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THE INDIAN VETERINARY JOURNAL

(The Journal of the All-India Veterinary Association)



*Monthly Record of
Veterinary Science*



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Vol. 36

February, 1959

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THE INDIAN VETERINARY JOURNAL

[THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION]

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A Monthly Record of Veterinary Science
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EDITOR

Rao Sahib T. VINAYAKA MUDALIAR, G.M.V.C.,

Office:—23, First Street, Vidyodaya East, T'Nagar,
Madras-17, (S. India)

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SHRI P. G. PANDE, M.Sc., M.R.C.V.S.,
The New Director of the
Indian Veterinary Research Institute,
Mukteswar.

THE Indian Veterinary Journal

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Editorial

AN AMERICAN TRIBUTE

We have before us a recent book on the Evolution of Veterinary Art by Mr. J. F. Smithcors, D.V.M., Ph.D., of the Michigan University. A review of this book had already appeared in our January 1959 issue. From point of exhaustive study, balanced view and commendable presentation, this book is a remarkable contribution to the existing literature on Veterinary Science.

Our purpose in returning to this subject editorially is to draw pointed attention of our administrators, politicians and scientists to the genesis of this noble art in this land of Bharat and the status it enjoyed even in very ancient days. The method of its development was peculiarly her own and not a copy-book maxim of other countries. She was in the vanguard of progress and showed the way to others, if recorded history is to be believed. What more, the author of this book expects Free India to dive deep into her ancient literature on Veterinary Art and lay it bare to the test of present knowledge, for whatever it is worth. Are the sons of Free-India doing it? Is there any sustained work in that direction? Fitful attempts have no doubt been made but of what avail are such half-hearted measures?

The author pays the highest possible compliment to ancient Hindu knowledge of Veterinary Art. He says "Ancient India has supplied the most concrete identification of the Veterinary Art in antiquity". He quotes Johnston Saint of Wellcome Historical Museum of London as saying "India was veritably an apotheosis of the animal world, and even the most irreverent layman would see (in ancient Indian Medical and Veterinary literature) the distinct fore-runner of all the scientific and surgical marvels of to-day". After mentioning that medical and veterinary historians have done less than justice to the great lore of ancient India, the author says "The writings of ancient India demonstrate that Veterinary Science was immeasurably farther advanced than anywhere else at a comparable, or even much later time". He adds "That Salihotra became the greatest of early Veterinarians

is adduced from the fact that after his time, Veterinarians were identified as *Salihotriya*. The present term, *Salutri* as a designation of Veterinarians is a derivative". It is hard to correctly place the age of this great Veterinarian. It could be anywhere between 2350-1200 B.C. "During the reign of King Asoka (250 B.C.) hundreds of well-equipped Veterinary hospitals were set up and staffed by *Salihotriya* paid by the State". The author opines "There is increasing evidence that the Greeks and Romans owed more to the Hindus (in the matter of Veterinary Medicine) than is generally realised".

The author exhibits an acute understanding when he says "In a civilisation where men and animals were considered to have the same destiny, it is logical that Veterinary Medicine should have been held in high esteem". He adds "India is the only country to-day to provide sanctuaries for old and decrepit animals as a part of the fundamental philosophy of animal care".

In the Vedic period the chief occupation of the people was cattle raising. The author points out that "It was the early development of the science of genetics that permitted a wise choice of animals to be used for breeding purposes". Otherwise it is difficult to account for the fine specimens of cattle that India has developed through ages. The learned author brings out clearly that the ancients "emphasised the need for Veterinarians to be experts on animal health rather than on animal disease alone". That is the genius of India, which we have been pointing out from time to time. That is her heritage for over 4,000 years now. People who wish to re-model and revise and adopt a pattern alien to the genius of the people, should be prepared to take the responsibility for the serious consequences that are bound to ensue. We make bold to assert that they will spell nothing but ruin on this noble art of healing animals and their development, which has been fostered with great care and devotion from time immemorial, as to evoke the admiration of such students of professional history of even foreign lands.

The author records "Surgery included the time-honoured techniques of firing, blistering, cautery and blood-letting. Strict rules of hygiene were followed. The method of administering drugs by passing a stomach-tube through the nose, supposedly originated by a Britisher in the 19th century, is described in Sanskrit Veterinary writings..... Tuberculosis is reported to have been "discovered" in elephants in the early 20th century, but two forms, a wasting and a pulmonary type, are described in a Hindu text over, 2000 years old." The profession seems

to have had also a code for the conduct of Veterinary Practitioners even in those early days! We are still to have one in this country, in these days. The author's unbiased outlook has made him to write a few home-truths, which should make all concerned to pause and ponder over.

"Until recently most of the writings to come out of India were from the period of British domination, and since many of the present day writers labour under the influence of a British-dominated education, there has been a tendency to disparage, if not to scorn, these earlier writings. With the rise of Indian nationalism, and renewed interest in Indian history, it seems likely that more emphasis will be placed upon the heritage left by the early writers in all fields, including Veterinary Medicine. As India looks to her own resources to bolster an independent economy and to recreate the glories of her proud past, we may expect her to turn to the writings of the past, particularly to find native substitutes for imported drugs (Italics are ours). In so doing, much of the history of medicine, of both man and animal, will be brought to life. The full recitation of this story may prove to be one of the most significant events in the entire history of Veterinary Medicine."

We look to America for many things in these days. May we hope that this piece of solid and substantial advice, coming from the same country will also receive the attention it deserves from the Powers - that - be?

Shri P. G. PANDE

THE NEW DIRECTOR OF THE INDIAN VETERINARY RESEARCH INSTITUTE

Shri P. G. Pande, M.Sc., M.R.C.V.S., took over charge of the post of Director, the Indian Veterinary Research Institute, Mukteswar, in September 1958. We are happy indeed that such a wise choice has been made for this highly responsible post. His back ground of experience raises high hopes in us.

Born in 1905 in Uttar Pradesh, Shri Pande, after a brilliant academic career taking a first class Honours degree in Zoology and a first class M.Sc., later in the same subject, joined the Royal Veterinary College, London, as a Government scholar in 1928. After obtaining his M.R.C.V.S., he joined as Veterinary Investigation Officer, Assam in 1933. After working there for six years, where he did some pioneering work and brought to light the etiology of some obscure diseases, he got his services transferred to the Uttar Pradesh Government. He joined as Research Officer (Pathology) in 1941 at the very Institute, over which he is to be the Head now. He was for some time Assistant Animal Husbandry Commissioner with the Government of India in 1944-1945

and later joined again the I.V.R.I., as Research Officer (Bacteriology). When the new College of Veterinary Science and Animal Husbandry was started at Mathura, he was selected to be its first Principal. There he laid the foundation for high standards and was mainly responsible for equipping it on a first class scale. Though it is one of the youngest of Veterinary Colleges in India, it has been selected for Post-graduate level of tuition in this country on a regional basis and thus it is one of the first two amongst the Veterinary Colleges to get this distinction and start functioning, the other being Madras. Shri Pande's contributions are to be found in the fields of Pathology, Bacteriology and Parasitology. His work on "Hump-sore" attracted some attention and he did some work on Amphistomiasis in Cattle, Sheep and Goats and on Pathology and Pathogenesis of Flouride Intoxication.

In 1957, he was appointed as the Director of Animal Husbandry and fisheries, U.P., and in spite of his heavy administrative duties he found time to keep himself engaged on some research work or other.

Thus Shri Pande comes to his new post with all the advantages of a varied experience and we feel certain the Institute stands to benefit by his being made its Director. Added to all these, he is a person of unbounded enthusiasm and of untiring zeal and he takes over charge at a time when the Institute is to run the new Post-Graduate College of Animal Sciences and to implement an expanded programme of work.

We are sure the good wishes of the entire profession go to him in his new sphere of work!

SIR MIRZA ISMAIL PASSES AWAY

Sir Mirza Ismail has passed away. Mysore and Mirza are virtually synonyms in India. He was the architect of modern Mysore. As Dewan of Mysore for well over fifteen years, he re-built the entire Mysore State practically. History says "Hyder was born to create an Empire and Tipu to lose one". But Mirza was born to resuscitate that Empire and make it prosperous. Villages were electrified, roads were laid, water supply was assured and schools and hospitals were opened. Major Industrial projects were planned and executed. He was a great City-builder. His aesthetic sense combined with his utilitarian views, brought into existence the modern Cities of Bangalore and Mysore. He was one of the ablest of administrators which India had produced in this century. For efficiency, integrity and zeal, it is hard to beat the record of his administration. Oh, when comes another like him!

General Articles

COMPARATIVE SUSCEPTIBILITY OF HILL CATTLE AND BUFFALOE-CALVES TO VIRULENT RINDERPEST VIRUS

By

D. R. UPPAL, K. C. SINHA and C. SEETHARAMAN,
Division of Biological Products,
Indian Veterinary Research Institute, Izatnagar, U. P.

[Received on 17-9-'58]

A scheme for the eradication of Rinderpest from India which was drawn up as early as 1949 was considered at the Animal Husbandry Wing meeting held in 1951 and 1953 and the recommendations of the committee were submitted to the Government of India. The Planning Commission realising the importance of the control of epidemics in cattle and in particular, the serious damage caused by Rinderpest, sanctioned necessary funds to initiate the work connected with the eradication of Rinderpest. Thus the Pilot Project of the All India Rinderpest Eradication Plan came into operation in the Southern Peninsula in October, 1954. The entire requirement of the vaccine for that area was supplied by the Indian Veterinary Research Institute. On completion of the Pilot Project, the Rinderpest Eradication Plan entered into the Second phase of the programme and the Indian Veterinary Research Institute was entrusted with the responsibility of producing larger quantities of vaccine. In view of the magnitude of work, it was later considered that it might not be possible for the Indian Veterinary Research Institute alone to meet the demand of the entire country and in order to ensure continued and undiminished supply, it was decided that the production of vaccine might be taken up at state levels where production facilities existed, e.g., Lucknow, Ranipet, Calcutta, Mhow and Hissar.

The National plan of Rinderpest eradication involves two processes, viz., (1) the production of vaccine and (2) mass immunisation in the field. So far as production of vaccine is concerned, this has been in progress at the Indian Veterinary Research Institute and during the Second Plan, large scale production of vaccine has also been taken up at Lucknow (U.P.), Ranipet (Madras) and Calcutta (West Bengal). Schemes for vaccine production at Hissar and Mhow have also been sanctioned. The freeze dried Rinderpest Vaccines supplied by the Indian Veterinary Research Institute to various parts of the country have been mostly standardised in hill bulls. But with the opening of vaccine production units in different parts of the country and the non-availability of hill cattle at all places, it was considered desirable to test out the susceptibility of some other animals so that, if found suitable, they could be used for the standardisation of Rinderpest vaccines. Accordingly

different batches of freeze dried Rinderpest Vaccines were titrated simultaneously in hill bulls and buffalo-calves, and the control animals so utilised for titration work afforded material to assess the comparative susceptibility of hill bulls and buffalo-calves to virulent Rinderpest virus.

It is well known that the European cattle, water buffaloes and Indian cattle with an admixture of foreign blood are the most susceptible to Rinderpest. Next in order of susceptibility are the cattle of the Kumaon hills. Curasson (1932) mentioned that buffaloes (*Bos-taurus-gaur-gayal, frontalis-indicus*) are highly susceptible to Rinderpest. The first systematic work on the susceptibility of various zebu cattle, hill cattle and buffaloes was undertaken some forty-five years ago (Holmes 1913). Hill cattle of Hazara District, Kangra and Darjeeling were found to be as highly susceptible as Kumaon-cattle, whereas cattle of the plains were fairly resistant. Buffaloes were found to be highly susceptible, even though the limited data available from his work show that the mortality rate was only 50 percent. Krishnamurti (1945) observed 49.2% mortality among buffalo-calves which were used for production of virulent virus.

Materials and methods

Buffalo-calves of about one to one and a half years of age and hill bulls between 3—6 years of age were used in the titration experiments. Buffalo-calves were procured from the contractors from open market in Bareilly and their body weights ranged between 150 lbs. to 220 lbs. Hill Bulls were procured from Mukteswar and their body weights ranged between 200—300 lbs. These animals were kept under observation for a period of at least one week before they were used as controls. One ml. of one percent suspension of * virulent bull-spleen rinderpest virus was injected subcutaneously and these animals were kept under strict isolation and necessary observations were carried out both morning and evening for a period of two weeks.

Experimental

In the present study, analysis has been made to assess the susceptibility of 47 hill bulls and 59 buffalo-calves. Observations on (1) morning and evening body temperature, (2) inappetance (3) mouth lesions (4) gastric and intestinal symptoms, and (5) mortality rate were recorded. Some of these animals which were destroyed at the height of reaction have been grouped under 'Killed.' In such cases, spleens were tested for the presence of virus and were always found positive.

* Virulent Virus used for above test was obtained from the Pathology and Bacteriology Division, Indian Veterinary Research Institute, Mukteswar. Results of observations on reactions in hill bulls and buffalo-calves are summarised in Table I and Table II.

Thermal response to the virus was classified under three categories *vis.*, temperature not exceeding 103°F, temperature above 103°F but not above 105°F and temperature above 105°F (Table I and Table II). Such classification with regard to various types of reactions no doubt gave an indication of the overall susceptibility but failed to yield any quantitative value.

TABLE I
Susceptibility of Hill-Cattle to Rinderpest.

Sl. No.	Animal No.	Temperature			Mouth Lesions	Inappetance	Intestinal disturbance	Remarks
		Upto 103°F	Above 103°F	105°F & above				
1	153			+	U	FF		d
2	316			+		FF		K
3	22			+	U	OF	D	d
4	24			+				K
5	156		+					K
6	222		+				D	d
7	248			+		FF	D	Survived
8	41			+		FF	D	d
9	19			+		FF		K
10	287			+			D	Survived
11	289			+		FF	D	d
12	380		+			FF	D	d
13	378			+		FF		K
14	815			+			D	d
15	283		+			FF	D	d
16	276					FF		Non-Reactor
17	802			+		FF	D	d
18	268		+			FF	D	d
19	50			+		FF		K
20	123			+		FF		K
21	125			+		FF	D	d
22	49			+		FF	D	d
23	16			+	U			K
24	151			+	U	FF	D	K
25	170		+			OF	D	d
26	405			+	U	FF	D	d
27	358							Non-Reactor
28	148			+		FF	D	d
29	495	+		+		FF	D	d
30	709			+				K
31	715		+		U	FF		d
32	142		+					K
33	631		+					K
34	634		+			OF	D	d
35	151			+				K
36	86			+		FF	D	d
37	604		+			FF	D	d
38	648	+				OF		d
39	258		+			FF	D	d
40	212			+	U	FF	D	d
41	608			+				K
42	256			+	U	FF	D	d
43	72	+				FF	SF	Survived
44	302			+		FF		K
45	178			+		FF	D	d
46	179			+		FF	D	Survived
47	294			+				K

TABLE II
Susceptibility of buffalo-calves to Rinderpest

Sl. No.	Animal No.	Temperature			Mouth Lesions	Inappetance	Intestinal disturbance	Remarks
		Upto 103°F	Above 103°F	105°F and above				
1	10							Non-Reactor
2	9			+	CG	FF	D	Survived
3	140			+		FF	D	Survived
4	145	+				FF	D	Non-Reactor
5	86		+					Survived
6	84		+					Non-Reactor
7	186		+					K
8	181		+					Non-Reactor
9	163		+			FF	D	d
10	151		+			FF	SF	d
11	73			+	CG	FF	D	Survived
12	74		+					d
13	46		+			FF	SF	Survived
14	53							Non-Reactor
15	47							Non-Reactor
16	90			+		FF	SF	Survived
17	76		+			FF	D	Survived
18	43			+				Survived
19	52			+				K
20	48			+				d
21	88			+				d
22	51	+						d
23	49		+			FF	SF	Survived
24	86							Non-Reactor
25	35			+	CG	FF	D	Survived
26	245	+			CG	FF	D	d
27	246	+			CG	FF	D	d
28	278	+						d
29	284			+		FF	D	d
30	331			+		FF	D	K
31	385			+	CG	FF	D	d
32	291		+		CG	FF	D	d
33	236		+		CG	FF	D	d
34	124			+	CG	FF	D	d
35	132			+	CG	FF	D	d
36	266		+					d
37	189		+					Survived
38	199		+			FF	D	d
39	177	+						Non-Reactor
40	178		+			FF	D	d
41	273	+						d
42	161			+		FF		d
43	73		+		CG	FF	D	Survived
44	77		+			FF	D	d
45	84			+		FF	D	d
46	28			+	CG	FF	D	d
47	22			+		FF		Survived
48	49			+		FF		d
49	51			+		FF		d
50	82			+		FF	D	Survived
51	83			+		FF	D	Survived
52	105			+		FF	SF	Survived
53	106			+		FF	D	Survived
54	212		+			FF	D	d
55	213		+			FF	D	d
56	218			+		FF	D	d
57	199	+			CG	OF	D	d
58	200			+		OF	D	d
59	203	+						Non-Reactor

+ Positive. FF = Feeds fairly. D = Diarrhoea. d = died.
U = Ulcer. OF = Off feed. SF = Soft faeces. K = Killed.
CG = Congestion of gums.

