with serious bacterial diseases of the kind that man contracts from an infected water supply.

The teaching of methods of water analysis may therefore well be omitted from courses of instruction on veterinary hygiene.

The points that are of importance in so far as concern the health of animals are:—

1. That the water should be available in plenty, and accessible whenever the animal naturally desires it. It should not be given in large quantities when the animal is fatigued, but otherwise, as has transpired particularly from the researches of Scheunert recently upon the watering of horses, it may be drunk at any time before or after a meal. In the case of working horses, in which the peristaltic action of the bowel may be easily disturbed, it is rather important to water the animals with regularity.

2. That the water supply should be clean, and free from gross suspended particles, notably sandy particles, as are present in large quantities in water pools in which animals are allowed to “puddle” while drinking. These particles tend to settle in the large compartments of the bowel and may cause severe “sand-colic,” or, short of that, the accumulation of earthy matter in the bowel interferes with peristalsis and digestion and brings about marked unthriftiness in condition.

3. That the water supply should not be allowed to stagnate. This statement refers particularly to the condition which is likely to arise in low-lying pastures where there is at certain seasons of the year a constant thin layer of water covering portions of the grazing land. The condition is ideal for the development of worm parasites, which,

as has been stated in discussing the hygiene of the soil, are responsible for an infinite amount of disease or unthriftiness in the domesticated animals. The remedy is good drainage and general good agricultural husbandry. It is noteworthy that the so-called sewage poisoning which was said to affect cattle often on sewage farms in England turned out to be, on closer investigation, verminous gastritis or enteritis, or, sometimes, Johne's disease.

The above desiderata may be considered to be the chief ones, but there are numerous minor ones, for example:—

1. Excessive "hardness" of water is probably injurious.
2. Throwing of carcasses into water-courses is a dangerous procedure, for they may be infected with anthrax, and a large area of grass land on the banks of the river, particularly when it recedes after the rainy season, may become infected in this manner with anthrax spores.
3. Avoid public watering troughs for horses, particularly in towns where glanders is prevalent. We know now that glanders is transmitted by the ingestion of material recently contaminated with the discharges from the nostrils, usually of glandered horses. Hence, the risks of infection through the medium of water in a public trough, which may have been used a short time previously by a glandered horse, are very great.

LEPTOSPIRAL JAUNDICE IN DOGS (YELLOWs).

By C. C. OKELL, M.C.M.B., CAMB., M.R.C.P., LOND., T. DALLING, M.R.C.V.S.,
Welcome Physiological Research Laboratories, Beckenham, Kent, and
 L. P. PUGH, B. Sc., F.R.C.V.S., *Sevenoaks.*

Enzoötic jaundice (yellows) is a troublesome disease often brought to the notice of veterinary surgeons. It occurs in all parts of Britain, particularly in hunting districts, while some areas, e.g. London, are comparatively free. More cases are met with in country districts than in towns, especially amongst the sporting dogs, though all kinds of dogs are liable to attack. Sporadic cases are met with amongst adult kennels where many dogs are housed together. Here it particularly affects young dogs as an enzoötic. Wallis Hoare (1915) says: "Except in mild cases the mortality is very high and we frequently find

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that an entire litter of puppies may succumb to the infection." This statement agrees with our own experience, for in the outbreaks we have investigated, the mortality has reached at least 95 per cent.

We think that our experience and observations have reached a convenient stage of publication, though many points remain for further investigation.

Symptoms in Naturally Occurring Cases.—The following description of the symptoms seen in naturally infected dogs is based on personal observations made during the outbreak we have studied. We believe that careful clinical observation shows that the disease can be divided into two main types with every gradation between. We have named these types the hyperacute hæmorrhagic type and icteric type.

(a) The Hyperacute Hæmorrhagic Type.

The chief characteristics are:—

(1) *Sudden onset.*—A puppy may be seen playing with its fellows, and an hour later may be found huddled up in the darkest corner of its shelter.

(2) *Temperature.*—When taken at the onset, the temperature is high, varying from 104°F. to 106°F. Death is always preceded by a sudden fall of the temperature to 97°F. or 98°F.

(3) *Nervous Symptoms.*—There is intense depression. Shivering is occasionally exhibited. Manipulation of the muscles of the neck or abdomen often causes pain. In a few cases symptoms of meningitis have been observed. Occasionally hiccough is met with.

(4) *Respiratory Symptoms.*—Epistaxis is common. The respirations are increased and may be laboured in severe cases. Bronchial rales are very evident, and may sometimes be heard several yards away from the patient, and there may be a soft repressed cough.

(5) *Alimentary Symptoms.*—Hæmorrhagic herpes of the lips is common, and frequently there is bleeding from the gums. Vomiting occurs in all cases, and is specially marked when water is allowed. Blood may be found in the vomitus. Thirst is always a prominent symptom. In most cases there is frequent passage of soft faeces in small amounts, often blood-stained and accompanied by tenesmus. Hæmorrhage into the alimentary tract has apparently been the cause of death in some cases.

(6) *Urine*.—The urine is passed in small amounts and occasionally contains bile pigment. All samples examined after death have shown abundance of albumen.

