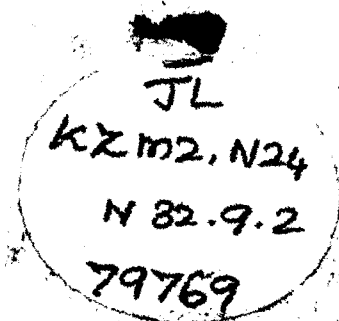


3962

The Indian Veterinary
Journal

1932 - Oct

VOL. 9. No. 2



Published Quarterly

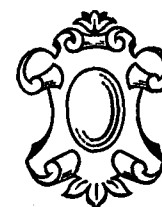
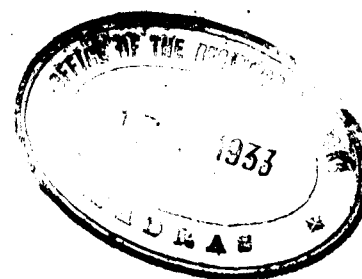
Vol. 1X.

Oct. 1932

No. 2.

The Indian Veterinary Journal.

(The Journal of The All-India Veterinary Association)



Editor :

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

Veterinary Surgeon, Madras.

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

MADRAS

PEOPLE'S PRINTING & PUBLISHING HOUSE, LTD., TRIPLICANE.

1932

NOTICE

The Indian Veterinary Journal

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

PUBLISHED FOR THE ALL-INDIA VETERINARY ASSOCIATION.

EDITOR :

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

*Veterinary Surgeon and Proprietor, Dr. Pungal's Veterinary Institute
26, Wallajah Road, Mount Road, Madras, S. India.*

**Sole Advertising Agent for the British Empire (Excluding India)
and America :—Bailliere, Tindall and Cox,
7 & 8, Henrietta Street, Covent Garden, London, W.C.2.**

SUBSCRIPTION :—

*For Members and Students :—Rs. 4 or 5s. 4d. per annum including postage
in advance. Re. 1. or 1s. 4d. per part.*

*For others :—Rs. 8. or 10s. 8d. per annum in advance, or Rs. 2. or 2s. 8d.
per part.*

1. Original Articles, Clinical Notes, Society Reports and Notes on interesting cases are invited. Contributors of Original Articles will receive 10 copies of their papers free, if wanted.

2. All Editorial Communications, Reports and Books for Review and Exchange should be addressed to the Editor.

3. All contributions should be sent to the Editor. Contributors are requested to sign their contributions. All communications must be authenticated by the name and address of the writer, whether intended for publication or not.

4. Members who do not receive the Journal regularly or who find it wrongly addressed are requested to communicate correct address to the Editor at once.

KZ m 2, N 24
N 32-9-2

ANTIPHLOGISTINE

FOR THE RELIEF OF INFLAMMATION AND CONGE-
STION IN VETERINARY PRACTICE

Composition		Effect
Silicate of	Heat retainer	Hyperæmic
Aluminum		Analgesic
(anhydrous)		Relaxant
Glycerine	Depletant	Antiseptic
(dehydrated)		Antipruritic Depletant
Iodine	Anti- septics	Bactericidal
Salicylic Acid		Antipruritic
Essential Oils		Anodyne

THE DENVER CHEMICAL Mfg. Co.,
NEW YORK, U. S. A.

Muller & Phipps (India) Ltd.,
P. O. Box 773, Bombay.

When writing to advertisers, please mention this Journal.

SOME RECENT VETERINARY BOOKS

"It takes the premier place amongst English Veterinary text-books."
—VETERINARY RECORD.

DOLLAR'S GENERAL OPERATIVE AND REGIONAL SURGERY

Second Edition. Rewritten and extended by J.J. O'CONNOR,
M.R.C.V.S., Professor of Surgery, Veterinary College of Ireland;
Examiner to the Royal College of Veterinary Surgeons.
6x9½. Pp. xvi+954, with 495 Illustrations. Price 25s. Postage 2s.

"An ideal book for the student and the busy practitioner."—VETERINARY JNL.

A Text-Book of the
DISEASES OF THE SMALL DOMESTIC ANIMALS
By O.V. BRUMLEY, V.S., Professor of Veterinary Surgery, College
of Veterinary Medicine, Ohio State University.
Second Edition. Pp. xxiv+611. Price 25s. Postage 1s.

"A book which should be on every veterinarian's bookshelf."—VETERINARY JNL.

FLEMING'S VETERINARY OBSTETRICS:
Including the Diseases and Accidents Incidental to Pregnancy and Parturition.
Fourth Edition. Revised by J.F. CRAIG, M.A., M.R.C.V.S., Principal
and Professor of Medicine, Royal Veterinary College of Ireland.
Pp. viii+552, with 165 Illustrations. Price 18s. Postage 1s. 2d.

"This book is the best available."—VETERINARY RECORD.

POULTRY DISEASES

Including Diseases of other Domesticated Birds.
By B.F. KAUPP, B.S., M.S., D.V.M., Pathologist, North Carolina
Experiment Station and Agricultural College.
Fifth Edition. Pp. 436, with 166 Illustrations. Price 18s. 6d. Postage 1s.

"It surely fills a long-felt want."—VETERINARY RECORD.

DISEASES TRANSMITTED FROM ANIMALS TO MAN
By G. HULL, Chief Bacteriologist, Illinois Department of Public Health.
Pp. xiv+350, with 21 Illustrations. Price 30s. Postage 1s.

"Illustrated by photographs or plates of practically every disease which is likely to
be met with in tropical climates."—VETERINARY JOURNAL.

DISEASES OF ANIMALS IN TROPICAL COUNTRIES
By C.R. EDMONDS, M.R.C.V.S., late Assistant Chief Veterinary
Surgeon, Rhodesia; and G.K. WALKER, C.I.E., O.B.E., F.R.C.V.S.,
late Principal, Punjab Veterinary College.
Second Edition. Pp. 407, with 37 Illustrations. Price 25s. Postage 1s. 4d.

New Edition. Just Published.

VETERINARY OBSTETRICS
By W.L. WILLIAMS, Professor Emeritus, Professor of Obstetrics,
N.Y. State Veterinary College.
Second Edition. Pp. xvii+482, with 101 Illus. Price 42s. Postage 1s.

BAILLIERE, TINDALL & COX,
7 & 8, HENRIETTA STREET,
Covent Garden, LONDON, W. C. 2.

When writing to advertisers, please mention this Journal.



Feed 396 Fitness!

Spratt's Dog Foods and
Requisites are stocked
throughout India.

SPRATT'S
Dog Soap
for Canine Hygiene
made in two strengths

No. 1. Red and Yellow
Wrapper.

No. 2. Blue Wrapper.
Unexcelled for quality.

Write for full list of Spratt's
Celebrated Dog remedies
and Toilet preparations.

Every nutritive agent known to science,
every vitalising element which intensive
knowledge and unrivalled practical experi-
ence can compress into Dog Food is found
in concentrated form in every package of
Spratt's crisp meaty biscuits and whole-
some energising meals. Hence their world-
wide reputation for consistent excellence.
Perfect blending and scientific balance
based upon the makers' wide understanding
of the dog's dietetic needs—that's the secret
of Spratt's quality...and the result?..an
unmatched combination of vitamin proper-
ties and high feeding values which places
Spratt's products in a class by themselves—
vitally and literally supreme of their kind.

Sole proprietors: SPRATT'S PATENT Ltd.,

24/5 Fenchurch Street, London, England.

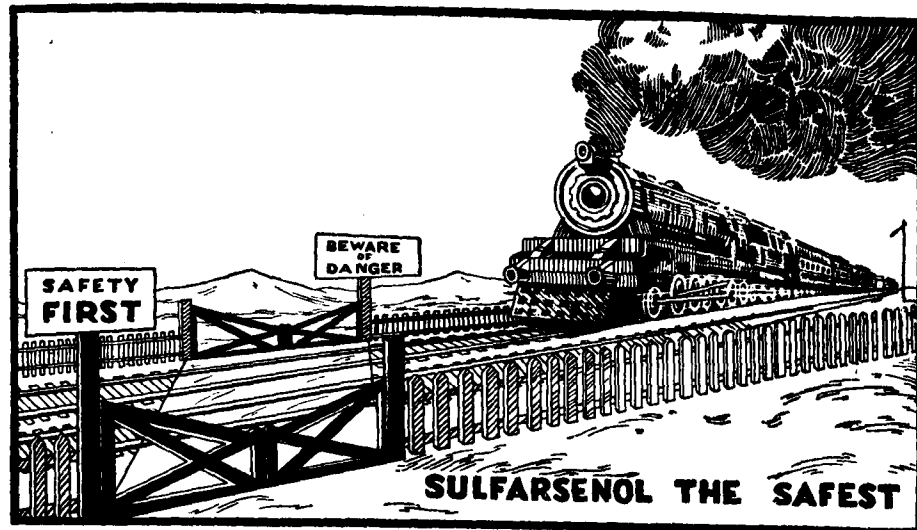
Trade enquiries: E. S. BEST, P. O. Box 291, BOMBAY.

SPRATT'S

MEAT-FIBRINE

DOG FOODS

When writing to advertisers, please mention this Journal.



"SULFARSENOL" is preferred because it is the safest arsenical.

It is the least liable to oxidation.

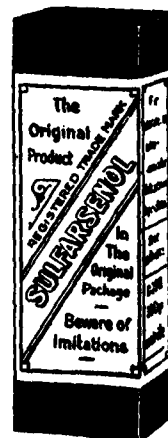
It is the least toxic.

Arsenical poisoning is practically eliminated.

Possibility of Neurotraumatism is reduced to a minimum.

By intramuscular or hypodermic injection sustained action is obtained, and the largest percentage of the compound is transformed into active derivatives.

The Genuine
Package.



THE ANGLO-FRENCH DRUG Co., (ESTN) Ltd.,
P. O. Box 460. BOMBAY.

When writing to advertisers, please mention this Journal.

THE INDIAN VETERINARY JOURNAL.

(The Journal of the All-India Veterinary Association)

Vol. IX.]

OCTOBER, 1932.

[No. 2.

CONTENTS

I. EDITORIALS.	PAGE
THE PLACE OF VETERINARY SCIENCE IN RURAL RE- CONSTRUCTION. ...	101
A VALUABLE COMMUNICATION. ...	104
A MORAL FROM THE WEST. ...	105
MR. P. T. SAUNDERS AND UNIVERSITY AFFILIATION. ...	105
TWO MORE VETERINARIANS LEAVE FOR POST- GRADUATE STUDIES. ..	107
II. ORIGINAL ARTICLES.	
A COMPARATIVE STUDY ON CERCARIAL FAUNA IN MADRAS.—By M. Anant Narayan Rao G.M.V.C. Madras ...	107
THE ETIOLOGY OF BOVINE NASAL GRANULOMA.—By Capt. S. C. A. Datta, B. Sc., M.R.C.V.S., Muktesar ...	115
III. ANATOMICAL SECTION.	
SOME PECULIAR ANATOMICAL FINDINGS IN THE HORSE.—By H. N. Chelva Iyengar, G.M.V.C., Madras ...	121
IV. GENERAL ARTICLES.	
AN INVESTIGATION INTO THE CONTROL OF FASCIO- LIASIS IN CATTLE.—By S. Udam Singh, U. P. ...	123
BACILLARY NECROSIS OR NECROTIC DERMATITIS IN HORSES.—By M. R. Sen, G.B.V.C. Calcutta ...	128
CARE OF DOGS IN HEALTH AND DISEASE.—By G. S. Banerjee, G.P.V.C. Calcutta. ...	130
PREVENTIVE INOCULATION AGAINST BLACK-QUAR- TER, BY AGGRESSIN ALONE METHOD.—By P. Sada- siva Bhat, G.M.V.C., Madras ...	133

CONTENTS.