To assess the quantitative percentage of reaction in hill bulls and buffalo-calves, the calculation Table of Haddow (1932) with minor modifications was used. Fairly dependable quantitative values were therefore obtained.

Different types of syndromes and mortality rates in hill-cattle and buffalo-calves are summarised in Table III.

TABLE III
Assessment of reaction in hill cattle and buffalo-calves

Class or species of animals	Syndromes (%)						
	(a)	(b)	(c)	(d)	Total reactions	Killed	Mortality
	Thermal reaction	Mouth lesions	Inappetance	Intestinal disturbance			
I. Hill Cattle ...	95.7	17.0	72.3	57.4	95.7	34.0	80.6
II. Buffalo Calves ...	81.7	16.9	66.1	55.9	81.7	5.0	51.7

Mean of all syndromes :—(a), (b), (c) and (d)

I. 60.6%
II. 55.9%

For evaluation of the reactions, Haddow's method with modifications was used. A brief outline of the method is given below :—

- | | |
|---|--------|
| I. Temperature (Morning Temperature only) | Marks |
| (a) Decided thermal reaction of over 103°F commencing on or before the fourth day | ... 20 |
| (b) As commencing on the fifth day or later | ... 15 |
| (c) Temperature not exceeding 103°F on or before the fourth day | ... 10 |
| (d) Temperature not exceeding 103°F on or after the fifth day | ... 5 |
| II. Inappetance | |
| (a) For each day the animal feeds fairly | ... 3 |
| (b) For each day the animal feeds slowly | ... 4 |
| (c) For each day the animal goes off feed | ... 6 |
| III. Intestinal Disturbance | |
| (a) For each day the animal passes soft faeces | ... 4 |
| (b) For each day the animal has diarrhoea | ... 8 |
| IV. Specific Lesions | |
| (a) A few Vesicles | ... 50 |
| (b) Numerous Vesicles | ... 70 |

V. Type of Syndromes

(a) Where any two of I, II and III are present ...	20
(b) Where any one of I, II, III and IV are present.	30
(c) Where I is present and death supervenes within twelve days ...	100
(d) Where I is present and death occurs within fifteen days ...	60

When the marks allotted to an individual exceeds 100, the total will be taken as 100 for assessing reaction. Results are summarised in Table IV.

TABLE IV

Summary and assessment of reactions in hill cattle and buffalo-calves to virulent rinderpest virus

Class of animals used	Number inoculated	Number destroyed	Reaction percentage (Mean) Haddow's method
I. Hill Cattle ...	47	16	92.8
II. Buffalo-Calves ...	59	8	80.0

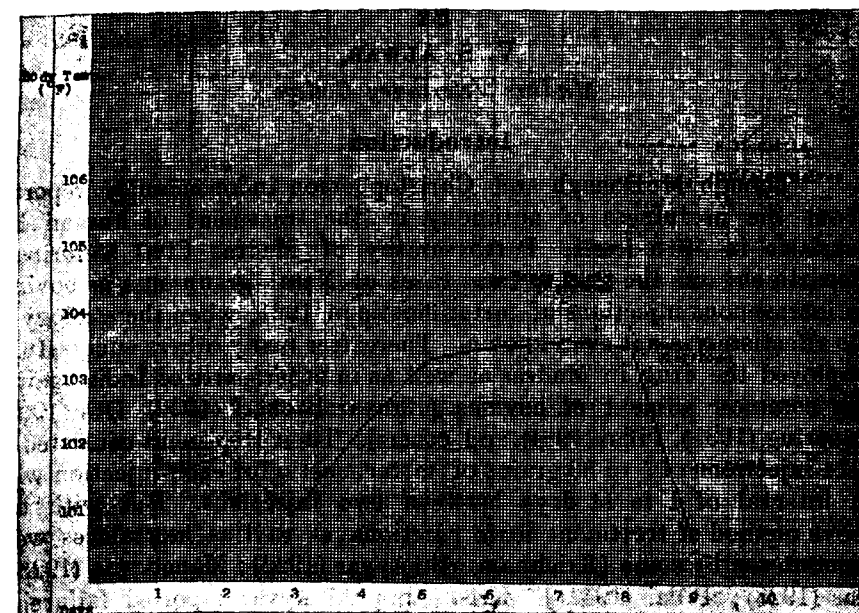
The thermal response and course of disease in hill cattle and buffalo-calves were more or less of a uniform pattern and in majority of cases the rise was observed by about the 3-4 day. Typical cases were accompanied by inappetance and diarrhoea. Mouth lesions in buffalo-calves were not prominent and characteristic ulcers were not developed as in hill cattle. Only patchy congestion was observed on the gums and lower lips of buffalo-calves. However, post mortem lesions in abomasum and intestines were as prominent as those in hill cattle. Composite temperature curve of reactors are shown in Fig. I.

Inference

In assessing the results set out in Tables I — IV and the picture of reaction projected in Fig. I, it will be seen that the overall mortality rate due to inoculation in hill bulls was 80.6 percent as against 51.7 percent in buffalo-calves. Overall reaction rate in hill bulls in this study was 60.6 percent as against 55.9 percent in buffalo-calves. It has been observed during the course of these investigations that if the buffalo-calves were in poor state of health, mortality occurred without showing typical symptoms of Rinderpest. Even though symptoms are quite comparable, it was observed that in buffalo-calves the mouth lesions due to Rinderpest were less prominent than in hill bulls.

Fig. I

Composite temperature curve of hill cattle and buffalo-calves to the experimental inoculation with virulent rinderpest virus.



Overall picture of susceptibility of buffalo-calves *vis-a-vis* hill cattle revealed that the course and intensity of disease in this class of animals was closely similar to that of hill cattle (fig. I) though there was a delay of 24—48 hours in the manifestation of certain syndromes. With the organisation of Rinderpest vaccine production units it has become essential that the vaccine should be standardised in animals like buffalo-calves as hill bulls may not be available at all places. As for suitability, hill cattle, on account of their susceptibility, appear to be the best suited for the purpose, but the observations made in this article amply prove that buffalo-calves in good condition from 1—2 years of age can replace such animals since their susceptibility and mortality rate compare satisfactorily with those of hill cattle.

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INTENSIVE TREATMENT OF NASAL SCHISTOSOMIASIS IN CATTLE

A Preliminary Report*

By

V. S. ALWAR,
Madras Veterinary College.

Introduction

Though McDonagh and Christopherson independantly reported about the usefulness of 'antimony in the treatment of human bilharziasis in 1918 itself, Parthasarathy of Madras Civil Veterinary Department was the first to treat cases of Nasal granuloma in bovines by intravenous injections of tartar emetic in 1921, when the etiology of the affection was not even known. Thereafter many others successfully employed the drug in Madras as well as in other parts of India against this common ailment of bovines [Bhuvarehachari (1922), Das (1928), Oxspring (1931), Pillai (1934) and others]. Their treatment consisted of 1-14 injections of 5 to 30 grains of tartar emetic for each injection with an interval of 1 to 14 days between two injections. But with the above method of treatment toxic reactions as well as mortalities were encountered by some [Krishnamurthi Ayyar (1922); Mahadevan (1923); Das (1928); Pillai (1934)]. Krishnamurthi Ayyar reported failure in the treatment also; while Oxspring (1928) recorded cases which were either not cured, though improved or were apparently cured and relapsed afterwards.

Rao and Mudaliar (1936) recommended the use of 1.5 grains of Potassium Antimony Tartarate for every 100 lbs. body weight to be injected intravenously daily for six consecutive days for effecting a complete cure of Nasal schistosomiasis on the basis of their experimental trials. But Naik (1942), Kale (1948) and Sen (1949) recorded fatalities in animals receiving the above treatment schedule. Choudhury (1955) reported deaths even after the first injection. Hence to be on the safe side, cases of Nasal schistosomiasis are generally treated by a course of six intravenous injections of Potassium antimony tartrate or sodium antimony tartrate with a lesser dose usually at intervals of a few days [Mohan Rao (1944), Sen (1949), Choudhury (1944), Patra and Murthy (1955) and Biswal and Das (1956)]. Even with the above line of treatment, besides mortalities, [Srivatsava (1943); Choudhury (1955)] relapses were also encountered in the apparently cured animals [Sen (1949); Biswal and Das (1956)]. Moreover, the disadvantage in the

above method is the undue length of time for completing the course of treatment, which makes the ryot to stop away in the middle of treatment as soon as he finds some abatement in the clinical symptoms. Such patients discharge viable eggs and form a source of infection.

In the treatment of human Schistosomiasis in Africa, Alves and Blair (1946) adopted an intensive course of treatment which consisted of giving six intravenous injections of Sodium Antimony Tartrate at the rate of three injections a day at three hourly intervals for two consecutive days. Subsequently this method was tried by Seitz (1946, '53); Ritchken and Kantor (1947); Rosin (quoted by Alves and Blair, 1947), Girgis and Aziz (1948), Rail (1949), Halawani and Dawood (1951), Greany (1952); Barton (1952), Dias *et al* (1952) and other workers. Talaat and Shoaib (1947) modified the above schedule to a total of four injections at the rate of two a day at six hourly intervals for two consecutive days maintaining the dosage rate of each injection adopted by Alves and Blair.

It was therefore thought that such intensive treatment was worth a trial in "Nasal schistosomiasis" and the details of the investigation undertaken in this respect with the financial assistance of the Government of Madras form the subject matter of this paper.

Experiments

Fourteen bullocks were experimented upon. Of them, 12 manifested prominent lesions in both the nostrils with copious nasal discharge and snoring sounds. No appreciable lesions were present in the other two. All the fourteen animals were confirmed for Nasal schistosomiasis by the examination of nasal discharge. The bullocks were subjected to different schedules of treatment. Sodium Antimony Tartrate was the drug employed in the experiments. The treatment was completed in all in two consecutive days. The Schedule was to give intravenous injections of varying dosages either at 5 hourly intervals (7 a.m.; 12 Noon and 5 p.m.) or at 10 hourly intervals (7 a.m. and 5 p.m.) as the case may be, making a total of 6 or 4 injections respectively. The drug was dissolved in 15 to 20 c.c. of the distilled water (1-2.5% soln.) just before each injection. A few of the animals showed reactions, while two died of toxicity. The reactions were rise of temperature to 103° to 104°F during the course of treatment especially on the second day and its persistence for a day or two, dullness, inappetance, shivering for a few minutes, cough immediately after injection, salivation, unsteady gait, starring coat and loose motions. Generally the above symptoms disappeared in one or two days. Those which died revealed congestion of internal organs and gastro-intestinal mucosa on post-mortem. The number of ova began to decrease rapidly after the treatment and very few only could be detected after 10 days. Dark coloured,

* Read at the Thirteenth All India Veterinary Conference held at Bangalore in November, 1958.

shirvelled and distorted ova indicating the dead nature of them generally appeared in the discharge in 1 to 4 days. In some cases free miracidia as well as normal ova were seen continuously for a period of even two weeks. The snoring sounds disappeared in about 1 to 2 weeks, while the nasal growths and even the dead eggs disappeared completely in a months' time. The animals were discharged as cured after a continued negative observation for 6 to 7 months. Autopsy on some such animals was done to verify the assumption of cure. In those animals which had relapse, ova reappeared in the nasal discharge after 9 to 16 weeks; but the lesions never became pronounced. In the bullocks which did not respond completely to the treatment, the progress of cure resembled the ones described above, but the nasal discharge continued to reveal very few normal eggs, though the lesions disappeared. To have an idea about the surviving worms, post-mortem was conducted on a few animals which showed relapse. Generally the treated bullocks showed an increase in their body weight by more than 100 lbs. in the course of 6 to 7 months.

Details of experiment

Schedule I.—Three injections of Sodium Antimony Tartrate a day at 5 hourly intervals (7 a.m.; 12 noon, and 5 p.m.) for two consecutive days.

Group A.—Administration of a total dose of 6 grains per 100 lbs. body weight.

A bullock weighing 603 lbs. revealed the ova in the nasal discharge without showing apparent lesions. This animal was treated by using 6 grains for each injection. Dark eggs began to appear in nasal discharge on the next day itself. Ova completely disappeared in a week's time. After observing it for 6 months the animal was discharged as cured.

For a second bullock showing congested areas only in nasal mucosa and weighing 607 lbs., 6 grains of the drug were used for each dose. The result was similar as in the previous bullock. Post-mortem of this animal after two months did not reveal any Schistosome.

Group B.—Administration of a total dose of 7 grains per 100 lbs. body weight.

A bullock weighing 403 lbs. was treated with 4, 4 and 6½ grains each day. In a month's time the lesions, symptoms as well as ova disappeared. But after 16 weeks, ova reappeared indicating a relapse. During the course of subsequent 3 months, the nasal discharge continued to reveal viable ova, but lesions did not develop at all and the animal looked apparently healthy.

Another bullock weighing 290 lbs. was experimented upon with 8, 3 and 4½ grains each day. In about 2 weeks time there was a complete disappearance of ova. In another 2 weeks the lesion also disappeared. It was discharged as cured after an observation of 7 months.

This dosage was tried in three more non-ailing bullocks and they were found to tolerate the drug.

Schedule II.—Two injections of Sodium Antimony Tartrate a day at 10 hourly intervals (7 a.m. and 5 p.m.) on two consecutive days.

Group C.—Administration of a total dose of 5 grains per 100 lbs. body weight.

A bullock weighing 344 lbs. was given 3½ and 5½ grains each day. Temperature reaction alone was noticed for 2 days after treatment; but it came down to normal thereafter. Though the lesions disappeared completely in a month's time with a marked reduction in the number of ova, a few normal ova were continuously seen throughout the period of observation of 5 months. Autopsy of this animal revealed a few live *Schistosoma nasalis*.

Another bullock weighing 229 lbs. was treated with 2½ and 3½ grains each day. The observations were similar to those of the previous animal and indicated a failure to effect a complete cure. In both, the lesions did not reappear and the animals looked healthy.

Group D.—Administration of a total dose of 6 grains per 100 lbs. body weight.

A bullock weighing 402 lbs. was treated with 6 grains for each injection. No other reaction except a rise in temperature on the day following the treatment was noticed. The lesions and the ova completely disappeared in 5 weeks and the animal was discharged as cured after observing for 6½ months.

Another bullock weighing 296 lbs. was treated with 4½ grains for each injection. The observations were identical initially, but after about 9 weeks ova reappeared in the nasal discharge. In the subsequent observations for 3 months, ova were continuously noticed without manifestation of lesions.

Group E.—Administration of a total dose of 8 grains per 100 lbs. body weight according to Schedule I of treatment.

A bullock which weighed 306 lbs. received at the rate of 3, 4½ and 4½ grains each day. The animal was dull and off feed in the evening of the 2nd day of treatment but became normal next day. There was complete disappearance of ova by the end of 2nd week. The animal was discharged as cured after an observation of 7 months.