(7) *Other Symptoms*.—The face may be swollen below the eyes. The cervical lymphatic glands are not infrequently enlarged. Petechiae have been observed on the skin of the flank and under the arms. An intense conjunctivitis may be present; some cases have shown a mild inflammatory condition of the eye with slight purulent discharge. As a rule icterus is not present. The disease runs a rapid course, death occurring in a few hours after the onset, but occasionally the dog lives for two or three days.

(b) The Icteric Type.

(1) *Onset*.—In this type the onset varies. In the rapidly fatal form with jaundice the onset is acute, while in other cases the disease may be so insidious that the dog is not thought to be sick until the development of obvious jaundice.

(2) *Temperature*.—In the majority of cases that show well marked jaundice the initial temperature is generally 102°F. or 103°F. As icterus becomes apparent on the conjunctivae, and on the gums the temperature falls to the normal or subnormal. A subnormal temperature is practically constant before death.

(3) *Nervous Symptoms*.—There is tendency for affected dogs to hide away and rest and to avoid muscular exercise. There is not the marked depression seen in the hyperacute type, and affected puppies often appear at times quite lively. As the disease develops depression becomes more marked. In uncomplicated cases there is no very obvious muscular tenderness, but when intussusception has occurred the abdominal muscles are held rigid.

(4) *Respiratory Symptoms*.—Generally the cough is absent, but bronchial rales can be detected easily in the more acute cases. Epistaxis has been observed, but is uncommon.

(5) *Alimentary Symptoms*.—The mucous membrane of the mouth usually appears healthy and free from mucus. The gums are yellow, the degree of pigmentation depending upon the stage of the disease at the time of the examination. Vomiting is fairly constant, and blood may be found in the vomitus. Constipation is usually marked, and the faeces when removed by lavage are pale and clay-like. As the disease

progresses the motions become loose and blood-streaked. Intussusception of the small intestine can often be diagnosed by palpation of the abdomen, and is frequently the immediate cause of death. Prolapse of the rectum has been observed.

(6) *Urine*.—The urine is usually dark-coloured with bile pigment, and contains much albumen.

(7) *Other Symptoms*.—The superficial lymphatic glands are not often swollen in this type. Pruritus appears to be fairly common. Conjunctivitis is often present in the more acute cases.

The day of the disease upon which jaundice appeared in each of the dogs we have had under observation is shown in Table I.

Associated with outbreaks of enzoötic jaundice, cases occur where dogs show a slight fever and transient gastro-intestinal disturbance. The fact that these cases occur frequently in association with enzoötic jaundice, in our view suggests strongly that they are mild cases of the same infection, but experimental proof is as yet lacking.

Acute cases may die within two days from the onset; milder cases may survive a week or more. Dogs which recover often develop conjunctivitis or keratitis as sequelae.

Morbid Anatomy in Naturally Occurring Cases.

As a rule, there is marked jaundice of the walls of the abdomen, the plantar surface of the paws, inside the ears, etc. All degrees, from a faint yellow tinge to a deep chrome color, have been observed. In the hyperacute case jaundice may be absent. Shreds of blood-stained mucus often protrude from the anus. There may be a thick catarrhal discharge from the eyes or nose or both, and a frothy blood-stained saliva may be discharged from the mouth. Punctate hæmorrhages may be seen under the arms. The subcutaneous fat is icteric. The *peritoneum* may appear normal or may show punctate hæmorrhages, either discrete or confluent, forming red patches on an icteric background. The *Peritoneal fluid* may appear normal, or may be blood-stained and increased in amount. All the abdominal blood-vessels are markedly congested. The stomach in many cases appears normal, in others it shows petechiae, which may involve any part, including the pylorus. Occasionally the whole of the stomach is affected. These hæmorrhages are seen from the exterior of the stomach, and can be shown by dissection to be both sub-serous and submucous. In cases of sudden death, the stomach may contain coagulated blood. The *intestines* usually show varying degrees of inflammation, varying from bright red to a dark blue

or almost black colour. Petechiae may be seen in any part of the small or large intestine, and are submucous and subserous. Large portions or even the whole of the intestine may be thus affected. The small intestine suffers more than the large, and the jejunum and ileum more than the duodenum.

Intussusceptions are very frequent and occur chiefly in the small intestine; a prolapse of the rectum was seen in one case. The *liver* is usually enlarged and congested, or on the other hand it may be pale and icteric. The *gall bladder* usually contains much bile. The *kidneys* may be congested or may be pale or icteric. Petechial haemorrhages may be present in the cortex. The *urinary bladder* usually contains some bile-stained urine. The bladder wall may show punctate haemorrhages. The *lungs* in all cases show a very characteristic appearance. Bright red, punctate haemorrhages are found scattered all over the surface, and are present in the substance of the lung. They may be small and discrete, or consist of irregular areas up to an inch in diameter. When such lesions are few in number, they are found mostly near the thin margins of the lung. In some cases a few lesions only can be found, in others the whole lung is involved.