V. CLINICAL ARTICLES.

LONGITUDINAL FRACTURE OF SCAPULA IN AN ARAB RACE MARE.—By M. Mohey Deen, M.R.C.V.S., Bombay ...	134
QUACKERY AND ITS CRUELTY.—By P. Veda Bhat, G.M.V.C. Bangalore ...	137
COMMENT ON GLYCERINE AND ITS USES IN SURGERY. —By P. N. Kak, L.V.P., (Hons.), Kashmir ...	139
AN OUTBREAK OF VERMINOUS BRONCHITIS IN SHEEP. By H. P. Abasi, G.B.V.C., Sind ...	140
HYGROMA OF THE ELBOW OF AN ELEPHANT.—By G. N. Roy Chaudhuri, G.B.V.C., Patna ...	141
PARALYTIC RABIES IN AN ELEPHANT.—By B. Ramiah, G.M.V.C. Madras ...	142
SUCCESS OF TR. LOBELIA AETHERIS IN TETANUS.— By Mohammed Daood, L.V.P., Mysore ...	145
FISTULA OF THE CORONARY BAND OF THE HORSE.— By John Rutherford Anderson, D.V.S., Georgia, U.S.A. ...	146
LIQUOR FORMALDEHYDE IN CASES OF CANCER (?) HORN.—By Sunderlal B. Pandya, G.B.V.C., Baroda State ...	147
TREATMENT FOR CHRONIC LAMENESS.—By S. Seshadri Iyengar, G.M.V.C. Madras ...	147
A CASE OF MARKING NUT POISON IN A BULLOCK.—By S. Seshadhri Iyenger, G.M.V.C., Madras ...	148

VI. NOTICE OF DRUGS.

SULFARSENOL IN THE TREATMENT OF SEPTICÆMIC INFECTIONS "POST PARTUM." ...	149
---	-----

VII. NOTES.

151

VIII. CORRESPONDENCE.

Major-General S. B. James's letter ...	155
Some Facts about the Horse situation in India—By Doomsday. R. L. Kaura's letter ...	158
...	159

IX. EXTRACTS.

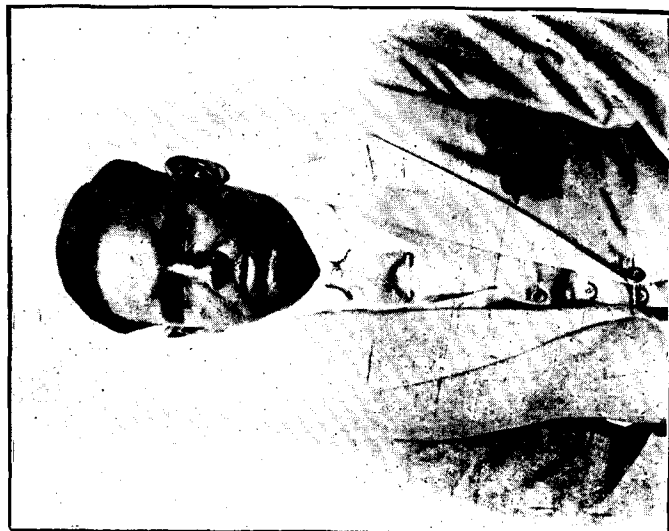
Rabies in the Mongoose.—By S.D.S. Greval, B. Sc. M.D., C.H.B., D.P.H., Major, I.M.S., Kasauli ...	159
The Infectivity of Milk and Meat in Rabies ...	163
A Rapid Paraffin Technic.—By W. L. McNamara, M.D., Hines. A Practical Staining Method for Intestinal Protozoa.—By H. Tsuchiya Sc. D., St. Louis. Mo. ...	165
Outline of Diagnosis and Control of Common Poultry Disease.— By Frang Breed, Lincoln, Nebraska ...	166
Contribution to the Symptomatology and therapy on Piroplasma Caballi.—By A. Bergthal, ...	167
...	171

X. ERRATA

173



M. LAKSHMANA RAJU, G.M.V.C.,
Veterinary Asst. Surgeon, Vizianagaram,
who has gone to Edinburgh for
Post Graduate Course in Pharmacology.



G. R. VISHWANATHAN, G.M.V.C.,
Asst. Lecturer, Madras Veterinary College,
who has gone to Edinburgh for Post Graduate
Course in Tropical Veterinary Science.

THE Indian Veterinary Journal

Vol. IX]

OCTOBER, 1932.

[No. 2

Editorials.

THE PLACE OF VETERINARY SCIENCE IN RURAL RECONSTRUCTION.

It will be remembered that soon after the Montford Reforms were ushered in about 12 years ago, the cry of "Go back to the village" was louder than ever and Rural Reconstruction was on everybody's lips. It looked as though they were going to create a new heaven on earth. The poor starved ryot looked in amazement and was joyous beyond measure at the prospective return of the old days of the alleged milk and honey flowing in the land. Witness after witness appeared before the recent Royal Commission on Agriculture and pleaded on behalf of the ryot for "Education, Health, Debt-redemption, Arbitration, Temperance, Agricultural improvements of all sorts, Marketing produce, Subsidiary Industries" etc. But not one of them spoke about the vital need of Veterinary Aid in rural areas, with the importance it deserves, to preserve the Cattle wealth of the ryot under the new dispensation.

What will debt-redemption mean if the poor ryot is going to lose his cattle year after year from mostly preventable causes? Will Agricultural improvements of all sorts mean much if the land is to be depleted of much of its Cattle from the ravages of epizootics? A well-meaning Minister even went to the extent of founding a Rural Reconstruction Fund. We don't hear so much now-a-days of Rural Reconstruction. Probably it is merged in the louder cry for Constitutional Reforms. Whatever it is, we will not be overstating the case, if we say that any scheme for development of rural areas will not be complete, if it does not provide for adequate Veterinary Aid.

In a predominantly agricultural country, where 95% of the population lives in the villages, does it need much imagination to state that the prosperity of the nation is intertwined with the prosperity of the village? Of the many things that contribute towards the prosperity of the village, the cattle wealth may be said to be of primary

importance. If that is not taken care of in the way we ought to, we lay our axe consciously or unconsciously on the very roots of national prosperity.

The indebtedness of the Indian ryot even normally is more than he can bear. Through marriages and deaths, through rituals and rites—customs which man has inflicted on him—he easily gets into the hands of village Shylocks and try however much he may, he scarcely gets out of their clutches. Nature with her annual freaks either in the form of floods or draughts, very nearly drives him to despair. He curses his existence; he is unable to look into the face of the ill-fed woman of the house and the little brood of children. Even under such depressing conditions, he struggles hard to keep his cattle fed and alive. The ordeal is too great for him to stand. The Cross too big for him to bear. He questions the justice of it all. He doubts, he hesitates, he hopes and he lives; But Lo! inscrutable are the ways of Providence. Misfortunes never come single. Cattle disease breaks out in his village. He is at a loss to know what to do. He seeks the help of the village Munsiff and the Tahsildar to get him some form of Veterinary Aid. It is not coming either for love or for money. The Veterinary staff are busy in another village; and by the time they come to his rescue, he loses his only pair of bullocks on which he was building his hopes of better days. It is all gone. He weeps bitterly. He remembers he has not even cleared the loan he took for the purchase of those bullocks. Where is he to go for further money? He lifts up his tear stained eyes to Heaven and asks for the mercy of the Lord. Some to drown their unbearable sorrows take to that master of all evils—the Drink and that completes the ruin.

No one who has gone into interior villages and stayed there in the midst of misery, squalor, dirt, disease and death, will consider the above picture over-drawn. The ryot who puts up a manly struggle against all indebtedness, breaks down like a hollow reed the moment he loses his cattle and makes a miserable picture. Is there no remedy? Is there no cure? Certainly there is—only it is not made available to him in the way it ought to be.

Having created the demand for Veterinary Aid, it is highly deplorable that the profession is not able to meet it. People come running for inoculations; either there is no serum or the Touring Veterinary Assistant Surgeon is busy in one village and is missed in hundred and one villages. Municipalities, Taluk Boards and District Boards ask for opening of Veterinary Hospitals, but the request is brushed aside on the plea of want of hands. If the popularity of existing institutions is any criterion for need for more hospitals, well, those who are in the know of things will confidently say there is an urgent, immediate and absolute need. In fact there ought to be a

net-work of such hospitals in rural areas. Then the Veterinary Aid will be near at hand and available at short notice.

After all that has been said above, there may be people, mostly outside the profession who would like to know if really there exists so much either on the preventive or curative side as to warrant their serious, earnest and immediate consideration. They might like to know our credentials for what they may consider to be a big claim on behalf of our profession. We shall certainly lay these before them. We do not say that we have a 'cure-all' for every disease. But let us see how far we have effective prophylactic measures with regard to the very many diseases that carry away cattle in lakhs and lakhs every year. We shall be as brief as possible.

First and foremost we have Rinderpest. It has rightly been called Cattle-plague. The S. S. method of inoculation now in vogue has saved many thousands of cattle. Is that at least made available fully in rural areas? Is not the ryot becoming more and more miserable through a preventable disease like this for want of Veterinary Aid and the country poorer day by day?

Next in order we have diseases like Black-Quarter. Haemorrhagic Septicaemia, Anthrax, Sheep-pox, Fowl cholera, etc., against all of which there are very effective prophylactic inoculations or vaccination. And yet, where are the necessary numbers of people to carry them to places where required? On the curative side very many of the sporadic diseases are amenable to treatment. This is being done in several veterinary institutions. But their number is negligible.

Thus a Veterinary Surgeon in rural areas can be of much use to the ryot. He can advise him on principles of breeding; help him to develop a good strain of cattle; castrate all his scrub bulls; teach him sound principles of feeding and rearing of calves, amongst which the mortality is very high due mostly to deficiency diseases, parasitic infestations or digestive troubles, most of which can be rectified; as these calves grow, he can protect them against diseases like Rinderpest, Black-Quarter, Haemorrhagic Septicaemia, Anthrax etc., as occasions arise; he can guard against communicable diseases from animals to man, such as Tuberculosis, Anthrax, Rabies, Variola, Undulant Fever, &c., he can advise the ryot on the care and treatment of dry cows; be of great help in cases of difficult parturition and serve again as adviser in pre and post Natal care and treatment; he can relieve the dumb animals of much pain and misery by attending to other non-contagious diseases; he can tell the ryots how the country is losing lakhs of rupees through indiscriminate branding. Thus and in many ways he can help the ryots to reduce the Cattle mortality to a very appreciable extent and thus contribute his humble share towards National prosperity.

We have written at some length on this subject. Many people have neither the time nor the inclination to bestow enough thought on what we consider to be a matter of first-rate importance in any scheme of rural development. If our attempt to present the matter in all its aspects should stimulate enough interest in those responsible for Rural Development, we would feel more than compensated for the little trouble we have taken.

A VALUABLE COMMUNICATION.