Another bullock which was previously treated with a 6 grain dose was given a total dose of 8 grains per 100 lb. body weight at the rate of $5\frac{1}{2}$, $8\frac{1}{2}$ and $8\frac{1}{2}$ grains, (weight 548 lbs.) on each day. The bullock manifested toxic symptoms and died 42 hours after the last injection.

Group F:—Administration of a total dose of 9 grains per 100 lbs. body weight according to Schedule I of treatment.

A bullock which weighed 299 lbs. was treated with $4\frac{1}{2}$ grains each time. The bullock was off feed and showed rise of temperature, on the evening of the second day, but it became normal the next day. The lesions, symptoms and the ova disappeared in two weeks. This animal was discharged as cured after observing for 6 months.

Another bullock treated earlier with a subtherapeutic dose and discharging viable ova was given $6\frac{1}{2}$ grains for each injection as it weighed 435 lbs. It showed toxic reactions and died 41 hours after the last injection. Live schistosomes were recovered from the nasal veins on post-mortem.

Since a total of 6 grains per 100 lbs. body weight, given divided into 6 injections was found safe and effective, another 5 bullocks were experimented upon.

Group G:—A bullock weighing 327 lbs. was given $3\frac{1}{2}$ grains per injection. Though the lesions and the eggs completely disappeared in a month's time, there was relapse as indicated by the reappearance of ova 4 months after treatment. Further observations were similar to those recorded in cases of relapse.

The second bullock weighing 323 lbs. received $3\frac{1}{2}$ grains for each injection. It became normal in a month's time and the animal was discharged as cured after an observation of 6 months.

The third bullock weighing 559 lbs. was treated with $5\frac{1}{2}$ grains for each dose. This animal had loose motions and was dull and off feed on the evening of 2nd day of treatment. These symptoms disappeared by the next day. Normal eggs as well as free miracidia were observed two weeks after treatment. There was a gradual reduction in the lesions, symptoms and ova with their complete disappearance by the end of fourth week. The bullock was observed for six months before it was discharged as cured.

The fourth bullock weighing 249 lbs. was treated with $2\frac{1}{2}$ grains for each dose. The animal was off feed and had loose motions with a rise in temperature for two days after treatment. It took 2 months for the ova to disappear and for the lesions to subside appreciably. Eggs

reappeared in deeply scraped materials from the end of the fourth month. The absence of apparent lesions and the detection of only very few ova — that too quite infrequently — were the observations noted for 7 months thereafter. The bullock was slaughtered at the end of the period and a very careful search resulted in the recovery of a few live *Schistosoma nasalis*.

The fifth bullock weighing 295 lbs. was treated with 3 grains for each dose. The ova disappeared in 3 weeks, while it took 6 weeks for the lesions to disappear completely. The negative findings were consistent thereafter for more than 6 months, the period for which the bullock was under observation. To assess the extent of elimination of blood flukes by the treatment and to justify the action of declaring the animals as cured after the negative findings for over six months, an autopsy was done on this bullock. No worms could be detected.

The same dosage schedule was tried on 10 more non-ailing bullocks. Three were off feed and manifested a slight rise of temperature just for a day only, while the rest did not show any reaction at all.

Discussion

In the above trials it was found that the total dose of 8 grains as well as 9 grains per 100 lbs. body weight were lethal to some of the animals while others showed reactions. The bullocks treated with a total dose of 5 grains did not recover completely though they looked normal, since the lesions had disappeared. Neither fatalities nor total failure in the treatment were noticed among the animals, which were given a total dose of 6 grains and 7 grains respectively per 100 lbs. body weight. There were some relapses in both schedules of treatment. In treatment with a total dose of 6 grains of Sodium Antimony Tartrate per 100 lbs. body weight the schedule of 3 injections a day is preferable to that of two a day, since in the former method the dosage works to 1 grain per 100 lbs. body weight for each injection, which is comparatively safer. This dose is less than the one employed by Alves and Blair (1946) ($8\frac{1}{2}$ grains per 100 lbs. body weight — 12 mgm./kgm.). Out of 17 animals experimented upon with 1 grain per 100 lbs. body weight for each injection given at the rate of 3 injections a day on 2 consecutive days only four animals showed slight reactions and they became normal in a day or two. Of the seven ailing cases treated, 5 were cured and 2 showed relapse. One of the bullocks declared as cured did not reveal any worm on post-mortem. Even in those cases which showed relapse there was a complete disappearance of lesions. The relapses noticed in these experiments are definitely due to the worms which escaped destruction by the drug, whereas the relapses encountered in the field by Oxspring (1928), Naik (1941), Sen (1949) and Biswal and

Das (1956) might also be due to reinfection since their trials were not conducted under controlled conditions. Girgis and Aziz (1948) and others also reported relapses in the intensive treatment in human schistosomiasis. Talaat and Shoahib (1947) too observed relapses in their modified procedure of the intensive treatment. Live worms found on post-mortem after a course of 9 grains per 100 lbs. body weight which proved fatal to the animal indicate that a 6 grain dosage may not completely destroy the worms in all cases. That explains relapses occurring after a therapeutic dose in a few cases.

Not much information is available on the metabolism and fate of Antimony in bovines administered intervenously. Antimony exerts a specific lethal action on the blood flukes. It seems to affect also the ova in tissues while acting on the granulomatous growths resulting in the appearance of dark and distorted eggs soon after treatment. Even though a few schistosomes escape total destruction, due to the selective action of the drug on the reproductive tissues, their genitalia become affected and so either sterile eggs are produced or ova are not voided at all. The worms recover from the effect of the drug after some time and resume egg production as the reproductive organs regenerate. This phenomenon explains the initial disappearance of eggs for a period and their subsequent reappearance in relapses. The recovery of a higher proportion of male worms indicate that they are more resistant to the drug. The administration of 1 grain per 100 lb. body weight for each injection brings about a dilution of the drug in the blood to 1 in 48,000. But this concentration will be reduced considerably in a short time, since a greater part of the drug gets quickly eliminated in urine and some quantity in the dung. Besides, a major portion of the balance of the drug is held in the liver and the thyroid. Hence the concentration of the drug in blood is reduced to a considerable extent at the end of 5 hours. The subsequent injections of the drug as per the schedule will either increase slightly or at least maintain the concentration of the drug in the blood so that the exposure of the worms to the drug is prolonged. Thus the intensive method helps to maintain the level of the drug in the blood for a considerable time, which should be lethal to the worms. Faust and Meleney (1924) observed the death of schistosomes in one hour in a solution of 1 in 42,000 Sodium Antimony Tartrate. But in these experiments the dilutions aimed at was 1 in 48,000 only, but the time of exposure of the worms is prolonged though the strength of the drug is less. A few relapses need not be taken seriously as the drug is the most effective agent available at present to treat this malady. The therapeutic dose may not prove toxic as the liver is not damaged in Nasal schistosomiasis.

Conclusion

The results of the experiments on the intensive treatment in Nasal schistosomiasis indicate that Sodium Antimony Tartrate at a total dose of six grains per 100 lb. body weight at the rate of 1 grain per 100 lbs. body weight for each dose injected three times a day on two consecutive days is fairly effective and safe. Reduced dosage did not completely cure the affection and an increase to a total dose of 8 grains or more proved fatal to some of the animals. Out of the seven bullocks treated with a total dose of 6 grains, two showed relapse though all the seven looked apparently cured. The observations on such small numbers of experimental animals may not be sufficient for the generalisation of the results. Hence it is felt desirable to try this therapeutic dose on some more experimental animals and towards that object sanction has been received from the Madras Government for extending the scheme. The results of further investigation will be reported after the trials are completed.

Summary

1. Seven bullocks suffering from Nasal schistosomiasis were treated with a total dose of 6 grains of Sodium Antimony Tartrate per 100 lbs. body weight, the dosage divided into six equal parts and administered as three intravenous injections a day (7 a.m., 12 Noon and 5 p.m.) on two consecutive days. Of them, five were cured (three were discharged as cured, the total elimination of the worms in the other two were confirmed on postmortem), while the other two showed relapse. The above dosage schedule was tried on ten more bullocks for noticing the reactions if any. Out of the total of 17 cases tried, only four animals manifested slight thermal reaction and anorexia for a day or two.
2. Of the two bullocks treated with the same total dose but given in 4 administrations, i.e., 2 injections a day (7 a.m. and 5 p.m.) for 2 days, one was cured and the other had relapse.
3. Two bullocks were treated with a total dose of 7 grains per 100 lbs. body weight, administered in three injections a day for two days. One was cured while the other showed relapse. This dose was tried on three more non-ailing bullocks and all tolerated the dose.
4. Both the bullocks which received a total dose of 5 grains per 100 lbs. body weight at the rate of 2 injections a day for 2 days were not completely cured.
5. One of the two bullocks in each group which received a total dose of 8 grains and 9 grains per 100 lbs. body weight respectively at the rate of three injections a day for two days died of toxicity and the others were cured of the affection. But they also manifested toxic reactions.

6. It is proposed to experiment further upon more number of ailing animals to arrive at definite conclusions.

Acknowledgments

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STUDIES ON THE UTILITY OF VARIOUS BIOLOGICAL STAINS AS SEMEN STAINS

Part II

By

Dr. C. KRISHNA RAO, G.M.V.C., B.V.Sc., M.S.(Calif.), Ph.D.,
Deputy Director of Animal Husbandry (Veterinary),
Andhra Pradesh, Hyderabad-Dn.

In an earlier paper, the author (Rao, 1958) reported the results of an investigation with several biological stains to determine their suitability for stainings semen smears. Previously, results with the stains in the alphabetical series from A to D ranging from acid green to dahlia violet were reported. This is a continuation of the earlier work and results with the stains in the alphabetical series from E to H ranging from eosin to hickson purple are reported in this paper.

Eosin was used very extensively in the past either alone or in combination with other stains for staining semen smears. Erb, Andrews and Hilton (1942), Keaty and Hamblen (1945), Lane-Roberts *et al* (1948) and Rao and Berry (1950) used eosin for staining semen smears. Fuchsin basic is another stain which was employed by a large number of workers with reference to the spermatozoa of various animals. Munro (1936), McKenzie and Berliner (1937), Phillips & Andrews (1937), Sampson & Warren (1939), Lambert and McKenzie (1940), Salisbury, Willett & Seligman (1942), Mercier (1944), and Lane-Roberts *et al* (1948) used various strengths and formulae of basic fuchsin. Gentian violet is yet another stain which was widely used in the past for staining

semen smears. Gelarie (1936), Holbert (1936), Lambert and McKenzie (1940), Frank (1940), Salisbury, Willett and Seligman (1942), Mercier (1944) and Rao & Berry (1950) used gentian violet in different formulae.

Haematoxylin is, perhaps, the single stain which was used most extensively and for staining spermatozoa of both man and practically all species of farm animals. Harris haematoxylin was used by Comstock and Brady (1937), Fetterman (1942) and Hotchkiss (1944). Munro (1936), and Hancock (1952) used Heidenhain's iron haematoxylin, while Mukherjee and Bhattacharya (1949) used Iron haematoxylin and Rao & Berry (1950) used Weigert's iron haematoxylin. Terrill (1937) used Delafield's haematoxylin for ram sperm. Wakely and Kosin (1951) reported better results with Ehrlich's haematoxylin for staining turkey sperm than with Heidenhain's haematoxylin. Cary and Hotchkiss (1935) employed Mayer's acid haemalum while Lane-Roberts *et al* (1948) recommended the use of haematoxylin-eosin for staining semen smears.

Materials and Methods

The techniques adopted in this investigation are the same as already reported in an earlier paper (Rao, 1958). The following four techniques of staining were employed and the abbreviations mentioned against each are employed in presenting the results.

- | | |
|--------------------------------|-------------------|
| 1. Conventional method | — Cv. method. |
| 2. Direct mixing method | — D. M. method. |
| 3. Dipping and blotting method | — D and B method. |
| 4. Ignition method. | — Ig. method. |

Results

Eosin (alcohol soluble) or Ethyl eosin:—1 per cent solution in 90 per cent alcohol gave very good results at 2 to 3 minutes exposure by the Cv. method, the sperm heads taking a light pink colour and the tails a deeper shade. The back-ground also took a light pink colour but did not interfere with the morphological clarity. Exposures beyond 5 minutes are considered wasteful. 1 per cent alcoholic stain also gave excellent results by the D and B methods, results being superior to those obtained with the Cv. method. 1 per cent alcoholic stain gave the best results by the Ig. method. The cytoplasmic cap on most sperm was clearly delineated as a lightly stained structure going all round the acrosome. Preparations obtained by this method were excellent.

Eosin B or Bluish:—10 per cent aqueous solution was found to be superior to the weaker stain and 3 to 5 minutes exposure was necessary to give satisfactory preparations. The sperm heads took a deep red colour while the tails took a lighter shade. Even after 15 minutes

staining the tails stained only light red. Unless smears were stained for 10 to 15 minutes with the 10 per cent solution by the Cv. method, preparations are not satisfactory for morphological study. 3 to 5 per cent stain in isotonic solvent gave satisfactory results by the D. M. method, the background taking a deep red colour against which the sperm morphology was clear. With fresh semen, there was differentiation of sperm into stained and unstained groups, the live sperm remaining unstained. 1 to 2 per cent aqueous stain gave excellent results by the D & B method, the sperm taking a deep pink colour. 1 per cent alcoholic stain gave satisfactory results by the Ig. method.

Eosin Y or Yellowish:—5 per cent aqueous solution gave excellent preparations at $\frac{1}{2}$ to 1 minute, the sperm taking a bright pink colour, the intensity of staining increasing upto 5 minutes exposure. Weaker solutions were unsatisfactory. 1 per cent eosin gave good results by the D. M. method the background taking light pink colour while the dead sperm took a deep pink colour and the live ones remained unstained. 1 per cent aqueous stain gave excellent results by D & B method. 1 per cent alcoholic stain also gave very good results by the Ig. method.

Erythrosin A or Erythrosin Yellowish:—5 per cent aqueous solution gave a deep red staining of sperm at $\frac{1}{2}$ to 1 minute exposure by the Cv. method and longer exposures upto 5 minutes increased the depth of staining. The D.M. method did not prove satisfactory but differentiated sperm in fresh semen into stained and unstained groups. 1 per cent aq. stain gave excellent results by the D & B method and so also 1 per cent alcoholic stain. Ig. method, using 1 per cent alcoholic stain, also gave excellent results, the sperm taking a deep pink colour with remarkable clarity of sperm morphology.

Erythrosin B or Erythrosin Bluish:—1 per cent aq. stain gave excellent results at $\frac{1}{2}$ to $\frac{1}{4}$ minute by the Cv. method, the sperm taking a deep pink colour and their morphology was very clearly delineated against an unstained background. Longer exposures upto 5 minutes increased the depth of staining. 5 to 10 per cent erythrosin gave good preparations by the D.M. method, the background taking a bright pink colour while the sperm in fresh semen were differentiated into stained and unstained groups. With the D & B method, 1 per cent stain gave excellent results and so also 1 per cent alcoholic stain, the sperm taking a deep pink colour. The latter formula also gave excellent results with the Ig. method.

Fast-green F.C.F.:—10 per cent aq. solution gave satisfactory results at 3 to 5 minutes exposure by the Cv. method, the sperm heads taking an intense bluish green colour while the tails stained lighter. Depth of staining increased to about 15 minutes exposure. 2.5 per cent

solution by the D.M. method gave negative staining with live and dead differentiation of sperm in fresh semen. 1 per cent aq. stain gave excellent results by the D & B method and so also 1 per cent alcoholic stain by the Ig. technique.

Fluorescein:—This was not found to be satisfactory as a semen stain. The only method by which satisfactory results could be obtained was by the D and B method using 5 per cent aq. solution, the sperm taking a deep orange colour. D. M. method gave a live and dead differentiation of sperm.