The *pleura, pericardium, and endocardium* may appear normal or show haemorrhages. Exudates of a serous or sero-fibrinous character may be found in the pleural and pericardial cavities. There may be small haemorrhages in the *heart muscle*. The *spleen, pancreas, and thyroid* are usually normal in appearance. The *suprarenals*, though often apparently normal to the naked eye, generally contain haemorrhages in their substance. The *thymus* may appear normal or may contain petechiae. The *lymphatic glands* of the thorax and abdomen are most invariably enlarged, dark, and haemorrhagic; all glands may be affected. The *eye* may be normal or inflamed; the sclerotic is usually icteric. Haemorrhages and jaundice may be seen on the *gums*. Haemorrhages, mainly interstitial, may occur in the *skeletal muscles*. The *brain and spinal cord* show no abnormalities.

THE EXPERIMENTAL INFECTION OF DOGS WITH A LEPTOSPIRA STRAIN OF RAT ORIGIN.

Three puppies were inoculated with a rat strain (Rat 2 leptospira), kindly sent to us by Dr. George Buchanan. The rat had come from a Scottish mine in which cases of leptospira infection had occurred in human beings. This gave rise to the typical clinical course and post-mortem appearances of the natural disease (*vide* account of Exp. Dogs

1, 15, and 16). The infection was fatal to Exp. Dogs 15 and 16. Exp. Dog 1 was killed *in extremis*. In the case of the latter dog, exhaustive search of the organs was undertaken by dark-ground method, and only after four hours' search could a few undoubted leptospiræ be found. This illustrates the frequent difficulty of finding the leptospiræ even in cases where the disease is produced by inoculation of definite leptospiræ of rat origin. Four guinea-pigs inoculated from the organs of this dog died typically, and leptospiræ were seen in the liver of all of them. In the case of Exp. Dog 15, fairly numerous leptospiræ were seen in the ground-up liver. A prolonged search through the organs of Exp. Dog 16 failed to reveal any leptospiræ. Death followed in all of the cases within six to seven days after the inoculation, and the third dog was dying six days after the inoculation. Jaundice developed in each dog on the fifth day after inoculation.

SYMPTOMS IN EXPERIMENTALLY INFECTED DOGS.

(a) *Dog Strain Leptospira Infections*.—(Exp. Dogs 2, 3, 4, 5, 6, 7, 12, 13, 17, and 18). Puppies inoculated with a strain of leptospira isolated from a dog suffering from jaundice present symptoms indistinguishable from those of the naturally occurring disease. The hyper-acute haemorrhagic type has not been observed in these experimentally infected animals. Symptoms usually developed in the following sequence: pyrexia, constipation, serous or purulent discharges from the eyes and nose, depression, loose clay-coloured stools, often blood-stained, vomiting, jaundice, a rapid fall in temperature to normal or subnormal, dark coloured urine, increase in the intensity of jaundice, great depression, intussusception, a weak, rapid pulse, death. A fall in temperature at the time of the appearance of jaundice is constant. It is not uncommon to find the inoculated dog apparently perfectly healthy for several days after inoculation, when the above train of symptoms develops suddenly, and death occurs within twenty-four hours of their onset. Intussusception can generally be found by palpation of the abdomen. The superficial lymphatic glands may be enlarged. Pruritus has been observed. One dog (Exp. Dog 2) developed mild symptoms and subsequently recovered.

(b) *Rat Strain Leptospira Infections*.—(Exp. Dogs 1, 15, and 16) Puppies inoculated with strains of leptospira obtained from rats show symptoms indistinguishable from those presented by puppies inoculated with dog strains or suffering from the natural disease.

Incubation Period in Experimentally Infected Dogs.—The period between infection and the development of jaundice in the experimental series of dogs is shown in Table II. The day of death is also indicated in the table.

GENERAL DISCUSSION OF THE EXPERIMENTAL RESULTS.

In three cases out of ten of enzoötic jaundice in dogs we were able to isolate leptospiræ which agreed in every respect with a known rat strain of *Leptospira icterohæmorrhagiæ*. In these cases we believe we have satisfied almost completely the postulates of etiology usually required in ascribing a disease to a given micro-organism. The very characteristic appearance of motile leptospiræ and the peculiar post-mortem picture have made it particularly easy to satisfy ourselves at every passage that we are dealing with a leptospiral infection.

We have been less successful in satisfying Koch's important "postulate" that "the parasitic micro-organisms are to be found in all cases of the disease in question." We have brought forward evidence, which is indeed familiar to most workers in this field of pathology, that the leptospira is often exceedingly difficult to recover from animals (other than guinea-pigs), even when the leptospira inoculated has caused a perfectly typical clinical and post-mortem picture. The same difficulty has been met with in demonstrating the leptospira in cases of Weil's disease in human beings (cf. Stokes, Ryle and Tytler (1917), Dawson, Hume, and Bedson (1917) and others). We might also refer to the difficulty that is so often met with in demonstrating *Treponema pallidum* in typical syphilitic material. Leishman (1920), in his Horace Dobell lecture on *Spirochaeta duttoni*, refers to the difficulty he met with in demonstrating the spirochaetes in infected ticks, although the juices of these produced relapsing fever when inoculated into monkeys. In connection with *Leptospira icterohæmorrhagiæ*, we cannot resist mentioning the hypothesis formulated by Leishman in connection with *S. duttoni* that the micro-organism may pass through a stage in its life-history which is either granular or invisible. We find it difficult to explain our own experimental results and those of other workers on leptospira infection, except upon some such hypothesis.