Major General Sir Bernard James, C.B., C.I.E., M.V.O., Secretary, National Horse Breeding and Show Society of India, has sent us a valuable communication, which we publish elsewhere in this issue, and we are certain that the profession in India will feel thankful to him for the inspiring letter.

He presents in it yet another phase of live-stock improvement which is deplorably neglected in this land. Even in these days of mechanisation, the horse will still be required in the realm of sports, in cross-country transport for military needs and probably for agricultural pursuits as well. With potentialities such as those existing in this vast country, it is a matter for extreme regret that powerful private agencies do not move in the matter, on a co-operative basis at least. The landed aristocracy with vast stake in the country should set an example to others. Where all these are lacking, the Government at least should move in the matter. National Horse Breeding and Show Society of India is really doing yeoman service in this direction; "but" says Sir Bernard, "its efforts are much handicapped by the lack of facilities in India for research in the question of genetics and equine diseases." He is not an Arm-Chair critic but one who is out in the field roughing all the vicissitudes of a new undertaking. Who will not agree with him when he says "I feel sure that you will agree that a higher standard of knowledge of genetics generally and more wide-spread information on the subject of the prevention of equine diseases would assist materially to this desirable end." We wonder what those who have anything to do at all with these questions, have to say to such a well-reasoned criticism. We consider that Sir Bernard James's suggestion is very timely. The curriculum of studies in Veterinary Colleges in India is to be shortly scrutinised by an Expert Committee and Disease Investigation Officers are to be recruited in the several presidencies. We hope these remarks coming from one who knows what he is speaking about will be borne in mind by those undertaking the above tasks.

A MORAL FROM THE WEST.

Our British Colleagues have celebrated the Jubilee Congress of the National Veterinary Medical Association of Great Britain and Ireland, on the 8th of August 1932, at Folkestone with a pomp and grandeur worthy of the occasion. We most heartily congratulate them on their achievement.

To run an Association for fifty years and with the success that has attended the N. V. M. A., is no mean task for a small profession like ours. And yet, Britain has done it and may we hope that we of the slumbering East will wake up and follow her worthy lead?

Of what use is all of our tall-talk, of past greatness, of equipping ourselves with all that is best in the world in our profession; of falling in line with other nations: of making India self-contained in matters Veterinary, etc., etc., if we are not able to organise ourselves properly and run even *one* meeting a year in such a huge sub-continent as India.

The blame if any is all on the stalwarts of the profession who are holding out from such organisations and not on the rank and file who have struggled hard under most adverse circumstances to do their 'bit' to the profession. Let them realise that such an attitude of the proverbial "Cat on the wall" will do good neither to themselves nor to the profession. In the Great March which must move the profession sooner or later, they are sure to be left behind, for posterity to remember them as men who took everything from the profession and gave nothing in return to sustain and improve it. No Indian Veterinarian can bestow a moment's thought over the present plight of the All-India Veterinary Association and its annual Conferences without a sense of humility. What is needed is not passive sympathy, but active work.

The lesson from the West is very encouraging and we hope that it will not be lost on the Indian Veterinary Surgeons.

Mr. P. T. SAUNDERS AND UNIVERSITY AFFILIATION.

While presiding at the inaugural meeting of the Madras Veterinary College Medical Association on the 18th of August 1932, Mr. P. T. Saunders, the Director of Veterinary Services, Madras, gave public utterance to his opinion on the question of affiliation of Veterinary Colleges to Universities, which coming as it does from such responsible quarters deserves careful consideration at the hands of all interested in the question.

He said "If the University would give a degree and let the Director at the same time graduate men from the College, well and good. But if they wished to control the studies of the College, if they wished to put higher still the entrance examination of the College and make the College worthy of affiliation in every sense of

the word, then there would be difficulties". We concede that this is one way of solving the problem. But looking ahead we could see it would be creating a professional "Caste system" of high and low, the results of which would be disastrous. There will not be much harmony inside the profession and much cantankerous propaganda of one against the other will only retard, nay, permanently damage the progress of Science.

Being an infant profession, luckily we have precedents in other departments to be guided by, in the Presidency of Madras itself. We would invite the attention of the learned Director to the fact that the sister profession of Medicine is deploring the existence of such divisions in its ranks. Various attempts have been made from time to time to do away with the Sub-Assistant Surgeons. It is all contemporary history well within the knowledge of the present generation. But our Medical brothers feel helpless now to undo the wrong. They have gone too far. In fact raising the course of the S.A.S's to very nearly five years now, is only introducing the thin end of the wedge to make a last and stupendous effort. They had another class called the "Apothecaries". They have done away with it.

Take again the profession of Agriculture. They had such divisions too. They have stopped recruitment to Pass-Course, Lower Subordinate class, etc. All these have been made after trying the experiment now proposed by Mr. Saunders. The evils that accrue and retard the healthy development of the profession outweigh the advantages of the measure of expediency, which the Director has in mind. In trying to meet the needs of the hour, vital interests of either the profession or of the country should not be sacrificed.

Both of our sister professions need men and more men, urgently, like us and yet they have tried to raise the standard and allow their men to go out with the hall-mark of the University. There can never be too much of interference by the University authorities in the management of professional Colleges. We do not believe that the Medical and Agricultural Colleges are any the worse for their affiliation to the University. If anything, the status of those departmental heads and their Colleges has increased considerably. After taking the University degree, scope for specialisation in particular subjects should be available to such of those who are so inclined. But the minimum qualification for a general practitioner must be the University degree. That will raise the status of the profession that will fit our men for better and more advanced work; that will bring them in line with other scientific professions.

We appeal to all concerned to bestow some thought over our suggestions and hasten the day of affiliation.

TWO MORE VETERINARIANS LEAVE FOR POST GRADUATE STUDIES.

We have much pleasure in noting that Messrs. G. R. Visvanathan and M. Lakshman Raju have gone to Edinburgh, Royal (Dick) Veterinary College, for training in Tropical Veterinary Science and Pharmacology respectively. We have to congratulate the Subordinate Veterinary Service of Madras for having in their midst men who sacrifice, in these hard times, any savings they may have had in the cause of knowledge. Two have already returned and two more have gone at their own expense. We hope the Government, on their return, will avail of the opportunity of utilising their knowledge by giving adequate opportunities to them to make use of that knowledge to the fullest extent.

Original Articles.

A COMPARATIVE STUDY ON CERCARIAL FAUNA IN MADRAS. *

BY

M. ANANT NARAYAN RAO, G.M.V.C.,

Lecturer in Parasitology, Madras Veterinary College.

Liston and Soparkar (1917) first started the study of Cercariae in India and began with the life history of *Schistosoma Spindalis*. Montgomery (1906), and Kemp and Gravely (1919), investigated into the possibilities of the presence or the introduction of Human Schistosomiasis in India by Troops returning from overseas. Sewell (1919) studied about the possible occurrence of *S. japonicum* Katsurada. (1904), in India. Soparkar (1921) published a full account of the Cercaria of *S. spindalis* and also a few other furcocercariae in *Planorbis exustus* (Deshayes) in Bombay. Sewell (1922) continued and amplified the work already commenced, and published his valuable monograph on *Cercariae Indicae*. Hamilton Fairley and Jesudasan (1930) in their "Studies in *Schistosoma spindale*" confirmed and amplified the work done by Liston and Soparkar on the life history of that parasite. In doing this the workers have published their observation on the Cercarial Fauna in the town of Bombay, and Sewell in the town of Calcutta.

In the Madras Presidency, Sewell (1922) studied the Cercarial Fauna of only the Nilgiri plateau, Wynaad with the adjoining plains of Malabar and Southern portion of the Chilka lake. It was therefore

* Received for publication on 10-9-32.

thought that the publication of the study on the Cercarial Fauna in Madras may be of some use to future workers.

In Madras there are a number of tanks, which do not dry up in any season and most of them contain a fairly large number of fresh water snails, affording enough material for such study. The Spur Tank, Egmore, was chosen for the purpose owing to its proximity to the College Laboratory, and it is one which is used by a fairly large number of cattle from the surrounding localities.

Collections of two species of molluscs, viz., *Planorbis exustus* (Deshayes) and *Limnea leuteola* (Lamarck) were made in every month from January 1931 to the end of that year. The test-tube technique, practised by Leiper (1915), was followed because this was found to be more rapid and less elaborate than actual dissection of all the mollusca collected. This method was also followed by Soparkar (1921) and Hamilton Fairley and Jesudasan (1930). *Limnea* species have the habit of crawling out of water in the test-tube on to its edge and falling over, and to prevent this, tubes containing snails of that species were lightly plugged with cotton wool. The tubes were left over night and the total number of snails discharging cercariae were noted, the cercariae studied and classified. The snails that did not discharge any cercariae, within 24 hours, were kept for nearly a week and the results noted.

Kinds of Cercariae found.

(a) From *Planorbis exustus* the following Cercariae were obtained:—

- (1) Cercariae Indicae IX Sewell 1922.
- (2) do XXVI do
- (3) An amphistome Cercaria of Sewell's *Diplocotylea* group hitherto undescribed. (C. Kylasami n. sp.)
- (4) Cercariae Indicae XVII Sewell 1922.
- (5) do X do
- (6) Cercariae of *S. spindalis*.

(b) From *Limnea leuteola* the following were obtained;—

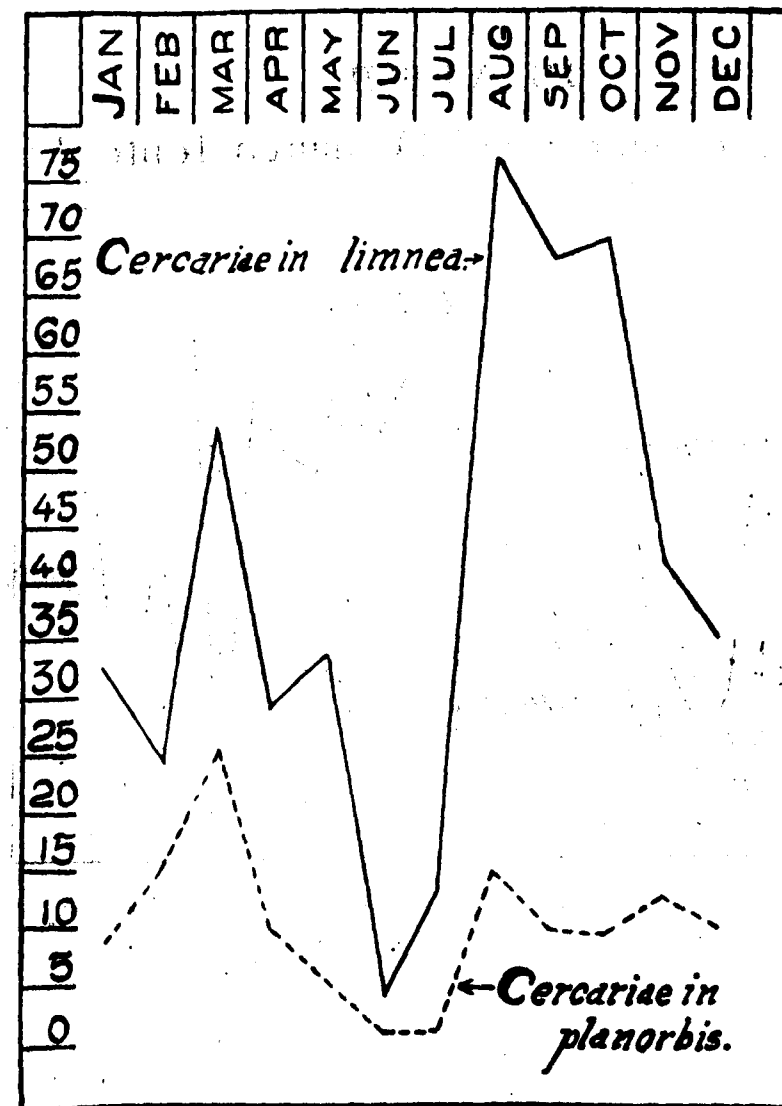
- (1) Cercaria Indicae XXIV Sewell 1922.
- (2) do XXIII do
- (3) do XIX do
- (4) A Furco-cercaria, undescribed hitherto. (C. saundersi n. sp.)
- (5) A Furco-cercaria, undescribed hitherto and is under study.