Fuchsin acid:—10 per cent aq. solution at $\frac{1}{2}$ to 1 minute exposure gave the best results by the Cv. method, the sperm taking a deep pink colour, the tails staining lighter than the heads. Washed in water lightly but sufficiently just to remove the excess of stain and immediately blotted dry. Exposures upto 5 minutes increased the depth of staining. 1 per cent acid fuchsin gave very good results by the D. M. method, the background taking a deep pink colour and sperm morphology was quite clear. Sperm in fresh semen were differentiated into stained and unstained groups. 1 per cent aq. stain gave excellent results by the D and B method the sperm staining a deep pink and preparations were pretty. 1 per cent alcoholic stain also gave similar results by the Ig. method.

Fuchsin Basic:—The following formulae of basic fuchsin were tried by the Cv. method.

1. 0.5 to 1 per cent aq. solution of basic fuchsin.
2. 1 to 5 per cent basic fuchsin in 95 per cent ethyl alcohol.
3. Ziehl - Neelsen's carbol fuchsin (Ziehl, 1822).
4. Verhoeff's carbol fuchsin (Verhoeff, 1912).
5. Aniline basic fuchsin (Koch - Ehrlich's) (Mallory, 1938).
6. Aniline basic fuchsin — prepared as follows:

Basic Fuchsin — 1 Gm.	} Aniline water is made by vigorously shaking 2 c.c. of aniline oil with 98 c.c. of distilled water.
Aniline water — 80 c.c.	
Ethyl alcohol — 20 c.c.	

Of the various formulae listed above the carbol formulae gave the best results followed by aniline fuchsin and lastly alcoholic fuchsin. Clearing of smears was essential to avoid intense background staining. Of the carbol formulae, Verhoeff's formula was superior to Ziehl's carbol fuchsin, 10 to 15 seconds exposure giving deep pink staining of sperm with remarkable clarity of morphology, the tails staining deeper than the heads. Exposure beyond one minute is considered wasteful. Both the aniline formulae gave about the same type of results and

excellent results were obtained at 15 to 30 seconds exposure. There is no need to stain beyond one minute but even after 18 minutes exposure there was no danger of overstaining. 1 per cent aq. solution also gave excellent staining at 15 to 30 seconds. There is no need to exceed one minute exposure ordinarily but even after 5 minutes exposure there is no overstaining. 1 per cent alcoholic stain was the weakest, but even this gave excellent results at 15 to 30 seconds staining and no overstaining occurred even after 5 minutes exposure.

With cleared smears all the above formulae gave excellent results by the D & B method, the sperm taking an intense pink colour. However, with the carbol and aniline formulae there was danger of overstaining unless the smears are removed from the stain within a couple of seconds and immediately blotted dry. It is much safer to use 0.5 to 1 per cent aq. stain or 1 per cent alcoholic stain by this method to get the best results. 1 per cent alcoholic fuchsin also gave excellent preparations by the Ig. technique.

Gentian Blue:—This stain was generally unsatisfactory as a semen stain with all the four techniques.

Gentian Violet:—The following formulae of gentian violet were tried by the Cv. method.

1. 0.5 to 3 per cent aq. solution of gentian violet.
2. 0.5 to 5 per cent solution of gentian violet in 95 per cent alcohol.
3. Hucker's gentian violet (Hucker, 1922)
4. Carbol gentian violet (Nicolle, 1895)
5. Aniline gentian violet (Koch-Ehrlich's) (Guyer, 1936)
6. *Aniline gentian violet*:—This stain is made as follows:—

Gentian violet — 1 gm.	} Aniline water is made by vigorously shaking 2 c.c. of aniline oil with 98 c.c. of distilled water.
Aniline water — 80 c.c.	
95 per cent alcohol — 20 c.c.	

7. Ehrlich's aniline gentian violet (Mallory, 1938)
8. Stirlings' aniline gentian violet (Stirling, 1890)
9. Aniline gentian violet (Cowdry, 1948) — Gentian violet was substituted for crystal violet in the formula.

With all the formulae of gentian violet listed above clearing of smears was essential to avoid intense background staining. Of the several formulae tried, the best results were obtained with carbol gentian violet and Hucker's formula followed by the aniline formulae, aqueous and alcoholic stains in descending order of superiority. With the carbol and Hucker's formulae 10 to 15 seconds staining gave excellent results,

the sperm taking a deep reddish violet colour, the tails staining deeper than the heads. While there was no danger of overstaining even after 5 minutes with Hucker's formula, with the carbol formulae exposures beyond one minute may cause overstaining.

All of the aniline formulae gave about the same type of results and excellent preparations were obtained at 15 to 20 seconds exposure. Exposures exceeding one minute may cause overstaining. It is suggested that for the sake of uniformity the aniline formula recommended for crystal violet by the American Society of Bacteriologists (Cowdry, 1948) may be adopted for gentian violet also.

1 per cent aqueous stain and 1 per cent alcoholic stain also gave excellent results at 15 to 30 seconds exposure. With the aqueous stain exposures upto 2 minutes may be used if necessary without danger of overstaining while with the alcoholic formula even at 5 minutes exposure, there was no danger of overstaining.

All formulae gave excellent results by the D and B method but since there is danger of overstaining with the carbol and aniline formulae unless the whole process is completed in a couple of seconds, 1 per cent aqueous or alcoholic stain is recommended for use. 1 per cent alcoholic stain also gave excellent results by the Ig. technique.

Gossypimine.—This stain was generally unsatisfactory but gave excellent results by the D and B method using 1 per cent aq. stain with cleared smears, the sperm taking a reddish saffron colour.

Haematoxylin.—The following formulae of haematoxylin were tried to determine their suitability as semen stains.

A. *Alum haematoxylin formulae*.—

1. Aq. alum haematoxylin (Mallory, 1938).
2. Delafield's alum haematoxylin (Delafield, 1885).
3. Harris alum haematoxylin (Harris, 1900).
4. Ehrlich's acid alum haematoxylin (Ehrlich, 1885).
5. Mayer's acid alum haematoxylin (Mayer, 1881).

B. *Iron Haematoxylin formulae*.—

1. Mallory's iron haematoxylin (Mallory, 1938).
2. Mallory's iron chloride (ferric) Haematoxylin (Mallory, 1900).
3. Weigert's iron haematoxylin (Weigert, 1904).
4. Verhoeff's elastic tissue stain (Verhoeff, 1908).
5. Groat's iron haematoxylin (Groat, 1949).
6. Heidenhain's iron haematoxylin (Heidenhain, 1896).
7. Short's rapid Heidenhain's Stain (Short, 1923).

C. *Other Haematoxylin formulae*.—

1. Mallory's phosphomolybdic acid haematoxylin (Mallory, 1891).
2. Mallory's phosphotungstic acid haematoxylin (Mallory, 1900).
3. 10 per cent haematoxylin in 95 per cent alcohol (ripened solution).
4. 0.5 per cent aqueous haematoxylin (ripened 3 weeks).

Alum haematoxylin formulae.—Harris alum haematoxylin gave the best results of the alum formulae and in fact of all the haematoxylin formulae, it was the most powerful, $\frac{1}{4}$ to 1 minute exposure giving excellent results, the sperm taking a deep bluish violet colour with the tails staining deeper than the heads. Exposure beyond 3 to 5 minutes is wasteful. Ehrlich's acid alum haematoxylin gave the next best results at 3 minutes exposure. Mayer's acid alum haematoxylin also gave satisfactory results at 3 to 5 minutes exposure. Aqueous alum haematoxylin* and Delafield's formula also gave very good results at 3 to 5 minutes exposure. With all these formulae, there was no need to clear the smears.

Iron haematoxylin formulae.—Mallory's iron chloride haematoxylin with 15 to 30 seconds mordanting with 5 per cent ferric chloride followed by 15 to 30 seconds staining gave excellent results, the sperm taking a deep blackish brown colour and the tails staining deeper than the heads while the background remained unstained or only lightly stained. Staining for periods longer than 1 to 2 minutes is wasteful. Weigert's iron haematoxylin also gave excellent results at 2 to 3 minutes exposure, the sperm taking a blackish violet colour. Longer exposures upto 5 minutes increased depth of staining and gave better preparations. Clearing of smears was not necessary. Heidenhain's iron haematoxylin also gave excellent results with 15 to 30 seconds mordanting of smears with 2.5 per cent ferric alum solution followed by $\frac{1}{4}$ to 1 minute staining, the sperm taking a blackish violet colour. Short's rapid method for Heidenhain's haematoxylin also gave excellent results the stain itself being readily available without waiting for long periods of mordanting. $\frac{1}{4}$ to 1 minute exposure is sufficient with this stain. Verhoeff's iron haematoxylin diluted with equal amount of distilled water and filtered 3 or 4 times to remove the stain deposits gave satisfactory results with cleared smears after 1 to 2 minutes staining. Groat's formula while giving satisfactory staining at 3 to 5 minutes did not offer any advantage over the older formulae which are distinctly superior.

C. *Other Haematoxylin formulae*.—Mallory's phosphomolybdic acid formula as well as the phosphotungstic acid formula were unsatis-

factory for sperm staining. Ripened 0.5 per cent aqueous haematoxylin and 10 per cent alcoholic stain were also unsatisfactory.

Haematin:—The following formulae of haematin were used in this study:

1. Mayer's haematin (Mayer, 1891)
2. Mayer's acid haemalum (Mayer, 1891)

Both the above formulae gave about the same type of results but the second formula was slightly superior to the first. 3 to 8 minutes exposure gave excellent preparations, the sperm taking a bluish violet colour. Clearing of smears was not necessary.

Helianthin:—This stain was generally unsatisfactory for staining semen smears. With the D & B method, however using 1 per cent aqueous stain, bright yellow staining of sperm was obtained.

Hickson purple:—This was not generally satisfactory as a semen stain. However, with the conventional method using 10 per cent aq. stain 5 minutes exposure gave satisfactory results the sperm taking a reddish brown colour. 1 per cent aqueous stain gave results superior to the above with the D & B method.

Summary

In continuation of the earlier work, several biological stains starting in an alphabetical order from E to H were studied to determine their suitability as semen stains.

Eosin B, eosin Y, erythrosin A, erythrosin B, fast green F.C.F., fuchsin acid, fuchsin basic, gentian violet and haematoxylin gave excellent results as semen stains.

Fast green F.C.F. gave excellent results as a negative stain. Eosin B, eosin Y and acid fuchsin also gave satisfactory results as negative stains.

Eosin B, eosin Y, erythrosin A, erythrosin B, fluorescein, fuchsin acid and fast green F.C.F., gave live and dead differentiation of sperm by the direct mixing method with fresh bull and buffalo semen.

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THE SOCIAL MISSION OF VETERINARY SCIENCE AND PRACTICE

By

CLIFFORD H. EBY, D.V.M.*

Approximately seven or eight thousand years ago, man became a civilized being. He grouped together in communities and forsook the life of the nomad to embark on a sedentary programme of breeding and rearing livestock and grain for his life's sustenance. Since this dawn of civilization, the veterinarian throughout the ages has practised his art for the benefit of both animal and man. Mankind's debt to this mission is recorded, for all to see, in the pages of history, which is man's ascension to his present situation. As we briefly trace the veterinarian's mission through the ages, let us bear in mind that the mission is not by any means completed and that the opportunities and responsibilities of the future will be even greater than those of the past. It is to the future we must dedicate ourselves, taking the past as a guide.

In the cradle of civilisation, the veterinarian was both priest and healer. The diseases, his meagre pharmacopoeia could not cure, were thrown into the laps of the gods for their ultimate decision of life or death. His world was ruled almost exclusively by myriads of gods, each with a different aspect of life under its control. Thus it may be seen that the ancient veterinarian led a complex life, ever afraid of offending one of the many forces that would bring destruction to the communities and livestock herds, which in turn would spell famine and deprivation for all. As a consequence, his medicine was a mixture of a few simple herbs and chemicals with an overdose of incantation and magic.

Yet with all of this, what we may call ignorance, his mission was then, as it is to-day, to bring hope to those unfortunate ones who had life's sustenance swept away by unseen and uncomprehensible forces. That his mission was adequately accomplished cannot be denied, for written and artifactual records tell the story of his work.

* Department of Clinical Medicine and Surgery, College of Veterinary Medicine, State College of Washington, Pullman, Washington.

The glory of the Roman Empire has been recounted over and over again throughout the ensuing ages. Truly it was one of mankind's greatest political and cultural achievements. And here again in the forefront of civilisation's changing picture, we find the veterinarian contributing fully to these social changes.

The Roman Legions occupied almost the entire world as its extent was then known. Equidae moved both fighting men and their equipment to the edges of this far flung empire. It was again to the veterinarian, that the empire turned, to keep moving this most vital part of war, its men and supplies. The herds that fed the troops, their slaughter and distribution all fell to the understanding guidance of the veterinarian. His practice mission well accomplished helped the Empire rise.

Yet, let us not forget, or be too enraptured by the pomp and splendor of the mighty Legions, that each conquered people had to be fed with products of their own lands. The social mission of the veterinarian was never more courageously exemplified than in his duties here as ambassador, teacher, healer, and humanitarian. To the Roman Empire its peoples were important, their sustenance was of prime import for under famine conditions a country's peoples could offer but little to the glory and expansion of the Empire.

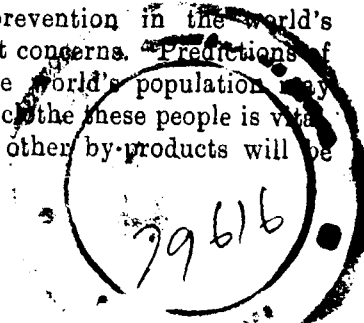
Again in the full bloom of empire building, the veterinarian's social mission was paramount to that undertaking and to its peoples, both conquerors and conquered.

Today the social missions of veterinary science and practice are basically unchanged from those of the past. Science, is now, supreme, yet the basic underlying truths and the basic underlying aspects of the art of veterinary medicine remain unshaken by science and time. In fact, for one who examines the art meticulously, there appears a great strengthening offered by the very science which some had felt would undermine the art. A blending of the art of medicine with the science of medicine has produced a potent tool for each veterinary practitioner to wield for the benefit of mankind.

The gruesome thought of widespread animal plagues decimating the livestock population and forcing great nations and their peoples to sustain the tortures of famine surely concerns each society.

Here quite plainly one aspect of our mission is seen, in both its social and humanitarian lights. Disease prevention in the world's livestock is one of the profession's paramount concerns. Predictions of the United Nations tell us that by 2050, the world's population may reach 15,775,000,000. The need to feed and clothe these people is vital. Vast supplies of edible animal protein and other by-products will be

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needed for this purpose. Realistic disease control programmes and disease eradication programmes are the profession's concern, on operational scales that we today can only contemplate.

A short review of the profession's contributions to the welfare of civilisation seems in order, with an appropriate starting point of approximately one hundred years ago in 1863, when the first International Veterinary Congress was held. To the Britisher, John Gamgee, belongs the credit for its original conception. Yet without the unselfish assistance and mature guidance of many of Europe's outstanding veterinarians, the Congress could not have been accomplished.

Why was the first International Veterinary Congress undertaken? Probably for a number of reasons, yet one stands out above others. It was, the hope that peoples of the world would comprehend their united animal disease problems, and that by the authority of this astute group of well informed men, take action to preserve their wealth in livestock, food, clothing, and personal being. The idea in its original conception was not selfish; it was meant to benefit all mankind. Whether the mission was accomplished is for the world to determine.

Later of course, came the International Office of Epizootics and others. To-day, we have the World Health Organization and other offices of the United Nations. The answer to the above appears to be in the affirmative.