The consistency of the characteristic clinical and post-mortem appearances, both in naturally and artificially infected dogs, makes it a strong presumption that all the cases were indeed due to leptospiral

infection. It may be added that piroplasma could not be found in any of the dogs examined.

PROPHYLAXIS.

It has been frequently shown that anything up to 30 per cent of the adult rats in many areas both in England and abroad harbour virulent leptospiræ in their kidneys and excrete them in their urine (Stevenson, 1922; Balfour, 1922). The rats themselves may show scarcely any reaction to the parasite, and may be looked upon in the great majority of cases as "healthy carriers" of the disease. In human outbreaks of Weil's disease a close association between man and the rat can nearly always be established, and the large epidemics on the various fronts during the Great War, described by Martin and Pettit, Stokes, Ryle and Tytler, Dawson, Hume and Bedson, and others, were universally referred to the close association between man and infected rats which took place under the conditions of trench warfare.

In the infected kennels we have investigated rats were evidently present in large numbers, and the opportunities of rat contamination gross. In the only two outbreaks where we have had the opportunity of examining rats infesting the kennels, we have demonstrated the presence of virulent leptospira infection in the rats.

We believe that rats are probably the main vectors of the disease, and therefore anti-rat measures appear to be an essential in the eradication of the disease. We are endeavouring to discover by experiment how the natural infection takes place. We think that it is by means of food and bedding. Presumably the food and bedding of the dogs become contaminated with the urine of rat carriers of the disease, and from these materials the puppies become infected. The Japanese workers showed that guinea-pigs may be infected by feeding with infected material, and Courmont and Durand (1917 a) showed that dogs could similarly be given the disease. It has been stated that leptospira infection may take place through the unbroken skin of guinea-pigs (Inada, etc., 1916 a). Courmont and Durand (1917 b) and the present writers have frequently infected guinea-pigs by rubbing a minute amount of material on a scarified area. Infection through bedding may therefore take place. Adult dogs apparently rarely become infected. Two explanations suggest themselves: either the greater acidity of the adult dog's stomach kills any leptospiræ taken with the food, or adult dogs are immune because they have already passed through an attack ending in recovery.

Human beings are known to carry leptospiræ in their urine for sometime during their convalescence from the disease, and rats are known to carry the infection in their kidneys and urine almost indefinitely. It seems very probable that dogs also may carry the infection in their urine for at least a short time after their recovery; that this actually takes place is strongly suggested by the discovery of leptospiræ in the kidneys, and probably in the urine, of Exp Dog 2 three weeks after recovery from the disease.

In a recently published paper, Buchanan (1924) has shown that pathogenic leptospiræ may multiply in damp places independently of any mammalian host, and indeed he concludes that rats may owe their infection to this source. These very important observations of Buchanan explain the known effect of telluric conditions (Tohyama, 1924) on the spread of the disease in rats and human beings, and emphasise the importance of kennels being kept as dry and hygienic as possible, for not only may leptospiræ excreted by rats be kept alive for prolonged periods in warm damp kennels, but may even multiply. Possibly, too, under certain favourable conditions, pathogenic leptospiræ may occur in damp kennels and their surroundings without any immediate connection with a rodent host.

Passive Immunity.—We have clearly shown that guinea-pigs can be protected against certainly lethal doses of leptospiræ of canine origin by an immune serum, and our field tests go to prove that a similar protection can be obtained in dogs exposed to natural infection. Of twelve pups which were "contacts" in an enzoötic, seven were inoculated with 5 c.c. anti-leptospiæ serum, and five were left uninoculated. Two of the five uninoculated dogs developed the disease, while the seven inoculated remained healthy. We believe that anti-leptospiæ serum will play an important part in prophylaxis. When a dog with jaundice is discovered in a kennel, it should be removed at once from the remaining healthy dogs, and the latter should be isolated either in their present kennel or removed to new quarters. Each should be inoculated subcutaneously with 5-10 c.c. anti-leptospiæ serum, the dose depending on the size and age of the dog. Any suspicious case should be removed at once. We believe that a dose of serum will confer a passive immunity for about three weeks. Further doses may be desirable if there is any likelihood of the dogs having been exposed to infection since the first inoculation. To guard against anaphylactic symptoms developing if too long a period elapses between a first and a second dose of serum, and to confer an immunity

of longer duration, we would provisionally suggest an initial dose of 5-10 c.c. at once, followed by a dose of 1 c.c. a week later, and a further dose of 1 c.c. at the end of a fortnight.

Active Immunity.—From the work of Noguchi (1924) and others on guinea-pigs, it is highly probable that a lasting active immunity to the disease may be obtained by the use of vaccines consisting of dead or attenuated cultures of leptospira. We are now investigating the value of such vaccines in the prophylaxis of the disease in dogs, but as yet we are not in a position to make any definite statement as to their utility.

TREATMENT.