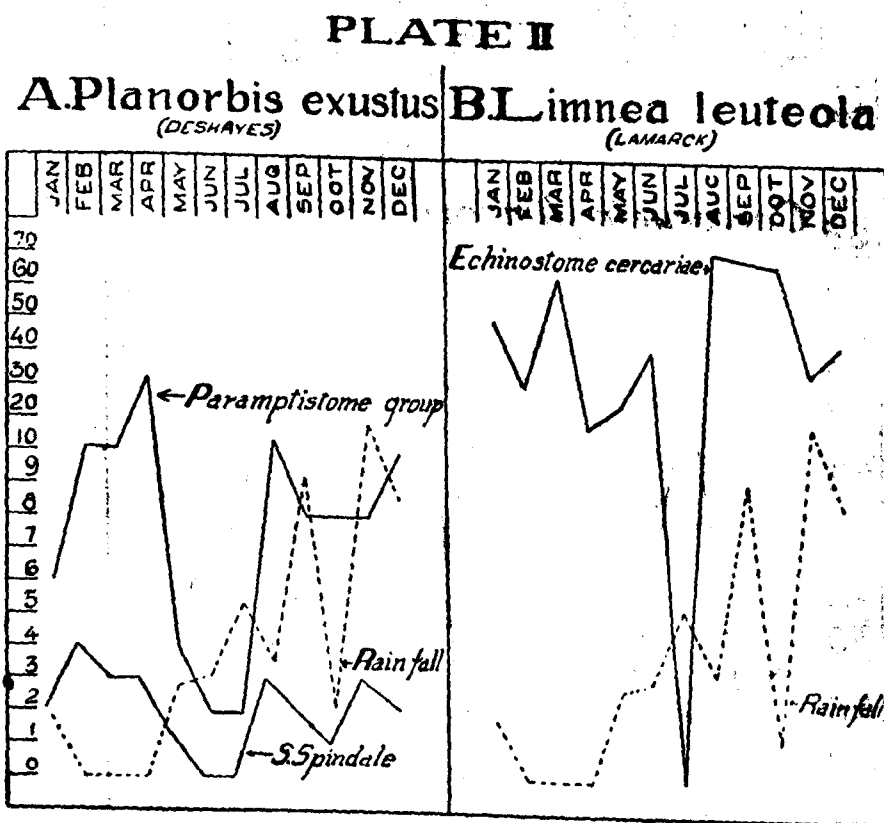
In all, eleven species of Cercariae were obtained out of which three happened to be new ones. Double infection in *Limnea leuteola* has been observed on four occasions,

Cercariae Indicae XXIX was found by Sewell in *Limnea acuminata* (Lamarck) in Calcutta and in *Limnea succinia* (Lamarck) and

PLATE I

Percentage curves





Gyralus euphraticus (Mousson) in Wynaad. In Madras, it was obtained always only from *Limnea leuteola*. It appears therefore that it is not very selective as regards its intermediary host.

The cysts of Cercariae Indicae Nos. XXVI and XXIX were fed to calves and *Paramphistomum cervi* (Schrank, 1790) and *Fischeodreus elongatus* (Poirier, 1883) respectively were obtained. C. I. XXIII, Sewell 1922, was allowed to encyst on the gills of fish and in wild snails kept for the purpose. These were fed to dogs and cats and a species of *Eupharyphium* resembling *E. malayanam* (Leiper 1911) was obtained.

SEASONAL VARIATION OF INFECTION IN MOLLUSCA.

This was studied only in two species of mollusca, viz, *P. exustus* (Deshayes) and *Limnea leuteola* (Lamarck), from only one tank (vide supra). These observations have been based on the collection of mollusca every month for one year. A total of 2383 *Planorbis* and 2301 *Limnea* were examined on the whole. The attached graphs show the percentage infection in every month for all the Cercariae taken together and of *S. spindalis*, *Paramphistome* and *Echinostome* Cercariae taken separately. The rainfall during the year is also marked.

It is seen from the graphs that, excepting during the months of June and July, infection is found in snails in all the months to a greater or lesser degree, and there are two rises, one in March and another in August.

The curve of Cercaria of *S. spindalis* shows three peaks, viz. February, August and November. It is low or absent only in May, June and July. The curve for the Cercariae of *Paramphistoma* group also shows three peaks, in April, August and December, and the interesting point with this is that there is roughly a difference of four months between each peak. The curves for the cercariae in *Limnea leuteola* has only two sharp peaks, one in March and the other in August and the mollusc host is never free from infection at any time of the year, with exception of *Echinostome* cercariae which drops to zero in July.

Sewell (1922) working in Calcutta also observed a double rise in infection rate but there is some difference in the time of the year between that found there and that obtained for Madras.

As regards the Cercaria of *S. spindalis*, Soparkar (1921) working in Bombay, found the greatest incidence during the monsoon months in Bombay. Hamilton Fairley and Jesudasan (1930) on the other hand found that the seasonal incidence is low during the monsoon and fairly high during the cooler months. In Madras the graph shows that the incidence rate goes up to 3 per cent. during the rains and between 2 and 4 per cent. during the dry and cool months of the year. Though two rises in the

incidence of infection rate of *S. spindalis* has been observed in three different places by different people, yet each one seems to get a different result as regards the monsoon and the infection rate. Hence it may be possible that there is no relation between the monsoon and the infection rate of Cercariae of *S. spindalis*, excepting indirectly in keeping the tanks supplied with water.

The curve of infection of all the Cercariae taken together in Planorbis is seen to rise with the monsoon and the reason for this is not quite clear.

Conclusion:—During his tours the author has had the opportunity of collecting and studying the Cercariae obtained from Mollusca in the Districts of Kurnool, Bellary, Anantapur, Chittoor and Coimbatore. It was found that Cercariae of *S. spindalis* could be obtained in fairly large numbers in Planorbis exustus, in all the Districts. It is strange that Cercariae of the liver fluke, *F. gigantica* (Cobbold, 1855) of cattle and sheep in India, has not been described hitherto though that parasite is fairly common in this country. The life history of many of the trematodes found in cattle in India have not been worked out and unless actual feeding experiments are made on susceptible animals nothing will be known about them, and the importance of knowing the life history of all parasites of animals of economic value is obvious.

SUMMARY

- (1) Eleven species of Cercariae are available in the fresh water mollusca viz. Planorbis exustus and Limnea leuteola in the Spur Tank, Madras.
- (2) Three of the species of Cercariae obtained have been found to be new to Science.
- (3) Monthly infection rate in the respective species of snails have been plotted out in curves and their relation with the monsoon has been discussed.

REFERENCES.

- Hamilton Fairley, N. and Jesudasan, F. (1930). *Studies in Schistosoma Spindale. Part I. Indian Medical Research Memoirs, No. 17.*
- Kemp and Gravely, F. R. (1915). *On the possible spread of Schistosomiasis in India. No. 1. Ind. Jour. Med. Res. VII.*
- Leiper, R. T. (1915). *Report on the results of the Bilharzia Mission in Egypt. Jour. Roy. Army Med. Corps, XXV.*
- Liston, W. G., and Soparkar, M. B. (1918). *Bilharziosis among Animals in India. The life cycle of Schistoma Spindale. Ind. Jour. Med. Res. V.*
- Montgomery, R. F. (1906). *Observations on Bilharziosis amongst animals in India. Jour. Trop. Vety. Sc. I.*
- Sewell, R. B. Seymour, (1932). *Cercarias Indicae. Ind. Jour. Med. Res. X Supplement.*

Sewell, R. B. Seymour, (1919). *The possible occurrence of Schistosoma Japonicum Katsurada in India. Rec. Ind. Mem. No. 29, Vol. XVI.*

Soparkar, M. B. (1921). *The Cercaria of Schistosoma spindale. Ind. Jour. Med. Res. IX.*

Soparkar, M. B. (1921). *Notes on some Furco Cercariae from Bombay. Ind. Jour. Med. Res. IX.*

THE ETIOLOGY OF BOVINE NASAL GRANULOMA.*

BY

CAPT. S. C. A. DATTA, B.Sc., M.R.C.V.S.,

Temporary Veterinary Research Officer, Imperial Institute of Veterinary Research, Muktesar.

INTRODUCTION.

There exists in India a peculiar chronic disease of the nostrils of cattle which in certain areas affects large numbers of animals and causes considerable loss to cultivators. The disease is known to exist in Assam, Bengal, Bihar and Orissa, Bombay, Central Provinces, Madras, Mysore and probably also in Sindh. It has existed in certain places for decades but it shows no tendency to spread as an epizootic. The condition would appear to be confined to India as no reports are available from any other part of the world. The peculiar immunity of the buffalo against this nasal affection has been particularly commented upon in every province of occurrence from time to time. Interesting information is available from a certain enzootic area of the Bombay Presidency that although nearly all the animals in the village are watered from a common watertrough, no horses or buffaloes have ever been known to be affected with the disease.

Although there is little doubt that this condition has existed in India for a long time, the earliest printed reference in English to this so-called "Snoring Disease" would appear to be by Jeya Singh. Raj [1910]. Krishnamurti [1922] was the first to demonstrate certain eosinophile, rosette-form bodies in histological sections, and he contended that the disease was a form of actinomycosis, since each of these bodies was considered by him to be a characteristic "ray-fungus". Cooper [1923] confirmed the above histological findings by studying tissues obtained from various provinces and further he [1923 and 1931] recovered repeatedly in pure culture a streptothrix organism from the lesions. Extensive experiments were carried out by him [1925] to transmit the disease artificially to healthy cattle, by housing in contact with naturally affected cases and by infection in various ways with a streptothrix isolated cultur-

* Reprinted from The Indian Journal of Veterinary Science and Animal Husbandry II. 2.

ally from the lesions but with negative results. Das [1929] also carried out experiments in the field regarding the mode of infection and obtained negative results. With regard to treatment, Das [1929] showed that although Potassium Iodide exerted no beneficial effect, the curative value of Tartar Emetic, as claimed by Parthasarathi Naidu [1921] when working at Saidapet in the Madras Presidency, was undisputed.