We could tell the story here of innumerable men from many countries of the world; Benesch of Austria, developer of the epidural anesthesia, the simple yet effective method of pain relief for both man and animal that avoids the risks of general anesthesia; Stader of the United States, afforded unfortunate fracture victims the freedom of ambulation while their wounds were healing, fixed by stainless steel pins; Schofield of Canada, who by his work with the anticoagulant, Dicoumarol, added greatly to its usefulness in heart disease; Bang of Denmark, unravelled the riddle of Brucellosis; Ramon of France, "the protector of little children", whose work with diphtheria antitoxin has relieved millions of mothers the endless agony of bedside vigils; and Greig of Scotland, pointed the way to control of parturient paresis. Also there are the thousands of practitioners who daily tend the ill, devising new and better methods of alleviating pain and disease from the world. We have passed over many names and many lands to be sure; yet let no one take offence, for our time is limited.

Another facet of our mission quite obviously is research, research in every direction and in many related fields. Our productiveness has been great, though our numbers and resources are meagre compared to other professions. The value and results of veterinary research, how-

ever, speak for themselves in terms that all can understand if they but take the time to look.

Many pages could be written concerning the three diseases that have come under the attention of veterinary research. These three are Brucellosis, Bovine Tuberculosis, and Rabies. Each ancient in origin, and each plague of both mankind and his animals. Work on these diseases must continue until complete world wide eradication is accomplished. Some countries have done admirable and even spectacular work concerning their eradication; yet for the world in general there is much work that lies ahead.

Closely aligned with research is our public health mission. Here our field is expanding so rapidly it dazzles one's imagination even to contemplate results yet to be achieved. Diseases transmissible between animal and man are important to societies for they not only entail economic loss to all species concerned, but they also jeopardize the potential of mankind itself.

The nations of the world have banded together to organize public health forces. The World Health Organization and many other branches of the United Nations speak eloquently for mankind's interest in public health. The veterinarian is today a leader and a vital part of this world wide disease control and eradication programme.

With the public health aspects of veterinary medicine also comes closer association with other branches of medicine. This, too, is part of our mission, to offer intimate co-operation to every branch of medicine and to expect the same in return.

Doctor H. J. Stafseth of Michigan State University has stated the matter well: "If we are seriously interested in maximum attainments in the field of preventive medicine and public health, the veterinarian must become more firmly aware of his potentialities and responsibilities as a practitioner of preventive medicine and a public health worker, and the physician and the public must fully recognize him as such."

For some members of the profession, no doubt, the inclusion of occupational diseases within the realm of veterinary medicine may be astonishing, yet the need of our profession's knowledge is most vital in this realm. Who better is there to solve the problems of "Wool Sorters' Disease," Ornithosis, Brucellosis, and others? The packing plant employee, the fish butcher, the poultry plant worker, all expose themselves daily to various health hazards; the solution of these problems lies squarely within the scope of veterinary medicine. If we are to look back on the mission of our profession over the ages, that is, the alleviation of mankind's afflictions that concern him and his animals,

surely our course is clear. The need and the challenge are obvious; we must comply.

For our profession to be cognisant of its duties, our mission must include the proper and adequate education of our successors. Veterinary education must be placed on a much broader basis than it now stands on. A tightly technical syllabus yields only trained technicians, not Doctors of Veterinary Medicine. More emphasis must be placed on the humanitarian aspect of our medicine and the pecuniary rewards de-emphasised. An adequate understanding of our profession's heritage and background is needed, not only to instil the ethical aspect but to implant devotion and dedication to our medicine in all its many facets. This, no doubt, is felt to be the duty in far too few schools and teachers in the art. The profession must ever be cognisant of the changing times and guard against obsolete educational programmes.

To overlook mention of our new and awe inspiring "space age" would be unthinkable, yet its potential is still beyond the imagination of the multitudes. What broad unimagined problems the veterinary profession must face and solve in this realm are yet to be ascertained. Suffice to note here, that already veterinarians are working fervently and fruitfully in many lands applying their knowledge and ingenuity to many of the unsolved mysteries that confront mankind. Their help is essential in this work.

As has been noted, the part played by the veterinarian in the past was enormous both in peace and war. Yet this mighty drama fades into insignificance when we pause a moment to consider the future yet to come. Civilisation will place undreamt of opportunities upon broad veterinary shoulders. The world's rapidly expanding population is demanding far more veterinary knowledge.

To prepare for the far greater tasks that lie ahead, veterinary science must see clearly the need for advanced thinking, teaching, research and practice. Society's demands have swiftly changed from the healing aspect of veterinary medicine to the preventive aspect of veterinary medicine. This challenge must be met with all conceivable weapons at our command. Far more emphasis must be placed on the prevention of disease and maintenance of health rather than the cure. The maintenance of hardy, healthy, livestock is our profession's full responsibility. The maintenance of a disease-free animal population, rather than the cure of a disease-riddled population, is the goal we seek.

The 14th International Veterinary Congress held in London in 1949, had for an opening speaker, Lord Boyd-Orr, who on that occasion summed up the facts when he noted, that the science of veterinary medicine was, of all sciences, the one in which advance could be made

without risking any of the issues of advance becoming a danger to mankind, but rather that every advance that could be conceived within it was likely to prove an unalloyed blessing to mankind.

To this end, veterinary science and practice must be completely dedicated if it is to fulfill the social aspects of its mission. The world turns its hopeful eyes towards our profession for an adequate supply of their basic needs. Were we to fail or heedlessly turn from this appeal, we would in fact forsake our social mission in this life. If the medical aspect of veterinary medicine appears to be overemphasised, we must bear in mind that if it were not for the control of contagious diseases, animal husbandry, as we know it today, would be non-existent. Although the veterinarian in the broadest sense is adviser to the livestock industry on many subjects, he is none-the-less, the first line of defence that guards and protects a nation's domesticated animals.

A PRELIMINARY NOTE ON THE INCIDENCE OF MIDDLE CERVICAL GANGLION OF THE SYMPATHETIC NERVOUS SYSTEM OF INDIAN CATTLE

By

A. LAKSHMINARASIMHAN,

Lecturer in Anatomy, Madras Veterinary College.

Introduction

No details about the incidence of middle cervical ganglion of the Sympathetic nervous system of Indian cattle is available in literature. This preliminary note deals with the incidence of Middle cervical ganglion in Indian cattle.

Materials and Methods

The cervical sympathetic system of 16 buffalo calves of 2 years of age and 4 white cattle calves (one 8½ month old foetus, one newborn and two 2 year old calves) used for the dissection and demonstration classes of the II year B. V. Sc., students of the Madras Veterinary College were examined for the presence of middle cervical ganglion. Gross dissections were made and in doubtful cases histological sections of ganglia were made in order to determine their true nature.

The results of these dissections are given in the Table I.

TABLE I

S. No.	Date	Animal and its age	Side	Middle cervical ganglion	Inferior cervical ganglion	Stellate ganglion	1st Thoracic ganglion	Nervus Transversarius	Ansa Subclavia
1	14- 9-57	Buffalo calf-2 yrs.	Left	—	+	—	+	From Inferior cervical	—
2	28- 9-57	Ox-calf 2 yrs.	Right	—	—	+	—	From Stellate	—
3	7-11-57	Buffalo calf-2 yrs.	Left	+	—	+	—	do.	+
4	8-11-57	do.	Right	+	—	+	—	do.	+
5	20-11-57	do.	Left	+	—	+	—	do.	+
6	do.	do.	Right	—	—	+	—	do.	—
7	do.	do.	Left	—	—	+	—	do.	—
8	do.	do.	Right	—	—	+	—	do.	—
9	1- 1-58	Ox-Newborn	Left	—	—	+	—	From Inferior cervical	—
10	12- 2-58	Buffalo calf-2 yrs.	Right	+	—	+	—	From Stellate	+
11	do.	do.	Left	—	+	—	+	do.	+
12	do.	do.	Right	—	—	+	—	From Inferior cervical	—
13	do.	do.	Left	—	—	+	—	From Stellate	+
14	do.	Buffalo calf-2 yrs.	Right	—	—	+	—	do.	—
15	14- 2-58	Ox-Foetus 8½ months	Left	+	—	+	—	do.	+
16	19- 2-58	Buffalo calf-2 yrs.	Right	+	+	—	+	do.	+
17	20- 2-58	do.	Left	—	—	+	—	From Inferior cervical	—
18	do.	Ox-calf-2 yrs.	Right	—	—	+	—	From Stellate	—
19	do.	Buffalo calf-2 yrs.	Left	+	—	+	—	do.	+
20	do.	do.	Right	—	—	+	—	do.	—
			Left	+	—	+	—	do.	+
			Right	—	—	+	—	do.	—

Note: + indicates presence and— the absence of the relevant ganglion.

Discussion

A short summary of the middle cervical ganglion and its connections to the sympathetic system of Man is given below:

According to Mitchell "this ganglion is small and inconstant and cannot be recognised as a distinct entity in 20—25% of the subjects although in such cases several minute nodules usually exist in the sympathetic trunk above, below or at the same level as that normally occupied by the middle cervical ganglion. The trunk between the superior and middle ganglia is more often single than double, but below the ganglion, the trunk is seldom or never single. In the simplest arrangement there are two unequal cords; the antero-medial one forms a loop—the "ansa subclavia" of Vieussens which encircles the subclavian artery; the postero-lateral cord often splits to enclose the vertebral artery before passing to the inferior cervical ganglion".

Sisson does not give a detailed description of the incidence of the middle cervical ganglion or its connections to the sympathetic trunk and cervical spinal nerves in domestic animals. Sisson just mentions that in the horse, "in some cases there exists a more or less distinct middle cervical ganglion which receives filaments from Vagus and is connected to the posterior cervical ganglion by a trunk. It occurs oftenest on the right side and gives off one or two cardiac nerves.

In the present study the observations are confined only to the presence of middle cervical ganglion in cattle. The communicating, visceral, vascular, osseous, muscular and articular branches of this ganglion have not been studied since the materials have been handled by students for dissection.

Two important factors are taken into consideration to say definitely that the ganglion dissected is middle cervical ganglion and these are:

1. The presence of Ansa subclavia and
2. The origin of nervus transversarius. The nervus transversarius commonly arises from either the inferior cervical ganglion when it exists separately or from Stellate ganglion. Gross dissections alone were enough in most cases to decide the presence of middle cervical ganglion and wherever doubts occurred regarding the nature of the ganglionic enlargements on the course of the cervical sympathetic trunk between the superior and inferior (or Stellate) ganglia, microscopical examination of sections of such ganglionic masses was resorted to, to establish the true nature of these

ganglia. The commonest arrangement of the middle cervical ganglion whenever it occurred is diagrammatically represented below (Fig. I.)

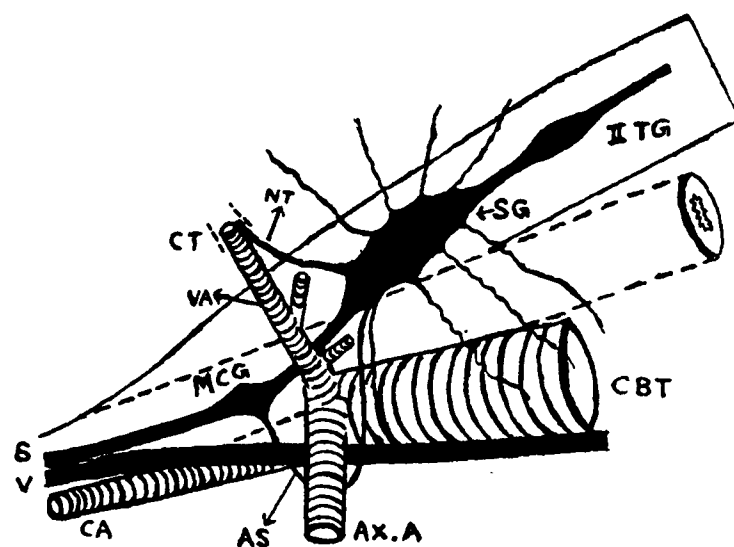


FIG. I.

EXPLANATION TO FIG. I

Middle cervical ganglion, Ansa subclavia and nervus transversarius of the left side.

LIST OF ABBREVIATIONS USED IN FIG. I

S	—	cervical sympathetic trunk.
V	—	vagus.
CA	—	carotid artery.
MCG	—	middle cervical ganglion.
CT	—	canalis transversarius.
VA	—	vertebral artery.
NT	—	nervus transversarius.
AS	—	ansa subclavia.
AxA	—	axillary artery.
SG	—	stellate ganglion.
II TG	—	II thoracic ganglion.
CBT	—	common Brachio-cephalic trunk.
The interrupted line ----- indicates oesophagus and the continuous line the Longus colli muscle.		

Results

Altogether 20 calves were dissected and examined to determine the incidence of middle cervical ganglion. From the results tabulated in Table I it is seen that 15 calves out of 20 possessed a middle cervical

ganglion. Of these 15 calves, 8 showed the ganglion on the left side only while 2 showed it on the right side only.

In all cases where middle cervical ganglion was present, it was seen that the trunk between middle and inferior (or Stellate) ganglia was always double; a superior, consisting of majority of fibres passes above the Axillary artery over the fascia on the oesophagus on the left side or the trachea on the right side, medial to the Vertebral artery near its origin from the common trunk of the axillary artery and joins the inferior (or Stellate) ganglion; an inferior — the ansa subclavia which loops around the axillary artery, passes over the common Brachio-cephalic trunk on the left side or the Brachiocephalic artery on the right side and joins the inferior (or Stellate) ganglion. In two cases where inferior cervical ganglion was present, the superior trunk was thicker and shorter. In these cases the inferior cervical ganglion was immediately in front of the Vertebral artery near its origin from the common trunk of the Axillary artery.

Summary

1. The middle cervical ganglion of the sympathetic system of Indian cattle as a distinct entity was present in 75% of the subjects dissected. It was present more commonly on the left side alone (in 53%). In 13% of subjects it was present on the right side alone.

2. Ansa subclavia always connects the middle to the inferior (or Stellate) ganglion.

3. Nervus transversarius commonly arises from the inferior (or Stellate) ganglion.

Acknowledgement

My grateful thanks are due to Dr. D. Mariappa, Professor of Anatomy, Madras Veterinary College, for guidance and a critical review of this note.

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COMMON PARASITES OF PIGS IN DELHI

By

SOHAN SINGH, B.V.Sc.,

Parasitology Section, The Punjab College of Veterinary Science and A. H. Hissar.

In India pigs harbour a large number of helminth parasites. Recently work on infectivity, intensity and pathogenesis of parasites of pigs has been done in Madras by Alwar (1958), who recorded different helminth parasites in a study based on examination of carcasses of 50 adult pigs and 15 piglets upto three months of age. The two common parasites of pigs i.e., *Ascaris lumbricoides* and *Macracanthorhynchus hirudinaceus* were not found in any of the carcasses examined by him.

The present work was undertaken to study the incidence and intensity of *A. lumbricoides* and *M. hirudinaceus* in pigs. The study was confined to examination of alimentary tracts of pigs slaughtered at the Pig slaughter house Delhi. Intestines of 30 pigs all above the age of one year were examined and the incidence and intensity of the above parasites was studied.

Results of examination

Out of the 30 intestines examined *A. lumbricoides* were found in 15 and *M. hirudinaceus* in nine.

The detail is as under:—

Pig No.	<i>M. hirudinaceus</i> .		<i>A. lumbricoides</i>		Remarks.
	Male.	Female.	Male.	Female.	
1	...	2	2	4	...
2	...	1	1	1	...
3	...	1	...	1	...
4	...	...	1	...	...
5	...	...	...	1	...
6	1	1	1	1	...
7	...	1	...	2	...
8	...	...	1	...	...
9	...	...	...	1	...
10	2	7	1	1	Six of the <i>M. hirudinaceus</i> worms had perforated the intestine within 1/2 an hour of the removal of the bowel from the carcase and were protruding outside the intestinal wall.

OSTEOSARCOMA IN A BULL

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11	...	1	3	5	...
12	...	...	1	3	...
13	...	...	...	5	...
14	...	...	1	...	...
15	1	2	1	3	...
16	...	1	...	...	...

This study reveals that the incidence of these two parasites is fairly common in pigs at Delhi and also shows, that *Ascaris lumbricoides* is found frequently in pigs even above one year of age although these worms infect mostly piglets.