It is yet too early to state that the administration of anti-leptospiæ serum will affect cures in all cases of enzoötic jaundice. We have received records of ten instances in which serum was administered to dogs suffering from the disease. In every case jaundice was obvious at the time of the administration of the serum. Nine of these, in the opinion of the veterinary surgeons, were saved by the administration of the serum. We at present have an open mind on the question. We have tried to save dogs which we had artificially infected, but we have hitherto been unsuccessful in saving them after jaundice had developed. It may be that the 1 c.c. of ground-liver tissue with which we artificially infected produced a more severe infection than occurs in the natural disease, and that the serum therefore failed to save the animals.

We have found the following general treatment of advantage: The administration of liquid paraffin by mouth and the withholding of all drastic purgatives. Enemata of normal saline solution till a free action of the bowels is obtained. Liquid diet of milk, water, and raw eggs.

The Relationship of Enzoötic Jaundice to distemper.

Gray (1915) says: "Indeed, it is permissible to doubt the connection between this enzoötic form of jaundice and distemper until some definite knowledge is forthcoming on the subject. No doubt some practitioners meet with cases of distemper that during the course of the disease develop evidence of jaundice, while hepatic lesions are found on post-mortem. In such instances the jaundice is usually regarded as a complication of the disease, but it must be remembered that a dog may be suffering from an unsuspected affection of the liver prior to the attack of distemper."

It is clear that Gray and other observers have realised that distemper and enzoötic jaundice are two distinct diseases, a conclusion borne out by our findings.

With regard to diagnosis, further observation will probably put the veterinarian in a position to say that at one end of the scale are the typical cases of leptospiral disease, either the form with intense jaundice or the acute form with enteritis, and at the other end are the cases resembling distemper with marked catarrhal symptoms. Instances may, however, occur in which laboratory investigation alone can establish the diagnosis of leptospiral disease as distinct from distemper. Time only can determine the limits in this borderland.

The earlier in the course of the disease one sees the patient, the more difficult it is to make a differentiation between distemper and leptospiral disease. We have provisionally adopted the following points as of help:—

Temperature.—In distemper this is generally persistently high, while in leptospiral disease the early high temperature may drop even to normal or subnormal for several days, followed by a sudden short rise and sudden fall to subnormal.

Depression.—Is greater than in distemper, the patient lying possibly for days and taking no interest in its surroundings.

Haemorrhagic Herpes and Blood-stained Vomit.—Are very characteristic of leptospiral disease.

Faeces.—In leptospiral disease there can be early diarrhoea, then constipation, followed by the passage of clay-coloured mucoid stools containing much blood, or perhaps only tinted or streaked. How many of the outbreaks of what has been considered intestinal distemper are due to leptospiral disease we cannot tell—probably many. If the serum in use proves in general practice to be as effective in both treatment and prophylaxis as it is at present proving, it will be possible to say that an epidemic that responds to leptospiral serum is not distemper. We shall, of course, take every opportunity available for investigating cases in what we may for the moment regard as the undefined territory between distemper and leptospiral disease.

SUMMARY AND CONCLUSIONS.

On the basis of clinical and pathological observations and experimental work, the commonly occurring enzoötic jaundice of dogs (Yellows) is attributed to infection with *Leptospira icterohæmorrhagiae*,

which is normally carried by a considerable percentage of rats in this country.

The following are the lines upon which we suggest combating the disease:—

• *Prophylaxis.*—(a) Protection of kennels and food from rats. Disinfection of infected kennels. Dry and hygienic condition of floors and bedding.

(b) The elimination “recovered cases” from kennels until it has been proved that they are not excreting leptospiræ in their urine.

(c) Complete but temporary protection against the disease is apparently given by passive immunity with a potent anti-leptospira serum.

(d) Active immunity will probably be given by suitable doses of a vaccine made from dead or attenuated leptospiræ.

Treatment.—The results obtained in the treatment of the disease with potent anti-leptospira serum have been encouraging.

We owe our thanks to Drs. C. M. Wenyon and R. A. O'Brien, who have given us much help and advice; to Dr. Stevenson, whose opinion we have sought on our histological material; and to Mr. Barnard, of the National Institute for Medical Research, who has kindly made the microphotographs of the leptospira which illustrate this paper. Our thanks are also due to several veterinary surgeons who have supplied us with material for investigation, in particular to Professor Hobday.

Table I.—Showing Time of Occurrence of Jaundice and Time of Death after Onset in Naturally Occurring Cases.

Dog	Occurrence of Jaundice (Days)	Time of Death (Days)
1	2	5
2	4	6
3	4	7
4	2	5
6	4	4
8	2	3
9	None	1
10	None	1

Table II.—Showing Time of Occurrence of Jaundice and Time of Death after Injection in Dogs Artificially Infected.

Dog	Leptospira Strain	Jaundice (Days)	Death (Days)
Ex. 2	Dog	16	Lived
Ex. 3	Dog	7	10
Ex. 4	Dog	5	10
Ex. 5	Dog	6	11
Ex. 7	Dog	6	13
Ex. 17	Dog	16	17
Ex. 18	Dog	16	18
Ex. 1	Rat	5	6
Ex. 15	Rat	5	6
Ex. 16	Rat	5	7

REMARKABLE FEAT OF SURGERY.

(Operation inside the heart.)