In commenting on the failure of Potassium Iodide, Edwards [1929] stated:—"It may be that the condition is not in reality a streptothricosis, in spite of the fact that granules apparently indistinguishable from those of actinomycosis are discoverable in the lesions". Cooper [1931] investigated a large outbreak in Jubbulpore a description of which has been recorded by Oxspring [1931], and summarised the position, on that date, concerning the etiology of Bovine Nasal Granuloma by saying that "since the disease is definitely amenable to treatment with Tartar Emetic, and this drug is of great value in the treatment of some protozoan affections, such as Kala Azar and Surra, it is reasonable to suppose that Bovine Nasal Granuloma may be due in reality to a protozoan organism. In 1927 Krishnamurti detected cases of nasal granuloma in cattle which were definitely due to a Rhinosporidium, regarded by some as a member of Protozoa, and certain facts have recently been collected by us indicating that it may yet be possible to correlate all the lesions found in cattle, including those at present believed to be due to streptothrix organism, with Rhinosporidium as their cause". In passing, it may be recalled with interest that Christopherson [1918] was the first to point out the almost specific action of Tartar Emetic in human bilharziosis in the Sudan.

The object of the present article is to record certain definite finding of the author in support of the view that Bovine Nasal Granuloma is a clinical manifestation of Schistosomiasis, where the worm seeks out the nose for the deposition of its eggs and as will be shown later, this view will readily explain all the known facts about the disease. It must be made clear here that there exists in India another separate and distinct affection of the nose of cattle and horses, namely, Rhinosporidiosis as described by Krishnamurti [1927 and 1931] and confirmed by Professor Ashworth, the eminent Zoologist of Edinburgh, in a private communication. Nasal Granuloma proper can however be easily differentiated by its naked eye appearances and the specific microscopic features. Lesions of Nasal Granuloma are elevated nodular masses, intimately connected with the subjacent tissues by a broad base. Lesions of Rhinosporidiosis, as pointed out by Krishnamurti, are more fragile and pediculated being composed of softer and more spongy tissues.

Plate IX.



Fig. 1. Photograph showing growths on the mucosa of the lateral wall of the nasal chamber in its anterior third.

Courtesy: "The Imperial Council of Agricultural Research."

Plate XI.

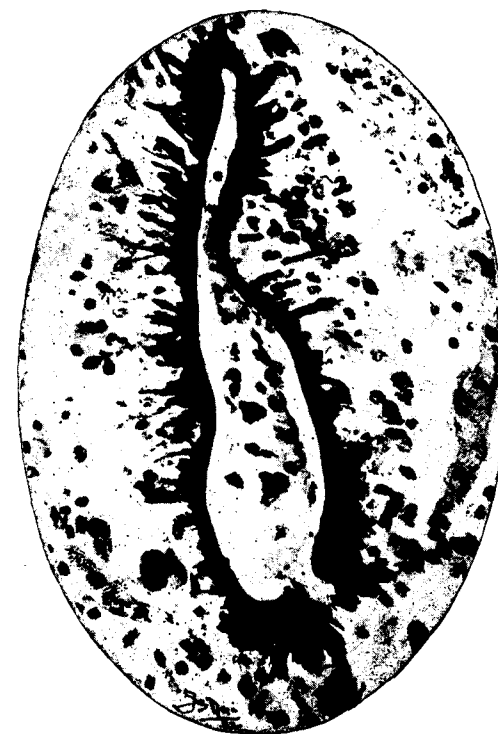


Fig. 3 ($\times 400$). Microphotograph of an "actino" body in section. The central cavity contains the cellular elements of the embryo.

Courtesy: "The Imperial Council of Agricultural Research."



Fig. 2 ($\times 400$). Microphotograph of the "Spindalis" type of egg found in the nasal discharge obtained from clinical cases at Muktesar. Note that one end is pointed and the other blunt.

Courtesy: "The Imperial Council of Agricultural Research."



Fig. 3. Microphotograph of a pair of adults in the "copula" in the fresh state, removed from the growth from a clinical case at Muktesar.

Confirmation of the diagnosis, initially made from the gross characters, can easily be obtained by microscopic examination by finding the characteristic rosette-shaped "actino" bodies in the former and the chitinous sporangium with spores in the latter.

CLINICAL DISEASE.

A constant running generally of both the nostrils, associated with noisy breathing and an occasional sneezing serves as the first indication of the disease. Apart from the symptoms of snoring and respiratory distress, which are markedly increased at work, there is no evidence of systemic ill health. The character of the nasal discharge varies with the development of the disease, being either thin serous, thick mucous, muco-purulent or sanguineous. The lesions of the disease first make their appearance at the alar margin of the nose and gradually make inroads posteriorly. Although the condition is a localised disease of the anterior nares, which is extremely well-suited for the extrusion of the mature egg, in advanced cases the middle region or even the posterior region may be encroached upon. At the Museum of this Institute, there are mounted specimens of Nasal Granuloma showing growths (1) on the mucosa covering the septum nasi to about the middle (2) on the turbinated bones to near their posterior limit, and (3) on the mucosa of the lateral walls of the nasal chamber in its anterior third. Plate IX, Fig. 1 shows the last mentioned specimen, which was obtained through the courtesy of Mr. W. Harris, M.R.C.V.S., Superintendent, Civil Veterinary Department, Assam. Initially the nasal mucosa shows patches of congestion and exceedingly minute vesicular and papular elevations, which develop into rounded granular patches of inflammatory thickening. Palpation of the abnormal surface gives one the impression of roughened crocodile skin. On the "mulberry like" processes of granulation, yellowish areas are seen, the surface epithelium of which gives way producing minute shallow ulcers, through which the ova make their exit. In the course of the present investigations, the writer had the opportunity of examining at Muktesar six clinical cases of Nasal Granuloma, three of which were obtained from Jubbulpore in 1930 and the other three from Bihar in 1931. Examined under the microscope, a caustic potash preparation made from the shreds of mucus contained in the nasal discharge of affected animals reveals varying forms of Schistosome eggs, and young forms of the parasite. In addition to the above-mentioned six cases, nasal discharges from 3 clinically affected animals at Jubbulpore have recently been received and examined and eggs of the "Spindalis" type have been seen in each case.

Examination of the urine reveals certain rudimentary forms of the parasite but the faeces have been found on the other hand to be

negative. It is to be noted that no mature ova have been discovered in the urine and no symptoms of bladder affection have been observed. The urine from these animals has been negative to the bensidine test for blood.

Roughly speaking, the varying ova found in the nasal discharge were (a) nonspind globular egg (b) round or ovoid egg with a single terminal spine which may be short or long slender throughout the length or broad at the base (c) an ovid—elongated egg with double terminal spine (d) an egg of the "Spindalis" type (Pl. IX, fig. 2.), as first described in India by Montgomery [1906] and also found by Vriberg [1906] in Sumatra. The exact significance of so many types of eggs is not clear.

Young, developing adult worms were also seen in the nasal discharge. The young males are short and tuberculated with a prominent ventral sucker, which in most cases being of yellow colour makes detection easy. The ventral sucker approaches the anterior end of the worm, as it develops. The young females are rather long and filiform.

Adult Schistosomes as seen in Pl. IX, fig. 3 have been removed at Muktesar from the diseased tissue. This was removed surgically by slitting open the nose, and deep sections were removed from the most posterior portion of the growths as they were most likely to contain the healthy adults. An adult male was first isolated from the blood and other fluids collected during the surgical operation.

PATHOLOGICAL HISTOLOGY.

The material for histological study was obtained from specimens, which had been collected at this Institute from about 12 cases of the disease from Assam, Bombay, Mysore Bihar and the Central Provinces from 1922 onwards.

Although other forms of bilharziosis, such as urinary and intestinal, are frequently associated with a tendency towards malignancy and the formation of polypoid growths, the essential histology of Bovine Nasal Granuloma is simply that of granulation tissue, the exact character of which depends upon the degree and the duration of the infection. An early growth is made up of very vascular young connective tissue, fibroblasts in activity being in evidence. Old tumours are not so highly vascular and contain a considerable amount of well formed fibrous tissue. Eosinophilia, which is a notable feature of Nasal Granuloma, may be localised in the periphery of the follicles, to be described later, or may even be diffusely scattered.

The epithelial covering of the growth is nearly completely intact excepting for areas showing ulceration. The epithelium covering active lesions shows inflammatory softening and may be actually thinned down due to the pressure exerted by the ova attempting to work



Fig. 2 ($\times 80$). Microphotograph of a section of the growth showing follicles with giant cells and "granules".



Fig. 1 ($\times 200$). Microphotograph of a section of the growth showing the epithelium thinned down and raised due to the pressure exerted by the subjacent ova, about a score of which can be seen here.

Plate X.



Fig. 1 ($\times 400$). Microphotograph of the "Spindalis" type of egg in the tissue, showing the blunt and the pointed ends. Note its similarity with microphotograph No. 2, Plate IX.

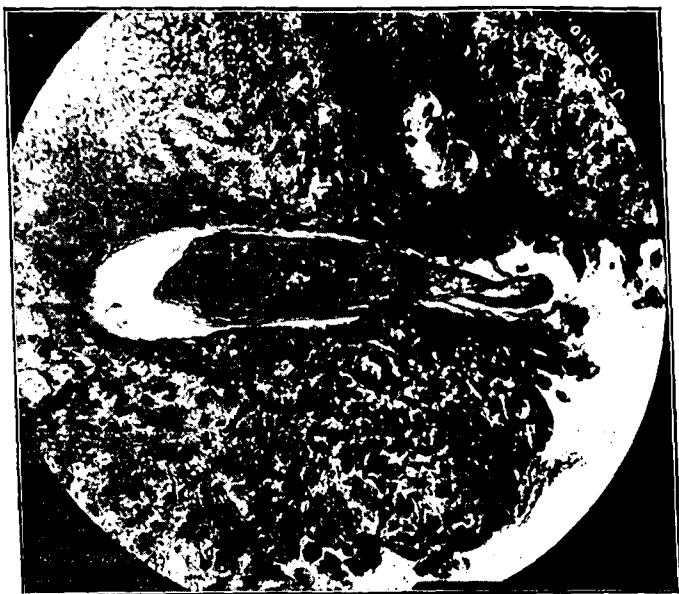


Fig. 2 ($\times 400$). Microphotograph showing a fully matured miracidium still attached to the spiny portion of the egg, lying in the space left by the egg. The caudal extremity of the embryo can be seen inside the egg shell.

Courtesy: "The Imperial Council of Agricultural Research."

their way out." (Pl. X, fig. 1.) Occasionally the apices of the epithelial papillæ are found infected and may show degenerative changes. It is primarily in the submucosa that the ova are deposited in quite appreciable numbers, determining the nodular vascular masses of simple elevations of the mucosa which characterise the disease. The submucous connective tissue is rather loosely disposed and may show channel formations.

The most characteristic microscopic lesions of Nasal Granuloma are represented by the *follicles* (Pl. X, fig. 2) the central core of which presents what has been considered by Krishnamurti [1925] to be "actinomycotic granules" surrounded by a characteristic "ray fungus" or "club" formation. The lesions are observed to follow a sequence of events, starting with a destructive abscess around the offending parasitic mass. The individual microscopic lesions that are formed in this manner are nodular abscesses, which are mainly cellular in character being composed of small round cells, endotheloid cells and polymorphonuclears. Having failed to extrude the irritant by a destructive process, an attempt to completely encapsulate the irritating ova is made and the process of repair as manifested by eosinophile cells and fibroblasts sets in. In places certain follicles are seen being exclusively composed of small round cells without any remnant of the parasitic element being discoverable in the centre. The appearance of some follicles would appear to be due to the section having passed through the periphery of the nodule. In early follicles, the young ova are seen surrounded by many layers of typical endotheloid cells with the formation among them of huge giant cells immediately surrounding the ova or in their neighbourhood. Evidence of degeneration with diffuse staining and broken down nuclei is seen in the centre of some follicles, in others the parasitic mass has been removed with a few giant cells still persisting, notwithstanding the maturity of the fibrous tissue supporting the follicles. In advanced lesions, the ova undergo calcification or are resorbed or totally digested by the "foreign body" giant cells and no eosinophilia may be present in the altogether fibrosed nodule. With the simultaneous fibroblastic activity and eosinophilic infiltration, concentric rings of fibrous tissue gradually invade from the periphery inwards until the lesion may be considerably fibrosed. From the above description of what have been designated as *follicles* by Krishnamurti [1925], in association with the presence of "foreign body" giant cells, it will be observed that the follicles appear to be identical with "a typical bilharzial *pseudotubercle*" of Fairley [1920].