Summary

An examination of 30 intestines of pigs slaughtered at the Delhi pig slaughter house showed *Ascaris lumbricoides* infection in 15 and *M. hirudinaceus* in 9.

Acknowledgments

The author is thankful to Shri P. N. Nanda, M.R.C.V.S., Principal, The Punjab College of Veterinary Science and A. H. Hissar for permission to undertake this study at Delhi and to publish the article. Thanks are also due to Shri Karm Chand, Professor of Parasitology, for encouragement and guidance.

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Clinical Article

OSTEOSARCOMA IN A BULL

By

B. S. RAJYA, B.Sc., B.V.Sc., & A.H., M.V.Sc.,

Department of Pathology and Bacteriology, U.P. College of Veterinary Science and Animal Husbandry, Mathura.

Tumours of bone have been described previously in cattle, horses, dogs and other domestic animals. Not too infrequently there occurs on the end of one of the long bones of human limbs a tumour of very bizarre microscopic structure. A tumour occurring on the gums with similar histological picture has been termed as "Epulis." These Epulides have been reported occasionally in dogs and horses by several authors (Smith and Jones (1957) and Davies (1955). It appears from the literature that record of the occurrence of Epulis in Cattle is

rather rare. This communication primarily reports on the gross and histopathology of the osteosarcoma (Epulis) of the Bull occurring at the body of the lower jaw.

History of the case

An adult Bull belonging to Sri Kedar Nath Chaturvedi, Kishori Raman Trust, Chowk Bazar, Mathura was brought to the Kothari Pashu Chikitsalaya on 11-7-58 for treatment of an outgrowth on the lower lip (Fig. 1). The biopsy material received on 12-7-58 was examined in the Pathology Department of the U.P. College of Veterinary Science and Animal Husbandry, Mathura. Sections of the material on histopathological examination revealed it to be an osteosarcoma. The animal was then kept under observation, and it died on 8-9-58.

Gross Pathology

The general condition of the animal was extremely emaciated, but there were no significant pathological lesions in any of the organs. Moreover there were no significant changes which could be suspected for the metastatic lesions of this neoplasm in any other organ. The external surface of the tumour was covered with a suppurative necrotic mass, and the growth measured 8" x 7" in transverse and longitudinal directions. The incisors were pushed aside towards the postero-lateral border on the left half. On sectioning the two halves of the mandible, the symphysis exhibited a fibrous growth intermingled with bony trabeculae extending up to two-thirds of the body.

Histopathology

The tumour consisted of bony trabeculae of variable size being embedded in a spindle cell sarcomatous tissue. Considerable irregularities were observed in the size, shape, nuclear structure of the bony element which appeared to be most disorderly. The spindle cell ground work was supported by a variable quantity of fibrillary matrix. The core of some of the spicules was basophilic owing to calcification, whereas at many places the periphery was acidophilic and was yet to be calcified. At places around the periphery of the trabeculae a few osteoclasts were also visible (Fig. 2). No microscopic lesions could be seen in other organs.

Acknowledgments

The author is greatly indebted to Sri C. V. G. Choudary, B.Sc., M.R.C.V.S., Principal, U.P. College of Veterinary Science and Animal Husbandry, Mathura, for his keen interest in the case and supplying the facilities with the material to the Pathology and Bacteriology Department. He is also grateful to Dr. C. M. Singh, M.Sc., Ph.D., Professor of Pathology and Bacteriology, for his guidance in the histopathological studies.

Osteosarcoma in a Bull

BY

E. S. RAJYA



Fig. 1
Head of the bull showing Osteosarcoma.

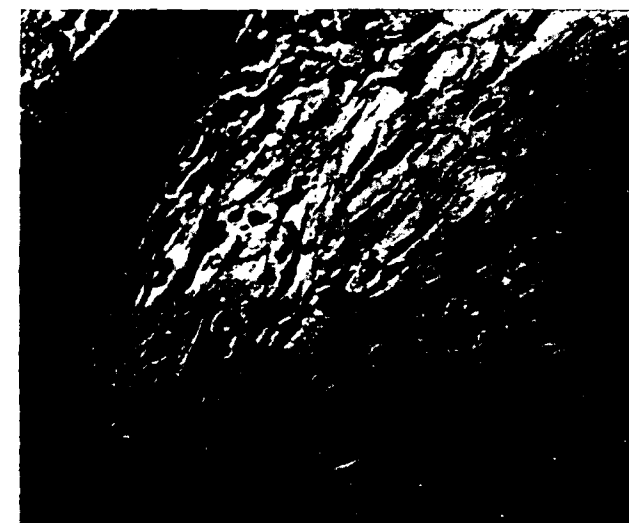


Fig. 2
Microphotograph showing spindle shape fibroblast and fibrillary matrix. 4400x.

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Abstracts

Characterization of Pleuropneumonia-like Organisms of Avian Origin.—

By RICHARD YAMAMOTO AND HENRY E. ADLER.—*The Journal of Infectious Diseases*, Vol. 102, No. 2, March—April, 1958.

Recent studies have shown that various antigenic and pathogenic types of pleuropneumonia-like organisms (PPLO) are present in poultry tissues. The present study involved antigenic analyses of various strains of PPLO and determination of their comparative pathogenicity for chickens and turkeys. The response of two-day-old chickens to PPLO inoculation varied greatly with the strain used and the route of inoculation. The virulence of the strains was graded by lesions produced,—from highly pathogenic to apparently avirulent. Nervous signs, joint lesions, and air-sac lesions were among the signs produced by pathogenic strains. Four distinct antigenic types were detected by a cross agglutination test with the sera of rabbits hyperimmunized with the various strains. A comparison of the serological data with the pathogenicity studies indicated that, with one possible exception, all the pathogenic strains were antigenically related. Intraocular inoculation was used to detect differences in strains as to pathogenicity.

A. MUKERJI.

Causes of Mortality in Chickens upto ten days old.—By P. S. WATTS AND R. RAO.—*The British Veterinary Journal*, Vol. 114, No. 10, October, 1958.

A large proportion of the eggs set in any hatchery are not fertile, fail to hatch or the chickens, if hatched, die within a few days. The causes are diverse. As the relative importance of different diseases in South Australia was not known, a hatchery was chosen which drew its eggs only from Government tested accredited Pullorum free flocks. Every chick which died was examined post-mortem. All deaths occurring during the first 10 days of life in 20,746 day-old chickens, hatched and maintained under identical conditions, were investigated and the cause ascertained. The greatest single factor was Omphalitis (48.7%) followed by unabsorbed yolk sac (30.7%), Minor causes of death were

THEY GO ABROAD



SHRI R. VIJAYARANGAM
Sheep and Goat Development Officer, Madras,
who has proceeded to Australia
for training in Advanced Sheep Husbandry.



Shri B. PANDA, B.Sc. (Vet.) (Hons.),
Orissa Veterinary College, Cuttack,
who has proceeded to U.S.A. for
Post-graduate studies in Animal Physiology.



Shri K. G. NAMBIAR, B.V.Sc.,
Kerala Veterinary College, Mannuthy,
who has proceeded to U.S.A. for
Post-graduate studies in Animal Genetics.

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Causes of Mortality in Chickens upto ten days old.—By P. S. WATTS AND R. RAO.—*The British Veterinary Journal*, Vol. 114, No. 10, October, 1958.

A large proportion of the eggs set in any hatchery are not fertile, fail to hatch or the chickens, if hatched, die within a few days. The causes are diverse. As the relative importance of different diseases in South Australia was not known, a hatchery was chosen which drew its eggs only from Government tested accredited Pullorum free flocks. Every chick which died was examined post-mortem. All deaths occurring during the first 10 days of life in 20,746 day-old chickens, hatched and maintained under identical conditions, were investigated and the cause ascertained. The greatest single factor was Omphalitis (48.7%) followed by unabsorbed yolk sac (30.7%), Minor causes of death were

and ambition that is going to develop it. All the members of the staff are quite young and fully equipped for the task ahead of them. As for the students, one cannot expect a better lot anywhere else in India. They have a high tradition to maintain. Kerala is famous for its intelligensia. We wish the College all success in its new premises!

The Haffkine Institute, Bombay.—The Diamond Jubilee celebrations of this famous Institute, one of the oldest and foremost medical research centres in the East, was inaugurated by President Rajendra Prasad on January 10. About forty scientists of international eminence representing important medical research Institutes in the world attended and participated along with their Indian counterparts in six symposia on different aspects of medical research.

Research:—Dr. A. L. Mudaliar, Vice-Chancellor of the University of Madras, speaking at the 13th State Medical Conference at Madras, said, "That any centre of post-graduate medical education could thrive only to the extent to which the members were fully endowed with the spirit of unceasing loyalty to the cause of medicine and unfailing adherence to scientific principles at all costs". He added "There were many fields of research where no doubt specialised facilities were necessary; but there were many fields, where the God-given gifts of observation and inference might go a long way to highlight a new discovery and its potentialities. He hoped that no one would be of the impression that research was something far from his ken and that some specialised knowledge and specialised methods had to be evolved to become a research worker". Dr. A. L. Mudaliar is not a person who ever indulges in empty platitudes. Let the members of our profession ever remember his advice.

The soil and the spirit:—A member of Marshal Tito's party said after seeing the sculptural grandeur of Mahabalipuram, near Madras "People from Europe and Western countries visiting this part of India appreciate how old the culture is and the high level it had reached in this part of India so early.....We can better understand the soil and the spirit of the Indian people as also the modern culture of the Indians based on the traditions of the past". That is just what we say, every nation has a pattern of its own in culture, character and civilisation.

Marshal Tito has made it even more explicit at the University of Bandung in Indonesia. "We must above all start from the fact that in the world to-day there are States with different social systems, with different levels of economic development, with different forms of political organisation and with opposing ideological views. These differences are the result of historical development and different conditions of social development. What will be the future social development in individual countries is the internal affair of every single country".

Carbon copy:—The Marshal added "nothing is gained by insisting that one should be the carbon copy of the other". How true! We add that not only nothing is gained but everything is lost by following such a process of unnatural copying.

A new drug:—A message from New Haven (Connecticut) dated 29th December 1958 states "The Yale University Medical School announced to-day that dogs had been "redeemed" from a state of pregnancy — without abortion or perceptible ill-effect — through the administration of a new drug. The drug discovered by Dr. Ivan Parfentger, a former Yale Microbiologist and known as *Malucidin* was injected into the animals and the embryo was gradually re-absorbed into the bloodstream." Another addition to the armoury of birth-control!

Processing of wool:—"The Vinnamangalam Wool (drugget) processing centre, a Rs. 15 lakh joint venture of Mysore and Madras States, is expected to start functioning from April or May next. The centre, when completed, would process about 18 lakh pounds of wool a year for distribution to the drugget manufacturers in Mysore and Madras". Let us hope it will materialise soon and not remain in the realm of mere wool-gathering.

IMPORTANT NOTICE

It is notified for the information of the subscribers that the dates of despatch of the *Indian Veterinary Journal* have been changed over to 20th and 21st of every month commencing with the March 1959 issue. They should therefore expect the journal in the last week of every month instead of in the first week. This was found necessary to tide over certain difficulties experienced.

MADRAS, }
31st January 1959. }

EDITOR,
The Indian Veterinary Journal.

THE INTERIM INDIAN VETERINARY COUNCIL

Extract from the Proceedings of the Third Meeting held at Bangalore on the 5th and 6th November 1958.

Report of the Secretary

The second meeting of the Interim Indian Veterinary Council, as members are aware, was held in New Delhi on the 30th and 31st December, 1957. At that meeting decisions were taken and recommendations were made on a number of matters. The proceedings of the meeting were supplied to the members on the 23rd January 1958. They would now be interested to know the progress made since the last meeting and the present position with regard to these matters most of which are dealt with at length in the notes on the items of the agenda of the present meeting.

Model bill and model rules and regulations for State Veterinary Councils

An important recommendation made by the Council at its last meeting, obviously to facilitate expeditious constitution of State Veterinary Councils and to secure as much uniformity of procedure, etc., as possible, was (i) that the Executive Committee should examine the Acts/Bills, enacted or proposed for the establishment of Statutory Veterinary Councils in the States and the rules and regulations already framed or proposed for their operation, and (ii) that the Executive Committee should prepare a model bill as well as a set of model rules and regulations for adoption in all the States. The Executive Committee accordingly met in Calcutta in July 1958 and considered the Acts already passed in the States of Uttar Pradesh, Bombay and Madras and the rules and regulations framed thereunder in the first two States, along with the draft Bills which had been prepared for the proposed Acts in the States of Bihar, Madhya Pradesh and West Bengal. To this special meeting of the Executive Committee were invited the Directors of Animal Husbandry and Veterinary Services of the States concerned, most of whom participated either in person or were represented by their nominees and the various provisions of their Acts, rules etc., were explained to the Executive Committee. The Executive Committee considered item by item the U. P. Act and the rules and regulations framed thereunder as well as the variations made or proposed in the other States, suggested suitable modifications and desired that the Secretariat of the Council should draft the required model Act and the model rules and regulations in the light of the various points that arose during the discussions, and were made note of, at the Calcutta meeting. The model Act and the model rules and regulations drafted by the Secretariat of the Interim Indian Veterinary Council have now

been placed before the Council and will come up for consideration under item 4 of the agenda. After these have been considered and approved by the Council, they will be forwarded to all the State Governments for adoption.

Rules and Regulations for the I.I.V.C.

The Council at its second meeting had also considered and approved the rules and regulations which had been drafted for the day-to-day working of the Interim Indian Veterinary Council. These were submitted subsequently to the Government of India who have examined them and observed that, since it had not yet become a statutory body, it would not be possible for the Interim Council to enforce many of the provisions made in the rules and regulations especially those pertaining to registration. Accordingly, the Government of India have advised that for the present I.I.V.C. may carry on its functions in the manner indicated in the Resolution notifying the establishment of the Council and that the question of prescribing statutory rules and regulations should be taken up only when the National Veterinary Council, with statutory powers, is set up.

Membership of the International Veterinary Congress

The question of India's becoming a member of the International Veterinary Congress was discussed at the first meeting of the Council. It was considered desirable that India should become a member of the International Veterinary Congress, but it was suggested that in the first instance the financial and other implications of the proposal might be ascertained and decision taken in the light of the information obtained. According to the rules of the International Veterinary Congress, every member-country has to subscribe annually to the Congress on the basis of one English shilling per veterinarian member of the country's national association. On this basis the annual subscription due from India at present would amount to about 5,000 shillings. This was confirmed by the General Secretary of the International Veterinary Congress; but it was subsequently explained to him that the only organisation which at the moment could be regarded as truly representative of the country as a whole was the Interim Indian Veterinary Council, the membership of which was then limited to 46. On this basis, the annual subscription due from India was 46 shillings, which the Government of India agreed to contribute. This contention, however, was not accepted finally by the International Veterinary Congress and, in view of the need for economy, the Government of India have decided that the question of India's becoming a member of the Permanent Committee of the International Veterinary Congress should be taken up after the statutory Indian Veterinary Council is set up.

Award of emergency diplomas to two year course trainees

While discussing the question of registration of Veterinary Practitioners at its first meeting the Council had desired that the trainees undergoing the two-year emergency course should be given only certificates, not diplomas, and that they should not be considered eligible for registration as Veterinary Practitioners. This matter was further examined, first by the Executive Committee and later by the I.I.V.C. at its second meeting in the light of the representations received from the State Governments as well as the trainees and of the recommendations made by the Government of India; and it was finally decided that diplomas may be awarded to these trainees provided they were worded so as to distinguish them from the regular veterinary diplomas, but that the trainees should not be allowed registration as Veterinary Practitioners. Most of the State Governments concerned have since agreed to word their diplomas in some such manner as suggested by the Council. The Government of West Bengal, however, have decided to award, without any distinguishing features, the same diploma as awarded formerly in the State to students successfully completing the three-year diploma course.