One of the October numbers of the British Medical Journal contains a description of one of the most remarkable surgical operations of modern times, and in its kind unique. It is unique in the sense that for the first time in the history of surgery, an operation was performed on the interior of the human heart. Hitherto operation on the heart were confined to the treatment of mere surface wounds, and it was thought fatal to attempt to manipulate any integral part of the organ itself. So that the operation in question has opened a new era in the treatment of heart disease.

To come to the operation itself, a plain and straightforward account of it is here attempted, stripped of the technical verbiage of the official description.

The operation was performed on a girl, 15 years of age, who was suffering from a common form of heart disease, namely, a thickening of the valves of the heart. This had given rise to various other complications which all together rendered the patient's life precarious. An operation was decided on by Dr. H. S. Souttar, C. B. S. M. Ch., F. R. C. S., Surgeon with care of outpatients in the London Hospital.

(The Hindu, 16th November, 1925.)

Dr. Souttar, it may be mentioned, is not a heart specialist. He is the inventor of the eyeless needle for use in surgical operations. This needle was patented by him and the patent presented to the London Hospital, which supplied it to all places in the world.

The operation in question was performed on May 6 this year, and was a complete success. Dr. Souttar, after the administration of an anaesthetic to the patient, made a curved incision on the left side of the patient's chest in the region above the heart. The skin and the tissues under the skin together with the left breast were then turned outwards, exposing an area of the chest wall five inches square. Further incisions were made and the ribs were divided, thus exposing the whole of the left side of the pericardium or bag or sack covering the heart.

A Hurrying Heart.

"The action of the patient's heart now became extremely hurried, says Dr. Souttar in his account of the operation, the pulse rising to 150." And until it calmed down, the surgeon's hand had to be stayed. But after 5 minutes' delay the beats became slower and steadier, and the operation was then proceeded with. The left portion of the pericardium was laid open by a curved incision, revealing the left auricle of the heart. Two sutures were passed through the upper and lower margins of the auricle (so named because it is sharpened like the ear) so that it could be pulled forward for easier manipulation. As the heart was still beating high the wound was attended to, but after a delay of ten minutes the heart had settled down again. The left auricle was now drawn forward, a soft curved clamp was applied to its base to prevent the blood welling up, and the necessary incision was made. Into the opening thus created the Surgeon introduced his left forefinger, the clamp was removed, and the portion of the auricle was pulled over the finger like a glove with the help of the sutures.

The whole of the inside of the left auricle could now be felt with ease, and the Surgeon says he was immediately able to notice from the rush of blood against his finger that the blood was being violently thrown back by the constriction in the valves but that there had been so much thickening of the valves as he had expected. As this was the case, that is, as the valves were not so badly affected as was thought, it was decided not to carry out the more complex operation which had been planned, and instead the constriction was remedied by manipulation with the finger, thus breaking down adhesions in the valves and

greatly improving the diseased condition of the heart complained of by the patient.

The operation was now practically over, and all there remained to do was to close up the wound. But at this stage an accident occurred which nearly spoilt the operation. Just as the Surgeon was withdrawing his finger from the auricle the lower suture gave way, the auricle (all this time drawn forward) slipped back into the pericardium and there was a sudden rush of blood through the incision in the auricle out into the lungs. This was, however, instantly checked by pressing the auricle against the heart, and in that position matters were put right again, and the incision was sewn up. The pericardium was closed next, and the blood which had rushed out was soaked up into gauze pads. The rest of the wounds was then closed up flap by flap, and the ribs placed in position. Just before the tissue over the ribs was closed a small quantity of 60 per cent alcohol was injected into the inter-costal nerves immediately outside the point at which the ribs had been divided.

PATIENT RECOVERS COMPLETELY.

Regarding the condition of the patient after the operation Dr. Souttar says that she was perfectly normal. She had a bright colour and an excellent pulse, and, except at the moment when the suture gave way, her condition had never caused the slightest anxiety. The whole operation took exactly 60 minutes. The Patient recovered completely, and seems to have suffered no after-effects.

A PRELIMINARY REPORT OF AN INVESTIGATION OF A CONDITION KNOWN AS "DRY COAT" IN HORSES.

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During the last few years several instances of this condition have come under our notice, occurring in racehorses and polo ponies imported from Australia into Malaya. As far as we know the condition does not exist in Australia, and no instance has been observed by us among the native-bred ponies of Malaya or those imported from the Dutch East Indies. These two facts would at once make one suspect that the

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disease is due to diet which these animals receive, but further observation does not confirm this. Any attempt at producing the condition by diet has not succeeded so far.

General Description of the Disease.—In a racehorse or polo pony that has been perfectly well previously, it is noticed that he does not sweat as profusely as usual after his gallops, and then that he only sweats in certain parts of his body, namely, under the jowl, behind the ears, behind the hind legs and under the saddle; even these areas soon show less perspiration as the condition progresses, until within a few months there is practically no evidence of perspiration at all.

It is remarkable that a certain few animals continue to race even when practically completely dry coated, but even these animals are bad doers, and difficult to keep in condition because of their capricious appetite. One such animal we observed who, in spite of being dry coated for at least a year, continued to race well in the open horse class of Malaya, but who after a particularly strenuous race, in which he was only just beaten, came into the paddock, collapsed and died, with all the symptoms of acute cardiac dilatation. This case is mentioned to show that it is possible for an animal to continue to be useful even when completely dry coated.