Now in regard to the peculiar bodies, "the clubs", Krishnamurti [1922] has considered them to be specific and of causal significance. These bodies are quite gram-negative but stain well by Plaut and other methods used for actinomycetes. The "clubs" or as the present

author prefers to call them, the "actino" bodies of Nasal Granuloma present certain definite peculiarities as compared with those of classical actinomycosis. Unlike actinomycosis, the central cavity within the "actino" body of Nasal Granuloma is definitely bounded with a thick, highly refractile capsule of hyaline nature and contains no gram-positive microorganisms or streptothrix filaments but reveals nuclei of the parenchymatous cells of the enclosed larva instead. This central cavity takes varying shapes up to that of a "Spindalis" type of an egg and contains in most cases a granular body or may even be empty, depending upon the angle at which the egg is sectioned and upon whether the enclosed larva is sufficiently differentiated for well defined structure to be recognisable inside it. In some shells, however, definite structures of the parasitic embryo can be seen.

The author agrees with Colebrook [1930] who states:—"The first point—and it is not at all new—is that the formation of "clubs" is not a specific character of mycelial infections. Thirty years ago it was shown that clubs were formed around a mass of dead tubercle bacilli implanted into living tissues and since then this has been demonstrated in many other circumstances." It is now known that the actino-bacillus, staphylococcus and *B. pyogenes* can produce "clubs". Recently Beaver [1931] has found a colony of staphylococci in the centre of a small abscess assuming morphological resemblance to *Actinomyces hominis*. The present investigation and another by Yamagiwa [1931], which is referred to below, have revealed that the same reaction in the shape of "actino" bodies can be produced also in helminthic infections, such as by Schistosomes. As "actino" bodies may be present in such divergent conditions as detailed above, it is clear that they cannot be considered specific. In what the author considers an earlier stage, the capsular body containing the parasitic mass is seen encircled outwardly with a pale blood-tinged fluid and later with certain changes the capsular body is encircled with numerous closely adjacent eosinophile club-like processes arranged in a radiating manner. The exact significance of the eosinophile "actino" bodies is not clear but it is undoubtedly a manifestation of the host's reaction and attempt at delimiting the ravages of the parasitic worm or of its toxin. In dealing with Madura disease and Actinomycosis, Kanthack [1893] has expressed the same opinion thus:—"Cubs are only formed when there is evidence of resistance on the part of the tissue towards the microorganisms. In rapidly spreading and extensive cases, little or no club formation may occur". Yamagiwa [1931] has encountered a similar reaction of "clubs" outside the parasitic shell in the study of lesions caused by *Schistosoma turkestanicum*. The interesting figures of degeneration of the egg shell given in support of his paper



Fig. 2 ($\times 80$). Microphotograph of mature worms in cobula lying in the tissue. No remnant of vessel endothelium or glandular epithelium is recognisable.

Plate XII.

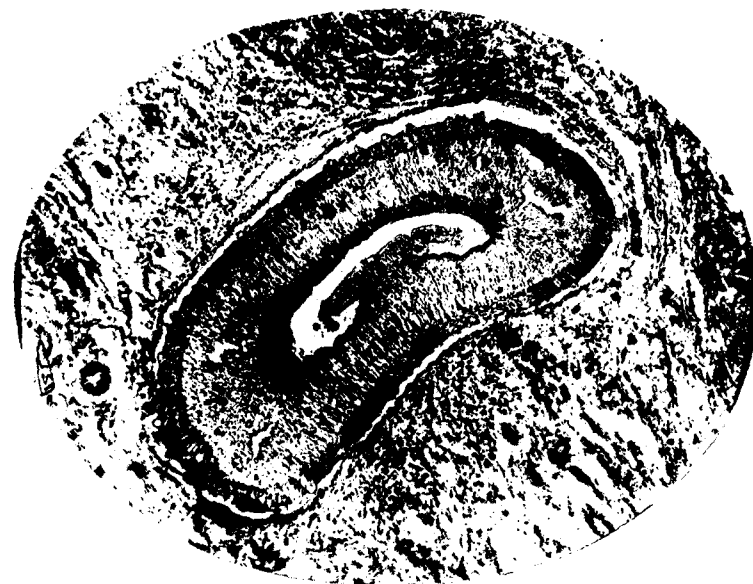


Fig. 1 ($\times 400$). Microphotograph of a transverse section of male worm in the tissue showing cuticular tubercles.



Fig. 3 ($\times 120$). Microphotograph of a deep section showing mucous glands and blood vessels, which contain several pairs of worms in copula.

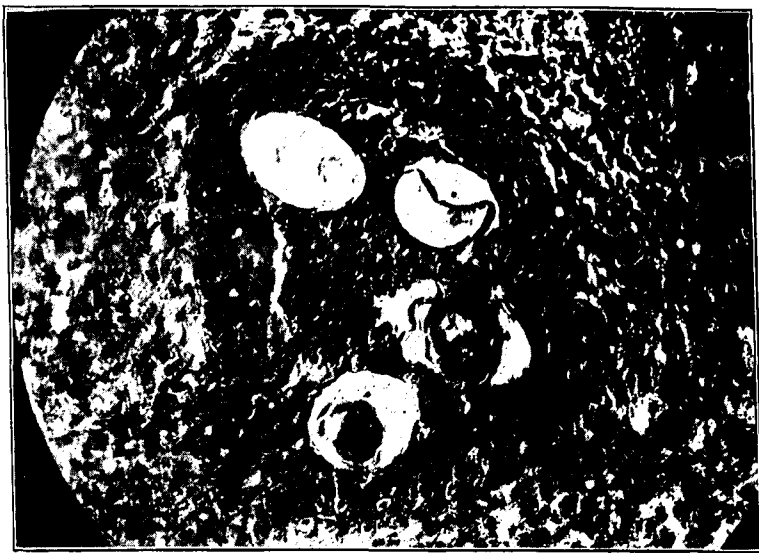


Fig. 4 ($\times 400$). Microphotograph showing a gland impacted with eggs and the commencement of changes for the production of a pseudotubercle.

Courtesy: "The Imperial Council of Agricultural Research."

form an illuminating study, as they present a great resemblance to the like structures encountered in Nasal Granuloma. In a notable contribution on the morbid histology of Onchocerciasis, Shafi Mohammad [1931] has made the suggestive statement:—"Giant cells here appear small and more compact and take various shapes, thus becoming *flattened or radiating* in close apposition to the cellular and fibrous elements around. This is due to the pressure of the growing fibrous tissues round them and also the counter pressure of the capsule of the tumours. Their protoplasm is not so eosinophilic as the above mentioned giant cells and their nuclei are pressed together into one or more solid masses and take the stain deeply."

In the different parts of the matrix of the growth, empty spaces of various shapes, rounded, oval, or spindle-shaped, are occasionally seen. These are presumably a kind of mould left by the eggs. The resemblance of the shapes to those of the actual ova discovered in the nasal discharges is worthy of note. The matrix reveals groups of embedded eggs or empty irregular capsular shrunken shells. Various stages of the embryo within the egg shell can be made out. Some appear to be fully developed, other show a distinct segmenting embryo whilst some egg shells are altogether collapsed and contain little or no organised material. Judging by the appearance, shrunken and blackened shells with dark amorphous content would appear to be eggs that have died due to unfavourable conditions. Inside the shell of viable eggs, a distinct envelope (vitelline membrane) may be seen enclosing the embryo. Some ova contain cells staining at the periphery, while others show cells staining at the centre. In one ovum, at least, a fully matured, miracidium was seen still attached to the spiny portion of the egg shell (Pl. XI, fig. 2). In some sections, spaces which were originally occupied by the eggs are seen occupied by mature or immature miracidia, a few of which are seen as leaf-shaped bodies with an anterior cone, eosinophilic cephalic glands and a distinct constriction between the cephalic and caudal regions. Some miracidia were observed to have a blunt caudal extremity terminating abruptly, and these presumably were the females.

In deeper sections, many coiled mucous glands and large blood vessels are included. Some of the glands are apparently normal although containing some discharge. Others may show hyperæmia. The glandular epithelium quite frequently is noticed to undergo fatty degeneration and vacuolisation in many places. In two samples of histological tissue, the discharges in the nasal gland have been found to contain typical Bilharzia worms. Some glandular tubules were definitely impacted with clusters of ova (Pl. XII, fig. 4), which would appear very suitable to form the nucleus of "bilharzial pseudo-tubercles". It is difficult at times to say definitely whether a

pseudo-tubercle was initially formed by the deposition of eggs in the tubules of nasal glands or within dilated capillaries or in the matrix of the connective tissue itself.

Apart from the changes in the connective tissue of the nose described above, the blood vessels show marked lesions in the shape of varying degrees of endarteritis, the lumen of some being altogether obliterated. The blood vessels in deeper sections are generally larger and contain mature healthy worms, either singly or *in copula* (Pl. XII, fig. 3, and may present considerable dilation and degrees of end-arteritis. As the worms in these vessels appear quite healthy and undegenerated, the changes in the endothelium and the wall of the vessels would appear to be due to bilharzial toxins. It is interesting to note that the lower margin of the field in a microphotograph (Fig. 2, Plate V) in Krishnamurti's [1925] Memoir shows what would appear to be a healthy *Schistosoma* worm. Some blood vessels reveal a perivascular reaction. If the mature worm or embryo undergoes death or degeneration, the parasite remnants serve as the commencing nucleus for thrombus formation. With an attempt at organisation of the thrombus so formed, the lesion in the blood vessel involves the other coats as well and is not restricted to the endothelium alone. The stages in the formation of pseudotubercles, characterised by huge giant cells, eosinophiles and fibrosis as already described, are also seen in the case of a capillary vessel containing bilharzial elements—the affected vessel finally losing its identity. A certain number of vessels in the growth have been observed to have a disrupted wall resulting in hæmorrhage into the surrounding tissue. It is believed that by means of the spine of the egg and due to the histolytic substances elaborated by the enclosed larva and exuded through the egg shell, a way into the perivascular tissue is made. The ova probably find their way in this fashion into the extravascular tissue, although it seems possible that an occasional mature female may stray into the tissue outside the vascular system and sometimes lay the eggs *in situ*.

DISCUSSION.

Earlier in the paper it was stated that the view that Nasal Granuloma proper is a form of Schistosomiasis readily explains all the known facts regarding the condition. These facts may be summarised as follows:—

- (i) Heavy accumulation of eosinophile cells in sections.
- (ii) The occurrence of peculiar "actino" bodies or "clubs" as a reaction against parasitic capsular shells.
- (iii) The superficial formation of characteristic small granulations without involvement of the tissues of the tongue and jaw, and the chronic nature of the lesions.