Changes in the composition of the Executive Committee

The Council had recommended at its second meeting that the strength of the Executive Committee should be increased from five members to six members by providing one additional seat for a non-official member representing the veterinary journalism, retired veterinary officers and private practitioners. This recommendation has since been accepted by the Government of India and the membership of the Executive Committee has been revised accordingly, *vide* Resolution attached with the Secretariat notes on items No. 8 and 9 of the agenda. With the retirement of Dr. S. Datta, a representative of the Government of West Bengal, a vacancy has occurred on the Executive Committee which is also to be filled by election from among the States' official representatives.

Meetings of the Executive Committee

Since the second meeting of the Council, the Executive Committee has met only twice to hold its 5th and 6th meetings. The proceedings of these two meetings have been placed before the Council under item No. 3.

Enlargement of the scope of membership of the I.I.V.C.

The Council, at its second meeting, had further recommended that the Government of India should be moved to increase the number of members under category III from 2 to 3 in order to afford adequate representation to private veterinary practitioners, retired veterinary officials, veterinary journalists etc. This recommendation was carefully

considered by the Government of India, who have not agreed to accept it for the present, as it would involve additional expenditure.

Short-term courses in management etc. of Zoo animals

The Council, while considering at its last meeting the recommendations relating to veterinary education made by the Food and Agricultural Organisation Seminar held at Bombay in September 1955, had recommended that the State Governments of Madras, Bombay and West Bengal might consider the feasibility of instituting at their Veterinary Colleges, in collaboration with the Zoo authorities short-term courses in management etc., of the Zoo animals. Members will be pleased to know that this recommendation has been accepted by the Government of India and the State Governments concerned have been requested to do the needful.

Uniformity in the designation and scales of pay of Veterinary Officers

While discussing the question of scales of pay and designations for the two-year course trainees, the Executive Committee, at its third meeting held at Coimbatore in May 1957, had desired that information about the designations, scales of pay etc., of the different categories of posts in the Animal Husbandry Departments in the various states should first be collected and placed before the Committee to enable it to consider the desirability of making suitable recommendations for achieving some sort of uniformity in the matter. Accordingly, the required information was collected from the State Directors but it has been found that it will not be possible to bring about uniformity in the scales of pay etc. as these are governed primarily by local conditions, which vary from State to State.

Veterinary qualifications required by Turf Clubs

The Council at its second meeting had recommended *inter alia* that the question of qualifications for issuing veterinary certificates required by Turf Clubs in India should be thoroughly examined by the Executive Committee and that necessary steps should be taken for the removal of any discrimination against members holding Indian qualifications. The action taken on this recommendation and the present position are fully described in the Secretariat note on item No. 6 of the agenda. In the light of the position explained therein it is now for the Council to suggest further action, if any, in regard to this matter.

Nomination of Veterinarians on Rajya Sabha and State Legislative Councils

Another recommendation made by the Council at its second meeting was that one seat should be provided in the Rajya Sabha and one seat in the Legislature of each State in consultation with I.I.V.C. and the State Veterinary Councils or Associations, respectively. Information in regard to the action taken on this recommendation has been furnished in the Secretariat note on item No. 7 of the agenda. The

Council may now suggest the name of a suitable person for consideration by the Government of India for nomination to the Rajya Sabha.

Veterinary Education

At the last meeting of the Council, the members were informed of the various steps that the Government of India had taken in recent years towards the improvement of Veterinary education and increasing the annual output of veterinary graduates. They were also informed about the steps that had been taken to secure some sort of uniformity in the curriculum and syllabuses for the veterinary degree courses of the different Universities. They would be now glad to know that the model curriculum as well as the model syllabuses for the different subjects were finalised and supplied to the Universities, the Veterinary Colleges and State Directors concerned. From the comments received, it appears that, generally speaking, the Universities etc., have agreed to adopt the model curriculum and the model syllabuses with only comparatively minor deviations in some cases.

Since the last meeting of the Council, two more Veterinary Colleges have been set up, one in Bangalore in Mysore State and the other at Nagpur in Bombay State. Thus, there are today 16 Veterinary Colleges in the country, each State having at least one veterinary college, and Madhya Pradesh and Andhra Pradesh having two veterinary colleges each.

Members are aware of the proposal for establishing a regular post-graduate college at the I.V.R.I., Izatnagar, and raising 4 of the Veterinary Colleges in the States to the post-graduate level. A post-graduate college has already started functioning at the Indian Veterinary Research Institute and the Veterinary Colleges at Mathura and Madras have been raised to the post-graduate level. The post-graduate college at I.V.R.I., like the one at Mathura, is affiliated to the Agra University. This scheme provides for the admission annually of 60 students at the I.V.R.I. and 40 in each of the Veterinary Colleges, though this year the total number of students admitted at these three centres was about 60. There have been certain difficulties experienced by candidates graduating from other Veterinary Colleges seeking admission to the post-graduate courses at these colleges inasmuch as the affiliating Universities of the latter have not yet recognised all the Veterinary degrees in the country as making their holders eligible for admission to their post-graduate classes. This matter is coming up before the Council for discussion under item No. 10 of the agenda.

In 1959-60, it is proposed to similarly raise to the post-graduate level the veterinary colleges of Patna and Bombay. We are hoping that ultimately each one of the Veterinary Colleges in the country would be suitably strengthened and equipped so as to provide adequate post-graduate training facilities and it is likely that some more Veterinary

Colleges would be raised to the post-graduate level during the third plan period. This is expected not only to provide adequate facilities for higher Veterinary training within the country but also to improve the standard of teaching for the basic Veterinary degree courses.

Another step which the Government of India have taken in recent years, to effect improvement in teaching, is to improve the efficiency of the teachers by holding refresher seminars in selected subjects. During the summer vacation of 1957, refresher seminars were held in Bacteriology at the I.V.R.I., Mukteswar and Anatomy and Surgery at the Bengal Veterinary College, Calcutta. Similarly, during the summer vacation of 1958, a refresher seminar in Pharmacology was held at the Central Drug Research Institute, Lucknow. Arrangements are now being made for holding a similar seminar in Animal Nutrition at the I.V.R.I. in 1959 and in Animal Genetics in 1960.

The importance of training Veterinary as well as Agricultural workers in extension methods has been emphasised time and again. A suitable scheme has been prepared for attaching regular extension wings to our Veterinary colleges, and it has been supplied to the State Governments for necessary action.

Members are aware of the arrangements that have been made with some of the American Universities and land-grant colleges for obtaining equipment, books and services of experts from America and for deputing Indian teachers for training in that country. Already considerable advantage has been taken of these programmes as well as the facilities available under other technical assistance programmes, such as those of the F.A.O., Colombo Plan, etc. In the special course of training in Animal Gynaecology and Obstetrics held at the Veterinary College in Stockholm, a batch of 9 Indian officers was trained in the first course and another batch of 5 in the second course. All these officers have since returned to India and most of them have taken up positions in the Veterinary Colleges for teaching Animal Gynaecology and Obstetrics and for conducting research according to a coordination scheme.

Indian Council of Agricultural Education

The third meeting of the Indian Council of Agricultural Education was held in Bangalore in August 1958. Many of the items on the agenda of this meeting were of direct or indirect concern to those interested in Veterinary education, and the Interim Indian Veterinary Council would have been specially interested in the decisions taken by the sister council on the various matters. Copies of the proceedings of that meeting are, however, not yet available, otherwise they would have been supplied to the members, as on the last occasion.

Association News

The All-India Veterinary Association

THE RESERVE FUND

An event of great importance to the Veterinary profession in India, took place in August 1924. It was the birth of the *Indian Veterinary Journal*. Circumstances were positively hostile and yet the profession took that bold step and the lion-heartedness of the early pioneers cannot be too highly praised. Ever since then, the *I.V.J.* has toiled hard under very adverse circumstances. The *I.V.J.* lives to-day so that the profession could prosper and science advance.

And now the hat is sent round so as to place this journalistic venture on a sounder and firmer basis. The *I.V.J.* is a priceless possession of our profession. It has placed the Indian Veterinary Surgeon, on the map of the scientific world. Just pause and ponder over, how much we owe to the Journal both individually and collectively. Is it too much then to expect the profession to respond to the appeal issued for a Reserve Fund? We hope not.

Some enquiries have come to us asking us to indicate the extent of help expected. We do not want to put the members of the profession to any undue financial strain in these hard days. At the same time, a certain amount of sacrifice is needed to make this fund a great success, so as to make it worthy of our profession. So we feel that the following scale of contribution will be quite reasonable. It could even be paid in two or three instalments.

Class I Officers	...	Rs. 100/- and above.
Class II Officers	...	Rs. 50/- and above.
All others	...	Rs. 25/- and above.

It is our ambition that no Veterinary Surgeon in this land should remain without contributing to this fund. Brick by brick, this great edifice of our's should begin to rise higher and higher. On the success or otherwise of this venture, the solidarity of our profession depends. "Pay and Prosper" is the slogan we pass on to the members of our profession.

Jai Hind!

T. VINAYAKA MUDALIAR,
Editor, *The Indian Veterinary Journal*.

THE I. V. J. RESERVE FUND

LIST OF CONTRIBUTORS

	Rs. nP.
Amount acknowledged in January 1959 issue	3,470-81
Dr. Raghunath Kohli, Vety. College, Bikaner, 1st. instal.	5-00
" V. K. Madhava Menon, Retd. Director, Anim. Husb. Trichur	25-00
" K. J. Simon, Vety. College, Mannuthy, Trichur	25-00
" M. Kandaswamy, Tg. V. A. S., Sankarankoil, Madras	5-00
" C. V. Subramaniam, Sarawak, (Malaya), 1st. instal.	25-00
" B. D. Desai, V. O. Dakor, Bombay State	10-00
" Digbijoy Lahiri, Mahishadal, W. Bengal	5-00
" L. B. Padaki, V. I., Hosadurga, Mysore, 1st. instal.	10-00
" K. S. Naik, Saundatti, Belgaum Dt., Mysore	10-00
" M. H. Navlur, Kalghatgi, Dharwar Dt.	10-00
Veterinary Officers, Belgaum district (Details later)	75-00
Dr. R. G. Shrikande-Rahatgarh (Sagar Dt.)	3-00
Total	3,678-81

Cheques, money orders and all correspondence should be addressed to the Editor, *The Indian Veterinary Journal*, Madras-17.

WEST BENGAL VETERINARY ASSOCIATION, CALCUTTA

Proceedings of the meeting of the Executive Committee, held on 3rd January 1959 under the Presidentship of Dr. S. L. Sen.

The first meeting of the Executive Committee of the Association for the year 1959 was held on 3-1-1959 at 5 p.m. at the registered office of the Association. Dr. S. L. Sen presided. The following resolutions were passed:—

Resolved that:

(i) This meeting is of opinion that it is high time to fill up the vacant post of one member of the Association on the Interim Indian Veterinary Council and it requests the Director of Veterinary Services and Animal Husbandry, West Bengal to please approve the nomination of Dr. Anupam Chatterjee to the above Council without further delay.

(ii) This meeting is of opinion that any member of the executive committee, who fails to attend three consecutive meetings of the association, will automatically cease to be a member of the executive committee of the Association, unless he shows sufficient satisfactory reasons for his absence.

(iii) That one member in each district be nominated as a District Organiser after examining the suggestions from members in the field.

(iv) That the following members be nominated as District Organisers for 1959:

District—		District—	
24 parganas.	Dr. B. B. Ghosh.	Howrah ...	Dr. L. K. Bose
Hoogly ...	Dr. A. K. Dutta.	Birbhum ...	Dr. A. C. Chakravarty.
Midnapore (S)	Dr. B. B. Guha.	Midnapore (S)	Dr. H. L. Baul.
Bankura ...	Dr. R. K. Sen ...	Purulia ...	Dr. S. B. Raha.
Burdwan ...	Dr. R. Som ...	Nadia ...	Dr. K. Dutta.
Murshidabad.	Dr. S. C. Maity.	Malda ...	Dr. C. R. Biswas.
W. Dinajpur.	Dr. M. Bagchi...	Jalpaiguri ...	Dr. F. Rahman.
Coochbehar...	Dr. P. C. Saha...	Darjeeling ...	Dr. R. R. Nag.
		Haringhata	Capt. H. L. Roy.
		Farm.	

(v) That the following members be co-opted in the executive committee for the year: Dr. A. K. Banerjee, Dr. (Mrs.) Kamala Dutta, Dr. B. K. Das.

(vi) That the designation of the Honorary Secretary be changed to General Secretary.

(vii) That the designation of the Convenor of the All-India Veterinary Conference be changed to Organising Secretary and Dr. Devraj Marwaha be nominated to function as the Organising Secretary till the next All India Veterinary Conference at Calcutta.

(vii-B) That the Organising Secretary be requested to submit a copy of the proceedings of any meeting to the executive committee of the association.

(viii) That in the absence of the General Secretary, Assistant Secretary, Dr. A. N. Guha, be empowered to endorse on vouchers upto a limit of Rs. 10 only in cases of emergency.

7-1-1959.

A. CHATTERJEE,
Honorary Secretary.

Correspondence

[The views and opinions expressed in correspondence are those of the writers themselves and are not always endorsed by the Editor.]

AN INVITATION

We give publicity to the following letter received from the Registrar of the Royal College of Veterinary Surgeons, London, for the information of the members of the profession.

The Editor,
Indian Veterinary Journal,
Madras-17,

9 & 10, Red Lion Square,
London, W.C.-1.
19th December 1958.

Dear Sir,

As some of the veterinary readers of your publication may be attending the XVI International Veterinary Congress at Madrid, in May 1959, and may afterwards tour Europe, I am writing to say that the Annual Royal College of Veterinary Surgeons Day is being celebrated on Tuesday the 2nd June, 1959, in London.

The Day commences with a full Choral Services and Commemoration of Benefactors in the Queen's Chapel of the Savoy, and is followed by a Luncheon in the Savoy Hotel. In the afternoon is held the Annual General Meeting of the veterinary profession in the United Kingdom, with a presentation of awards. There will also be an Exhibition relating to the foundation in 1791 of the Royal Veterinary College of London.

The President, Professor T. J. Bosworth, M.A., B.Sc., F.R.C.V.S., D.V.S.M., asks me to say that visiting veterinarians and their wives will be welcome to attend all or any of the above ceremonies, provided that there is sufficient room. Admission is strictly by ticket for the Luncheon (price £3. 3s. 0d. sterling per person) and by reserved places for the Chapel Service and the Annual General Meeting (reservation to be made at and tickets to be obtained from the Royal College).

He will welcome all veterinary friends from overseas but in view of the limited number of places available it is advised that early application be made to me at 9, Red Lion Square, London, W.C.-1.

Yours faithfully,
(Sd.) W. G. R. OATES,
Registrar.

REPLY

Dear Sir,

We thank you on behalf of the Veterinary Profession in India, for the invitation so kindly extended to us for your College Day on 2nd June 1959.

It is really very thoughtful of the President to have remembered his overseas colleagues and extended the invitation.

We are giving due publicity to it in our very next issue i.e., February 1959.

We wish the institution continued prosperity and eminence in the New Year!

Madras, }
1-1-1959. }

Yours faithfully,
T. VINAYAKA MUDALIAR,
Editor,
The Indian Veterinary Journal.

FORT-LAMY,
20, November, 1958.

The Editor of the Indian Veterinary Journal,
Madras, 17.

Sir,

We have the honour to submit the following letter for publication in the Indian Veterinary Journal.

Yours respectfully,
Dr. J. M. VILLEMOT, vétérinaire,
Dipl. Bact. Imm. (Institut Pasteur).

Dr. A. PROVOST, vétérinaire,
Dipl. Bact. and Imm. (Institut Pasteur)
Member of the joint F.A.O./O.I.E./C.C.T.A.
panel of experts on contagious bovine pleuropneumonia.

Service de Virologie
Laboratoire de Farcha
FORT-LAMY, Tchad, A.E.F.

We have read with interest the report by Manjrekar, Dhake and Kulkarni on the laboratory diagnosis of contagious caprine pleuropneumonia published in this journal (I).