But in the majority of cases the history is far different. With the first appearance of a dry coat the following concomitant changes are usually noticed. After his usual exercise the animal shows abnormal dyspnoea, which persists for several hours. His disposition is changed, he is no longer keen on his work, and takes every opportunity to shirk, and is even considered by his owner to be lazy. His coat becomes lustreless, his eyes are dull, his mucous membranes pale, and his temperature is elevated, even as high as 104°, especially after any exercise or in the heat of the day. His blood pressure is much increased (in one case it was over 400 mm. Hg. systolic), and his pulse rate is accelerated.

We have not observed any oedema, but there is a diminution in quantity of urine. His chest and abdomen show no abnormal physical signs, but his appetite is capricious.

All these symptoms and signs progress rapidly, and in a few weeks he may become quite useless. In extreme cases he cannot even walk without urgent dyspnoea; most of his hair falls out; he has constant fever; and his urine is found to contain abundant albumen and casts.

In two instances after violent exercise two such ponies collapsed, their lives being saved by prompt venesection.

It occurred to us that this condition might be due to a general infection with some micro-organism, and about six months ago we grasped the opportunity of making a careful study of one case. A very beautiful chestnut mare about eight years of old, whom we had known to be dry coated for over a year, and who had every possible treatment given to her—rest, change of climate, change of diet, etc.—was finally to be destroyed. This was done with the "humane bullet", and immediately a blood culture was taken. The method employed was to put 10 c. c. of blood into nutrient broth medium, containing 2 per cent glucose and 2 per cent sodium citrate; 3 c. c. of blood was put into a sterile test tube and allowed to clot so that the serum might be used for agglutination tests.

A thorough post-mortem examination of the organs of this mare was made.

Results:—Blood Culture.—After forty-eight hours' incubation, a slight cloudiness was observed in the medium, which was found to be due to a bacillus, which was motile, Gram negative, slightly longer than the typical *Bacillus coli*, having rounded ends, and being nonspore forming. It produced acid and gas readily in McConkey's litmus glucose broth. It did not ferment saccharose. This organism was agglutinated by the mare's serum in dilutions of 1 in 800.

Post-mortem findings:—Stomach.—This organ contained numerous specimens of a small worm, probably *Habronema microstoma*; there was also an abscess about the size of a pigeon's egg with thick fibrous walls containing worms, probably *Habronema muscae*. Microscopically, no special changes were noticed, except the formation of small cystic areas in the submucosa, with surrounding inflammatory infiltration, as the result of irritation from the worms present.

Intestines.—The cæcum and colon were fairly heavily infested with small round worms; these were not particularly identified. The intestines show no special abnormality microscopically.

Kidneys.—Both kidneys were definitely enlarged, especially the right one which was about half as big again as normal. The capsules stripped fairly easily, and there were no cysts nor calculi. On section there was evidence of swelling, most marked in the cortex. The pelves were normal.

Microscopically, the kidneys showed combined inflammatory and arterio-sclerotic changes. The smallest vessels were much narrowed;

Bowman's capsule was thickened, and surrounded by collapsed glomeruli, which appeared as wrinkled structures, with a definite space between them and the capsule. In some places the epithelium, of the capsule appeared to have vanished entirely.

The epithelium of the tubules was much swollen, the cells having a granular appearance; the tubules contained hyaline material; and between the kidney cells in some places there was definite leucocytic infiltration, as well as small hæmorrhages.

The picture was one of a mixed nephritis, showing different stages of the disease in different parts of the kidney.

Heart.—This was considerably enlarged, weighing a little under 9 lb. There was no pericarditis. All the cardiac chambers were hypertrophied, the left ventricle most so.

The valves showed no marked gross changes. The coronary arteries were thickened. There were no thrombi nor emboli.

Microscopically, the heart muscle showed marked hypertrophy with occasional fragmentation of the fibres and leucocytic infiltration.

Aorta.—This was thickened, and less elastic than normal. There were no areas of classification. Microscopically, the intima was thickened, the elastic tissue was sparse, and there was bulging of the intima in some areas. The muscularis did not appear to be much thickened.

The liver was moderately enlarged and fatty. Microscopically, the liver cells were cloudy, and there were many small areas of focal necrosis. No increase of fibrous tissue was noted.

The spleen showed no noteworthy changes.

The lungs were voluminous and definitely emphysematous. There was no chronic bronchitis.

The skin.—A small area, devoid of hair, was examined. It had a peculiar shiny appearance and seemed devoid of elasticity. Microscopically, there was moderate thickening of the epidermis, with an almost complete absence of elastic fibres in the corium. The hair follicles were atrophied and the bulbs shrunken. No definite changes were recognised in the cutaneous blood-vessels. No normal sweat glands could be recognised, but some markedly tortuous, atrophied ones were seen, in which the cells were granular and shrunken, and around which there was a distinct replacement fibrosis.