- (iv) Enzootic nature of distribution.
- (v) Failure of experimental transmission of the disease by contact, and by treatment with cultured *Streptothrix* or with diseased tissue.
- (vi) Failure with Iodine treatment and almost specific response to Tartar Emetic.

With regard to the identity of the parasite, it has been stated that the "spindalis" type of egg has been seen in the tissue and in the nasal discharges of affected animals and the adult parasite also resembles *Schistosoma spindalis*, Montgomery, but unfortunately fully mature specimens have not yet been obtained so that a definite opinion on this point cannot yet be expressed. However, certain facts have come to light which suggest that it may be a new species. It is interesting for example, to note that Fairley and Makie [1926] conveyed infection of *Schistosoma spindalis* to buffaloes, which they believe to be the natural hosts of the parasite, but the buffalo appears to be strongly resistant to attack by the parasite of Nasal Granuloma.

Liston and Soparkar [1918] and other workers on *Schistosoma spindalis* infection mentioned above, have not encountered eggs of any other type than "Spindalis," although these workers have studied infection by this parasite in such animals as cattle, young goats, guinea pigs, buffalo and the monkey (*Macacus sinicus*). They have also stated that *Schistosoma spindalis* affects only the alimentary tract or its appendages and its ova are voided solely with the faeces.

Further investigation into the specific identity of the parasite and its intermediate host, together with the reproduction of the disease, drug therapy, and prevention will be taken up as opportunities occur.

CONCLUSIONS.

A few cases of Rhinosporidiosis of cattle have been recorded in India, but Bovine Nasal Granuloma proper is a separate entity and is a Schistosomiasis.

Nasal Granuloma presents an altogether new localisation of Schistosomiasis, as compared with the hitherto known urinary and intestinal forms.

The parasite resembles *Schistosoma spindalis*, Montgomery, but certain differences which, are under study, have been observed.

The true nature of the "granules" previously described in this condition has been shown to be closely connected with the invading parasite, which sets up reactions, resulting in the formation of the so-called "follicles" and actino-bodies.

Examination of nasal discharges in caustic potash preparations should be of great value in the diagnosis of the disease in future.

With the definite information now available regarding the etiology of this condition, further experiments with the intravenous administration of such drugs as Tartar Emetin, Antimosan, etc., are indicated.

Acknowledgments. My thanks are due to Mr. G. D. Bhalerao, M.Sc., Helminthologist at this Institute, for giving me the value of his expert opinion and confirming my findings with regard to the parasitic elements discovered.

In conclusion, I take this opportunity of placing on record my great indebtedness to Mr. F. Ware, F.R.C.V.S., I.V.S., the Director of this Institute, for his keen interest and helpful encouragement and for affording me all facilities, without which the present investigation would not have been possible,

REFERENCES.

- Beaver, D. C. (1931). Granulomatous abscess of the liver of pyogenic origin—Plate 90, Fig. 9, *Am. Jl. Path.* 7, 3, p. 276.
- Colebrook, L. (1930). Discussion on Actinomycosis common to man and animals. *Proc. Roy. Soc. Med.* 23. Part I, p. 864. Section of Comp. Medicine and Surgery.
- Cooper, H. (1923). *Rep. of Imp. Bact. Lab., Muktesar*, for two years ending 31st March, 1924, p. 47.
- Cooper, H. (1925). *Rep. of I. I. of V. R., Muktesar*, for the year ending 31st March, 1925, p. 43.
- Cooper, H. (1931). *Report of I. I. of V. R., Muktesar*, for the year ending 31st March, 1931, pp. 23-24.
- Christopherson, J. B. (1918). The successful use of Antimony in bilharziosis by intravenous injection of Antimony tartaratum. *Lancet* (2), pp. 325-27.
- Das, P. N. (1929). Nasal Granuloma in Cattle, *Mem. Imp. Dept. Agri. India. Vety. Ser.* 4, 4.
- Edwards, J. T. (1929). Comments on Das's Memoir, *Mem. Imp. Dept. Agri. India, Vety. Ser.* 4, 4 v. 147.
- Fairley, N. H. (1920). A comparative study of experimental bilharziosis in monkeys, as contrasted with those in man. *Jl. Path. Bact.* 23, p. 298.
- Fairley, N. H. and Mackie, F. P. (1926). Pathology of *S. spindalis* *Proc. of 6th Congress, F.E.A.T.M., Vol. I, pp.* 423-447.
- Jeya Singh Rao (1910). A peculiar disease of Nose in South India, *Mad. Vety. Jl.* 1910, p. 419.
- Krishnamurti Ayyar, V. (1925). "Snoring disease" in Cattle. *Mad. Vet.* 11. No. 15, July 1922, pp. 2-7.
- Krishnamurti Ayyar, V. (1925). Nasal Granuloma in Cattle, *Memoirs of the Dept. of Agri. in India Veterinary Series* 3, 6.
- Krishnamurti Ayyar, V. (1927). Rhinosporidiosis in Cattle. *Trans. F.E.A.T.M.* 1927, Vol. III, pp. 658-664.
- Krishnamurti Ayyar, V. (1931). Rhinosporidiosis in horses. *Proc. 18th Session, Ind. Sc. Congress, Nygpur*, 1931, p. 356.
- Kanthack, A. A. (1893). Madura disease (Mycetoma) and Actinomycosis. *Jl. Path. and Bact.* 1 p. 140.
- Liston, G., and Soparkar, M. B. (1918). Life Cycle of *S. spindalis* *Ind. Jour. Med. Res.* 5. pp. 567-66.

- Montgomery, R. E. (1906). Observations on Bilharziosis among animals in India, II, *Jl. Trop. Vety. Sci.* 1 pp. 138-174.
- Oxspring, C. E. (1931). Bovine Nasal Granuloma. *Jl. R. A. V. C.* 2, No. 4 pp. 179-182.
- Parthasarathy Naidu (1921) Nasal Granuloma. *Mad. Vety. Jl.* Issue No. 19, pp. 2-6.
- Shafi Mohammed A. (1931). On the Morbid Histology of Onchocerciasis. *Ann. Trop. Med. and Parasitology.* 25, 2, p. 249.
- Vriberg, Von, A. (1906). *S. spindalis* in Sumatra. *Central-blatt for Bacteriologie* 43, 1906, pp. 806-807.
- Yamagiwa, S. (1931). Histology of lesions, caused by the invasion of *S. turkes-tanicum*, Skrijabin in Cattle. *Jap. Jl. of Vety. Sc.* June, 1931 p. 1932.

Anatomical Section.

SOME PECULIAR ANATOMICAL FINDINGS
IN THE HORSE.

BY

H. N. CHELVA IYENGAR, G.M.V.C.

Lecturer in Anatomy, Madras Veterinary College.

(Continued from page 12, No 1, Vol. IX.)

4. *Anastomosis of the Pre-humeral artery with a branch of one of the largest muscular branches of the Brachial artery.*—In all the subjects (horse) that were dissected all these years, the pre-humeral artery did not show any deviation in its course and distribution except in one subject. In the left fore of this subject that was dissected on 7-10-25, this pre-humeral artery was found to be extremely slender and one of the largest muscular branches which was intended for the biceps and which was detached from the brachial artery at the inferior third of the humerus, divided into two branches; one of these spent itself in the biceps at its inferior part while the other branch went up and anastomosed with the extremely slender pre-humeral. (Plate IV.)

Note:—The pre-humeral artery of the right fore limb of this subject was normal.

5. *Variation in the number of branches of the Deep Humeral artery.*—This branch—the deep humeral artery, is given off from the brachial artery either a little below or almost at the same level as the pre-humeral artery and after a short course backwards usually divides into four branches and supplies the three heads of the triceps extensor cubiti and scapulo-ulnaris. (Plate V-A.)

This deep humeral artery in the left fore of three subjects (horse) dissected on 7-10-25, 9-9-26, and 15-10-30 and in the right fore of the subject dissected on 25-10-29, instead of dividing into four usual branches divided only into three. (Plate V-B). Perhaps to compensate the want of the fourth branch, a branch nearly as large as the

deep humeral was found coming off from the brachial artery about an inch below the deep humeral. (Plate V-C). This additional branch was found spending itself purely in the caput magnum (long head) and caput parvum (medial head).

6. *Peculiar origin of the Ulnar artery.*—The ulnar artery usually comes off as a branch of the brachial artery arising from its posterior face and that just above the elbow joint at the lower border of the caput parvum (medial head of the triceps). This condition has been uniformly found in all the subjects but in the left fore of the subject that I dissected on 7-1-25, this ulnar artery was found to be a branch of the anterior radial artery instead of being a branch of the brachial artery and that marking its lower limit. (Plate VI.)

The ulnar artery of the right fore limb of this subject did not show this deviation in its origin.

7. *Variation in the number of branches of the large metacarpal artery:*—

(a) *Want of a lower branch of the large metacarpal artery.*—Large metacarpal artery usually gives off two unnamed branches and the first branch which is given off at the origin of the large metacarpal artery, joins the ulnar artery to form the supra-carpal arch while the second branch which is given off a little before the bifurcation of the large metacarpal artery into two digital arteries, branches. These branches of the second branch ascend to anastomose with the two anterior and two posterior interosseous metacarpal arteries.

The second branch of the large metacarpal artery of both forelimbs in the subjects dissected on 14-10-26, 21-10-26, 23-9-26 and 25-9-29, was wanting. A branch from the external digital artery went up (Plate VII) and branched in its turn. These branches ascended to anastomose with the two anterior and two posterior interosseous metacarpal arteries. It is therefore seen that in these four subjects that the want of the second unnamed branch was compensated for by this additional branch (of the external digital arteries) which behaved in a manner similar to the second unnamed branch of the large metacarpal artery.

(b) *An additional branch of the large metacarpal artery.*—Though only two unnamed branches of the large metacarpal artery were noticed usually in almost all the other subjects (with the exception of the four cases described in 7 (a) yet in the left fore of one subject dissected on 7-10-25, a third branch was noticed coming off from the large metacarpal artery in its course above the level of the lower part of the upper third of the large metacarpal bone. (Plate VIII.)

Plate No. V.



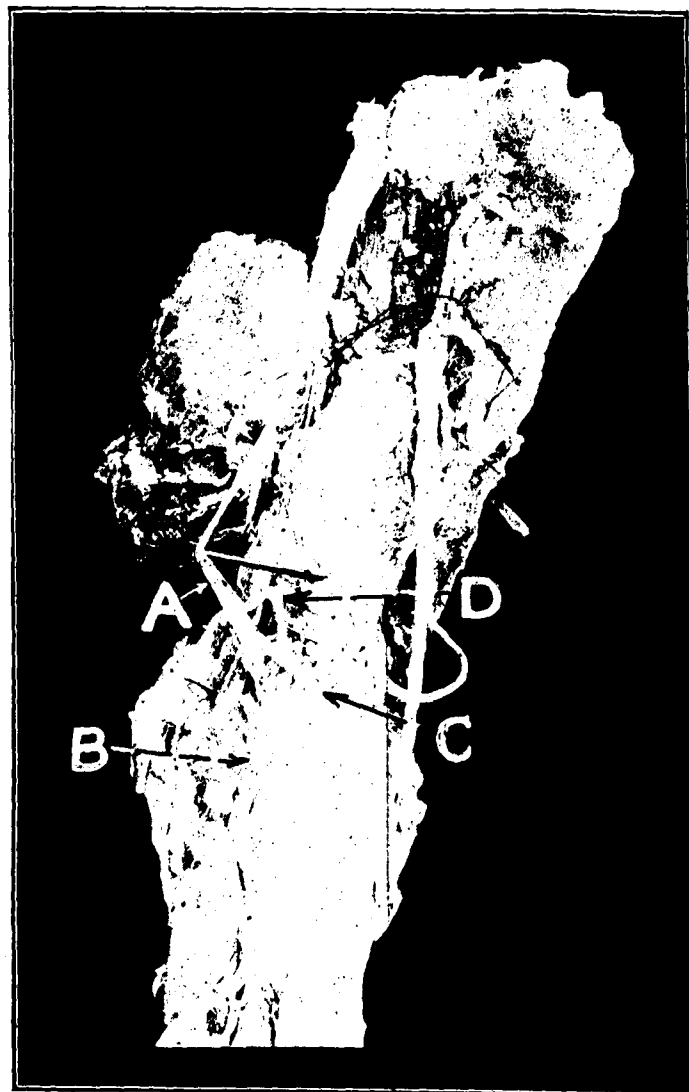
(A) Normal deep humeral artery.
(B) Deep humeral dividing into three branches.
(C) The compensatory branch.