The following criticisms and observations are prompted by experience and work in our laboratory:

I. In the review of the literature, the authors seem to ignore that the complement-fixation test is a reliable method for the diagnosis of contagious bovine pleuropneumonia (2, 3, 4, 5). However, it is now the official method of diagnosis of the disease in Australia (6). Up to now,

this test has been very specific, except in a single case on several ten thousands of diagnostics. On the other hand, they seem to ignore also that the rapid slide test for the diagnosis of the same disease has been studied to a very high extent in Africa (7, 8, 9, 10, 11) and that its practical application in the field gives appreciable results in Kenya, Nigeria and Chad.

We agree with them when they claim that no great reliance can be placed in the tube agglutination test, and, for this reason, it seems most strange that Manjrekar *et al.* have used this latter method for the diagnosis of contagious caprine pleuropneumonia.

II. The correct name of the causative organism of contagious caprine pleuropneumonia is no more *Borrelomyces peripneumoniae capri* but *Mycoplasma mycoides var. capri* (12, 13).

III. In the performance of their agglutination tests, Manjrekar *et al.* compare an agglutination of microorganisms and an "agglutination" from healthy or infected goat lung suspension. Excepting the case of the infected lung suspension where some antigen from the causative organism is certainly present, it seems objectionable to compare a suspension of bacterial antigen to a tissue suspension containing numerous other antigens.

The immunological phenomenon which would cause the "agglutination" of the goat healthy lung suspension by a bullock serum is not clear. From long it is known that normal ox serum has no immune properties against goat tissues. On the other hand, cattle and goat do not belong to the same Forssman group; as it is stated by the authors that they used "normal" bullock serum, one does not understand why this serum "agglutinates" the healthy lung suspension. Is "agglutinate" the proper term? Would it not be a precipitation?

Systematic research on this paradoxical result would be of a high theoretical interest.

IV. This latter criticism being excepted, which is the immunological phenomenon which causes the agglutination of *M. mycoides var. capri* by normal bullock serum? It is at first striking that an immune goat serum agglutinates to a lesser titre the causative organism than a normal ox serum. If one supposes that the immunological phenomenon in cause in this agglutination is a true union of an antigen with its homologous antibody (our results in this laboratory permit to drive such a conclusion), why has the ox serum so high a titre of antibody and where does the bullock get the antigenic stimulus? No answers are given by the mentioned authors to these capital questions.

It is this aspect of the problem that we have considered here. Briefly the results can be summarized as follows :

In Africa, as it has been demonstrated in Europe, cattle harbours in its genital tract microorganisms belonging to the P.P.L.O. group.

Immunological cross reactions occur between different strains of genital P.P.L.O., *M. mycoides var mycoides* and *M. mycoides var capri*.

We have been unable to get any agglutination with "true normal" ox serum and antigen from *M. mycoides var. capri*. This serum originated from France, where bovine pleuropneumonia is unknown; it has been shown that it contained no antibodies for bovine pleuropneumonia nor for bovine genital P.P.L.O. infections.

We have adjusted our antigen suspension to No. 2 Brown's opacity tube as Manjrekar *et al* did. Using this dilution, the results are scarcely legible. It would seem desirable to increase the quantity of antigenic material in order to obtain more clear-cut results.

Cross agglutinations occur with different ox sera, at about the same titre, between two strains of *M. mycoides var. capri* (one being virulent, the other attenuated) and several strains of genital P.P.L.O.

Cross agglutinations occur also between *M. mycoides var. mycoides* and *M. mycoides var. capri* using pleuropneumonia-immune ox serum, but to a very less extent.

Cross reactions occur between *M. mycoides var. mycoides* and vaccinia virus (14). It could be eventually the case with *M. mycoides var. capri* but this possibility has not so far been studied.

From this, it seems to us that the results of Manjrekar *et al* could be interpreted in the following way :

1. Re-examination of the "agglutination" of the goat lung suspensions, both normal and infected, should be extensively studied.

2. Results obtained by these authors using suspensions of *M. mycoides var. capri* and ox serum are confirmed, but we feel that they have unintentionally used sera from oxen infected with genital P.P.L.O. (or even with cow-pox); the possibility that they have used sera from oxen infected with pleuropneumonia is rejected as this disease is not present in India, except in Assam State (15).

3. The method of diagnosis of contagious caprine pleuropneumonia that they have described is of a too early application, keeping these results in mind.

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REPLY

Sir,

The authors feel extremely thankful for the highly useful criticisms and suggestions contained in the above letter.

The primary object behind the authors' experiments was to improve upon the existing methods in India and not to ignore the methods followed in foreign countries, so as to try to evolve a suitable and comparatively easier and quicker method in the laboratory diagnosis of the disease taking into consideration the facilities available in this country. It was never the intention of the authors to establish any special claim to the agglutination test or to ignore the successes that have attended workers in other countries with Complement fixation test and/or the rapid slide test. It is with the same urge for a simplified procedure that the plate method was given a trial, but with negative results, as has already been recorded by the authors. After giving a fair trial to the tube agglutination test, it was the intention of the authors to take up the rapid slide or the plate test. In fact it was tried by one of the authors (S. L. Manjrekar) when he was working as Investigation Officer for Diseases of Sheep and Goats, but it was not a success at his hands.

Regarding the correct nomenclature, the position is quite clear now. But the actual position of the organism was not fixed till 1956, when the paper was written. In their latest Edition (5th Edn. 1956) of Bacteriology and Virology, Merchant and Packer have stated that, "It's

position is not certain", and that they have called 'it as *M. mycoides*' on tentative basis only. Same is the case in the Text book of 'Principles of Bacteriology and Immunity' Topley and Wilson (1956). Hence to avoid ambiguity in the minds of field workers in India the name "*Borrelomyces peri pneumoniae capri*" was used.

As regards the comparison of agglutination of micro-organisms with the agglutination of the lung tissue suspensions the following will clarify the position.

In the begining of the experiments, only suspensions of the micro-organisms (*M. mycoides*) either the pure culture (virulent) or the attenuated culture (vaccine strains) were tried and on seeing that the specific antigens in the cultures did show agglutination with the normal ox serum (from the apparently healthy animal), further trials were taken up with either the artificially infected or naturally affected goats' lung tissue suspensions, as these tissues contained the specific organisms in highest concentration. Naturally as these tissues contained the specific antigen, the same reaction noted with pure culture suspension and the normal ox serum, was also observed and has been recorded in the original paper. The reaction observed was always in the form of agglutination and not precipitation.

Further, with a view to ascertain whether really such a phenomenon does occur with only the specific antigen in the affected lung tissue suspension or even with the non specific antigens in the healthy lung tissue suspension, a few more trials were taken and were recorded. The authors did not get clear agglutination reaction in higher titres from the healthy lung tissue suspensions. The actual position was as follows: On four or five occasions they saw agglutination reaction in a titre of upto 1:80 and never above it; (in one case 1:40; in two cases 1:20; and in the 4th case 1:80 and in the last case 1:10). Thus in the original paper 1:80 is said to be taken as the highest titre one may expect to get even from healthy lung tissue suspension.

However, there was no possibility to check up the correct history of the 'healthy goats' used for the purpose. It might be that they were sensitized through a natural mild infection much prior to these trials. The same is the case with normal ox serum. It is a fact that the Bovine pleuro pneumonia does not exist in this part of the country, but it is very much likely that the animal might have been carrying the P.P.L.O. in the genitalia, which possibility was not either investigated or ruled out.

Thus it can be seen that these concomitant studies with the bacterial suspensions were only arbitrary comparisons and were recorded as such.

Further studies on the various aspects of this problem will certainly be pursued as and when time permits and the authors take this opportunity to express their thanks once again to Dr. A. Provost and Dr. J. M. Villemot, for their keen interest shown in the humble work of the authors and for the fine guidance they have given in their letter.

Bombay,
Dated the 20th Jan. 1959

S. L. MANJREKAR.

PURPURA (?) IN CATTLE

Sir,

In reply to Mr. M. B. Tatke's letter in November 1958 issue, further information is given below:

In many poisoning cases such as sweet clover, Bracken, Trichlorethylene-extracted soyabean meal, crotalaria poisoning, the close resemblance of the clinical symptoms with defective clot retraction, are often confusing.

In spoilt sweet clover (Dicoumarol) poisoning, haemorrhagic tendency, with subcutaneous bleeding resembling haematoma is most common, due to hypoprothrombinemia.

Dicoumarol does not increase capillary fragility but bleeding time may be prolonged (Thornson, 1947) as it has got selective action on prothrombin formation.

Vitamin K antagonises the depressant action of Dicoumarol on prothrombin formation in the liver. Hepatic or renal diseases, as well as pyrexia, enhances the toxic actions of Dicoumarol as it is a competitive inhibitor of Vitamin K (Richards, 1943). It takes at least 12 hours to become effective and administration of this will not alleviate the terminal haemorrhagic state in purpura.

A few thrombocytopenic conditions due to experimental Bracken poisoning were treated with Vitamin K (Synkavit a synthetic product) in doses of 20 Mg. S/C and Vitamin B group by Evans & Evans (1954) but the results were not satisfactory and haemorrhagic tendencies were not effectively checked.

Hence in my opinion Vitamin K will have no significant value in the treatment of such Bovine purpuric conditions where defective capillary function is the major cause. Many more clinical trials on this are required before any opinion can be given definitely.

Presence of Dicoumarol in any Indian fodder needs further investigation.

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M. M. PATNAIK, V.A.S.,
Sonepur, Orissa.

"PURPURA (?) IN CATTLE"

Dear Sir,

With reference to the query raised by Tatke in your valuable journal of November '58 on the subject of *Purpura* in cattle, may I furnish a little information available to me.

First of all, it is necessary to decide whether the cases treated by Patnaik are cases of sweet clover disease as Tatke suspects. The usual symptoms of acute haemorrhagic sweet clover disease are :—

1. Non-inflammatory swelling more frequently of the rump, neck, thigh, pectoral shoulder, and ventral thoracic regions.
2. Slight increase in respiration.
3. Almost normal appearance until a few hours before death.
4. Normal or subnormal temperature.
5. Blanched mucous membrane.

In case of subacute anaemic form, there is usually no symptom until traumatic or surgical interference results in bleeding.

According to Roderick, young animals are highly susceptible, while older ones are markedly immune. This however is not corroborated by others. Taking these facts into consideration and the findings of Patnaik that the swellings were hot and painful, the subjects had high temperature and were not young, it is probable that these were not cases of dicoumarin initiation.

Regarding the delay in coagulation time, which is the common criterion for vitamin K deficiency or presence of anti-vitamin K, one has to content with the fact that coagulation time will vary considerably depending upon the method used. With Howell's method it will average about 20 minutes while with Lee and White's, it will be 5 to 10 and with Duke's 4-6.

Coumarin is a white crystalline ester of orthohydroxycinnamic acid. This is the "bitter principle" of clovers and is present in all clovers such as white sweet clover, yellow sweet clover, Daghestan sweet clover, Hubam sweet clover etc. Clover being of the leguminosae family, probably it is present in plants of the same family in India, at least in small amounts. But because of the rarity of usage of leguminous plants as the *sole feed* of livestock, especially in the form of hay or silage and for long periods, cases of hypoprothrombinemia may be absent or mild. Link has proved that in normal animals haemorrhage does not occur unless 4-hydroxycoumarin is fed or injected over a period of time. With regard to the use of Vitamin K for cases of sweet clover disease, Schapiro, Lehman and Davidson have shown that methyl-naphthoquinone (synthetic vitamin K) counteracts the action of dicoumarol (dicoumarin). It has also been shown that adrenalin can hasten the restoration of prothrombin level reduced by dicoumarin. So Patnaik's treatment was in line with that suggested by Tatke.

Agellar has reported that the anticoagulant therapy with dicoumarin may result in purpura, haematoma, bleeding of wounds, haemoptysis, gastro-intestinal haemorrhage, haematuria etc. Therefore treatment with vitamin K is likely to have favourable results in cases of purpura.

I have to congratulate Tatke for raising this query and hope that someone who knows the subject better, will give it a detailed treatment it deserves, more particularly about the dicoumarin content of Indian fodders.

Dept. of Bacteriology,
University of B.C.,
Vancouver, Canada.

SIMON, P. A.

"STUDIES ON SOME ASPECTS OF JOHNE'S DISEASE"

Sir,

With reference to the article entitled "Studies on some aspects of Johne's disease" by Dr. P. C. Nag, which appeared in your esteemed journal in January, 1959, I would like to point out that under Indian conditions the field workers should diagnose the disease clinically, allergically and microscopically. Complement-fixation test, however indicative it might be, is not feasible under present conditions. Johnin test, if carefully done, is a very sure guide, particularly in the pre-clinical and early clinical stages. Fallacies, if any, are rare. If such cases are followed, they will also be confirmed microscopically in due course. Since the disease is first established in the anterior part of the small intestine and progressively extends towards the posterior end and

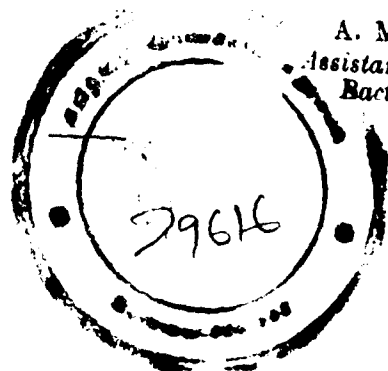
since the bacilli in large numbers reside intracellularly in the intestinal mucosa cells and occasionally escape into the lumen, the different materials from the same animals collected at a time, viz.,—rectal mucose pinch, bowel washing and dung may all prove negative, particularly when the disease has not progressed sufficiently. A proper understanding of this condition is necessary for a successful diagnosis. In cases where rectal mucosa pinch is found to be negative, repeated examination of bowel washing and dung should be undertaken. The dung samples, in field conditions, should be suspended in water contained in tall glass cylinders. After thorough mixing the cylinders are left undisturbed for a few hours. Coarse, medium and fine strata are then separated and are found superimposed one above the other. The supernatant fluid, together with the top fine stratum, should be pipetted off and slides should now be prepared from the junction of the medium stratum and the lower portion of the fine stratum. The concentration of bacilli in this region is more. Addition of Antiformin to the dung suspension, however, has an additional advantage.

With regards to the prevalence of this disease among Indian Cattle, I agree with Dr. Nag that it is becoming widespread. I find that the disease has penetrated into the village cattle of West Bengal. It is rather disheartening to think about the future of our livestock.

Dr. Nag has suggested Vallee and Ringard vaccine or its modification as a control measure for Johne's disease in Indian cattle. While it is useful on a limited scale in selected herds, its large scale use in the field, under the present conditions, is not practicable. This method is useful in western countries where positive cases, on detection, are generally slaughtered thus removing the potential source of infection and then vaccination is undertaken. In India, it is difficult to deal with the detected cases as slaughter is not always possible and segregation is difficult to arrange. Vaccination by premunition method, under the present conditions, is not wholly desirable. However, I.V.R.I. is the best judge for deciding this question. Meanwhile, it is rather embarrassing to create new problems by mass detection of Johne's disease in this country, as there is no easy solution of this problem.

Bengal Veterinary College,
Belgachia, Calcutta-37.
The 14th January, 1959.

A. MUKERJI,
Assistant Professor,
Bacteriology.



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Review

Kerala Veterinary College Souvenir, Vol. III (1958) Ps. 84.

The Kerala Veterinary College Magazine issued as a Souvenir on the eve of the inauguration of the new College buildings, gives one glimpses into the rapid strides the College had taken since its inception in August 1955.

The bulk of the contents comes from the students, as it should be, and they have shown uniform assiduousness in the compilation of articles.

The Principal's 'open letter' is a valuable survey of the task ahead of Veterinary educationists.

The issue includes also some inspiring messages received from a few of the leaders of the profession and the life sketch of Dr. K. S. Nair, its first Principal. The get up of the magazine is quite good but it could have been better bound.

M. S. J.

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