The pathological and bacteriological findings were those of a chronic infection, and we decided to make blood cultures from horses

similarly affected, and, if possible, to prepare autogenous vaccines for them.

We have made blood cultures from four such horses up-to-date. In all these horses the same organism has been found, and an autogenous vaccine has been made up for each horse. The following is a brief resume of each case treated with an autogenous vaccine :—

Case 1.—Bay mare, 14.2 ; 9 years. Imported in 1921 for racing, broken to polo in 1922. No history as to when the condition started but has been dry coated for more than two years.

Shows distress on exercise and is useless except for very slow chukkers. Eight injections of an autogenous vaccine were given at intervals of five days commencing in October 1924, initial dose 750 million, which was gradually increased to 2,000 million. The temperature was taken 24 hours after each injection ; there was no temperature reaction.

This pony has shown marked improvement in her general condition, the coat has quite regained its normal lustre, the eyes are bright and the appetite good. The dyspnœa while much improved has not entirely disappeared. Sweating has recommenced after exercise in the jowl, along the edge of the mane, to some extent behind the ears, and more noticeably between the hind legs ; the rest of the body, however, including the area under the saddle, is still dry. A blood culture taken one month after completion of the treatment was sterile.

Case 2.—Black mare, 14.1 ; 10 years.

Imported in the year 1919 for racing, broken to polo in 1921. Dry coated about four years. Condition good, but very little used owing to distress on exercise.

The animal collapsed in 1923 after polo; life was saved by venesection.

The coat is always in very bad condition, scurvy, and the hair scanty and dry. The urine contains albumen and numerous casts. Hæmaglobin 60.

Ten injections of an autogenous vaccine were given at intervals of five days in December 1924, commencing with a dose of 1,000 million, which was gradually increased to 3,000 million. The temperature was taken 24 hours after each injection. Temperature actions occurred after the 6th injection (2,300 million) 103°, and after the 7th injection (2,500 million) 104.5°.

A blood culture taken one month after completion of the treatment was sterile. Hæmaglobin taken at the same time was 75, and the urine contained no albumen nor casts.

This pony has improved very much in general condition, the hair is growing all over the body, the eyes are bright, and the appetite is very good.

The dyspnœa has almost disappeared, and the animal is now being conditioned for fast Polo, and has already played in several fast chukkers, without distress. The pony is sweating over the entire surface of the body, but the amount of sweat is not so great as one would get in a normal horse under the same conditions.

Case 3.—Chestnut gelding, 14.2 ; 7 years.

Imported for racing in 1923. Condition good, but has been going dry for the past three or four months ; was reported to be quite dry at the end of January.

The disease does not appear to have caused the animal much distress on exercise ; he has been racing regularly.

Treatment with an autogenous vaccine was begun on the 11th of February, 1925 ; the initial dose was 1,000 million, the intervals between the injections five days.

The pony is still under treatment ; he has already received seven injections, the intention is to give ten ; he received 3,500 million for his last dose ; he has had no temperature reaction.

The pony was cantered for a mile and a half on the race-course on the morning of the 11th of March ; he sweated freely after exercise over the whole surface of the body. The action of the sweat glands appeared to be normal. The general condition and appearance of the pony has much improved.

Case 4.—Brown gelding, 15.2 ; 6 years.

Imported for racing in January 1924 ; was the best griffin of the batch, winning races in the May and July meetings.

The horse in July was in perfect condition, but started to go dry very soon afterwards. The condition was more severe and there was more constitutional disturbance than in Case 3.

The horse was raced in January, but was never placed ; at that time he was showing all the symptoms of "dry coat."

Treatment with an autogenous vaccine was commenced on the 11th of February 1925, the treatment being the same as for Case 3, but temperature reaction occurred after the 4th injection (2,500 million) 104.8°.

The horse was cantered for a mile and a half on the race-course on the 14th of March; he was almost dry immediately after the exercise, but commenced to sweat within five minutes. Moisture was observed on the muzzle, under the jaw, on the sides of the neck, under the saddle, and between the hind legs. Sweating was not so free as in Case 3.

The horse has regained his appetite and his condition has much improved.

Conclusions.—We are not prepared to make any definite claims on such few observations, but as far as we have gone the following results are definite :—

1. The same organism was recovered from four horses suffering from the same disease apparently, but in different stages.
2. All the ponies treated have definitely improved under treatment with an autogenous vaccine, and this without any change of diet or marked difference in exercise.
3. The two ponies treated in whom the disease was known to be of long standing have improved, but in view of the pathological findings in the one case thoroughly studied we cannot hope to restore these ponies to normal health.

This study will be carried on systematically, and any further developments reported in due course.

NOTICE.

Since most of the subscribers are anxious to know the proceedings of the fourth All-India Veterinary Conference, held at Calcutta, as early as possible, the fourth issue of the journal to be published in April, will be issued at the end of February. The third volume will commence from July, as usual.

ERRATA.

In the last issue of the Journal page 97 first line, for 'presents us remarkable' read 'presents no remarkable'.

In the last issue, page 100, line 18, for Potassium Iodide 1 oz., read Potassium Iodide 1 dram.

In this issue, page 133, line 21 for 'Journal' read 'Journals.'

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Veterinary Surgeon, Madras.

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