Plate No. IV.



(B) Brachial artery: P. Prehumeral artery
M. Largest muscular branch to biceps.
U. Branch of M going up to P. (A) Anastomosis of U & P.

Plate No. VI.



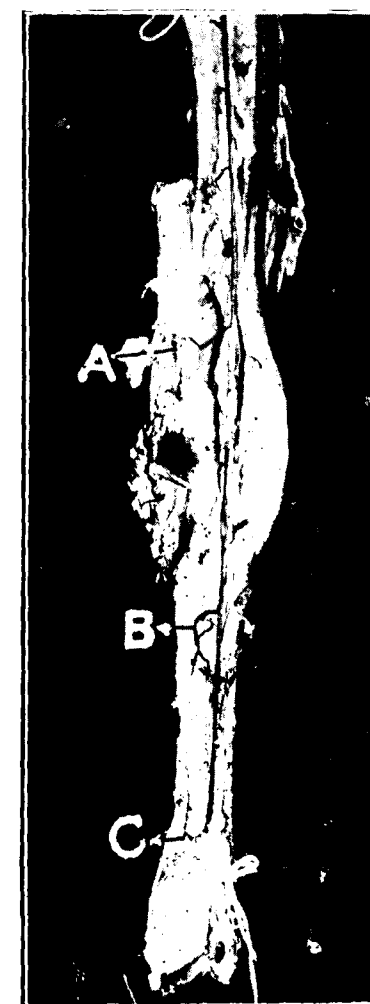
- (A) Brachial artery.
- (B) Posterior radial artery.
- (C) Anterior radial artery.
- (D) Ulnar artery arising from C.

Plate No. VII.



- (a) A branch of the external digital.
- (b) External digital artery.
- (c) Internal digital artery.
- (d) Large metacarpal artery.

Plate No. VIII.



- (A) & (C) The usual upper and lower branches, respectively of the large metacarpal artery.
- (B) The third stout branch.

General Articles.

AN INVESTIGATION INTO THE CONTROL OF FASCIOLIASIS IN CATTLE.

CARRIED OUT BY

S. UDAM SINGH,

Veterinary Inspector, on special duty,

UNDER THE DIRECTIONS OF

CAPTAIN S. G. M. HICKEY, M.R.C.V.S., I.V.S.,

Director, Civil Veterinary Department, United Provinces.

I. INTRODUCTORY.

In view of severe mortality reported of late years amongst cattle from the Almora district of the United Provinces, a hilly tract in the lower Himalayas, due to Fascioliasis which caused heavy losses to stock-owners, a primary inquiry was instituted by the Civil Veterinary Department, United Provinces, in collaboration with the Imperial Institute of Veterinary Research, Muktesar, to investigate the intermediary host responsible for dissemination of the infection and to adopt suitable remedial measures, both prophylactic and curative and to control the disease. Investigations carried out last year into the life history of the intermediary host by the Helminthologist of the institute have not yet been completed. During the monsoons of the present year further work in this connection has been taken up and the results will be made known in due course. However, as a result of preliminary investigation it was ascertained that the infection was due to *Fasciola Gigantica*.

This paper deals mainly with the remedial measures so far as they have been applied in the experiment under report.

II. REMEDIAL MEASURES.

(1) Use of Danistol.

(a) *Administration of the drug* :—The Director of the Imperial Institute of Veterinary Research, Muktesar, placed at the disposal of the Civil Veterinary Department, United Provinces, 740 sealed capsules each containing one gramme of Danistol which was administered to 34 head of cattle in November, 1931. In order to test the efficacy of the drug an equal number of infected animals was kept as controls. The drug was administered on an empty stomach in the morning before first feed for four consecutive days at the rate of three grammes for an animal upto 250 lbs. body weight and for every additional 100 lbs. 1·5 grammes more were added.

(b) *Effect of Danistol* :—Out of 34 animals kept as controls 33, i.e., 97.1 percent died during the cold weather from November to March while the remaining one, i.e., 2.9 percent was found alive but in poor condition with typical swelling under the jaw. Out of 34 animals which received Danistol 3, i.e., 8.8 percent died during, or soon after the course of treatment while the remaining 31 animals, i.e., 91.2 percent were found alive and most of them in good condition. In many of the treated animals striking improvement in their general health was noticed within a few days after the administration of the drug.

(c) *Toxicity of Danistol* :—With the exception of some cases of a temporary loss of appetite and slight diarrhoea no adverse effects on the general condition of the treated animals were observed. Within a few days the appetite was regained and diarrhoea ceased. The three treated animals which died were more or less in a cachectic condition when treatment was started and were presumably heavily infested with liver flukes. Post-mortem examination of one of them revealed the presence of numerous dead flukes mostly in a degenerated and emulsified state. Unfortunately the carcasses of the other two animals could not be had for post-mortem examination as the owners had thrown them down the *Khud* (hill side). Death of these animals is considered to be due to the toxic effects caused by the sudden destruction of the flukes and to absorption of products of their decomposition in the bile ducts. Leeb (1926) has shown that dried flukes contain albumen (63 percent.), fat (10 percent.) Glycogen (20 percent.) as well as numerous proteolytic and glycolytic ferments, that injections of aqueous extracts of dried flukes or of their excretions or secretions provoke symptoms identical with those of distomatosis and that the harmful properties due to mechanical inflammation of the bile ducts are less important than those provoked by the products of metabolism or which result from the decomposition of dead flukes.

(d) *Cost of treatment with Danistol* :—Approximate cost of a full course of 4 days treatment with the drug amounts to Rs. 14 per animal.

(2) Use of Carbon Tetrachloride in Cattle.

Considering the low value of cattle in this part of the country the high cost of Danistol stands in its way for its use for mass treatment of cattle in an infected area especially during these days of agricultural depression when there is need of an in-expensive but, at the same time, a highly efficient mode of treatment. Hence this opportunity was availed of to try the use of Carbon Tetrachloride—a drug which is much cheaper and possesses excellent anthelmintic properties but is nevertheless reputed to be unaccountably toxic.

(a) *Administration of first dose of Carbon Tetrachloride* :—In the latter part of March of the present year the drug was administered to 120 animals comprising 28 buffaloes, 42 bullocks, 36 cows, 11 young stock (cattle) and 3 goats. The cows and bullocks received a dose of 5 c.c. each, buffaloes 6 to 10 c.c. according to weight, young stock proportionately less from 1 to 4 c.c. and goats 1 c.c. in gelatinous capsules followed by a saline solution of magnesium sulphus excepting animals showing symptoms of diarrhoea.

(b) *Toxicity of Carbon Tetrachloride observed after first dosage* :—As a result of doing with the drug almost all the animals became ill exhibiting alarming symptoms of drowsiness, prostration, incoordination of muscular action, refusal of food, decreased yield of milk supply and in a few cases passing of blood stained faeces. Pregnant animals did not show any other ill effects. One buffalo died of acute poisoning about 10 hours after the administration of the drug and on post-mortem examination revealed the presence of numerous dead flukes together with a few amphistomes in the bile ducts. The latter were also found in the rumen. Two buffaloes and three cows died between a period of 2 to 3 weeks after the dosage probably due also to combined factors of general debility, irreparable damage caused to the liver by the flukes and possibly nutritional defects. One calf died about 1½ months after dosage: this appears to be due to parasites which at the time of dosage being immature might have escaped destruction. So the figure of mortality comes to 7 out of 120 animals treated, i.e., 5.8 per cent. This, of course, includes the animal which died of acute poisoning directly after dosage and the percentage for it is 0.8.

(c) *Curative effects of Carbon Tetrachloride observed 2 months after first dosage* :—Ninety nine animals i.e., 82.5 per cent. were found to have been beneficially effected by the use of 1st dosage of the drug. Three of the treated animals met accidental death which in no way could be connected with the use of the drug, (2 fell down the *Khud* and the other trampled to death). Eleven, i.e., 9.2 per cent. were found not to have shown any improvement in their general condition. Out of these 2, i.e., 1.7 per cent had the appearance of swelling under the jaw and a few had diarrhoea as well. It is noteworthy that with the exception of these two animals none of the others, whether found in good or poor condition after 1st dosage, showed return of swelling under the jaw. It would not be out of place to mention that the eleven animals which showed no improvement might concurrently be suffering from other parasitic, protozoan or nutritional diseases. These experiments were conducted under ordinary field conditions and no claims are made to elaborate details which are only practicable in a laboratory.

(d) *Administration of second dose of Carbon Tetrachloride*.—The drug is known to have no parasitidal effect on immature forms of the parasites to parenchyma of the liver (Veterinary Record VII, 679). As these immature forms become mature and lay eggs in about 4 weeks a further dosage was considered necessary to destroy them. Accordingly it was thought advisable to administer a second dose two months after the first. This time the drug was mixed with the saline solution of magnesium sulphate instead of being given in capsules.

(e) *Toxicity observed after the second dose of Carbon Tetrachloride*.—One cow which was able to withstand tolerably the first dose of 5 c.c. showed much reduced tolerance to the drug of the same dosage at the second administration and died within 24 hours. Post-mortem examination, six hours after death, revealed the presence of a few dead flukes and the liver appeared to be not very appreciably enlarged or cirrhotic. The work of Jones and Montgomerie (1928), had also indicated that, cattle tolerate the drug more poorly on redosage and may still even show a lower tolerance if treated a third time.

In view of the severity of toxic symptoms exhibited by the treated animals after the first dose, the rate of second dose was reduced, in many cases, from 5 c.c. for hill bull or cow and 10 c.c. for hill buffalo to 4 and 8 c.c. respectively. But toxic symptoms were again observed in majority of cases. It was very astonishing to note that a dose of the drug which did not produce very appreciable toxic symptoms in one animal produced severe toxic symptoms in another of equal age and weight, thereby showing without any doubt that the drug is most uncertain in its effects so far as cattle of these parts of the province are concerned. This finding is in confirmation of the view so often expressed by various workers abroad with regard to the effects of this drug in cattle. Toxic symptoms were noticed by Norris (1927) by giving so small a dose as 2 c.c. in cattle. Jones and Montgomerie (1928) administered 5 c.c. in yearling and 5 to 10 c.c. to cattle rising 2 years but did not find toxic symptoms. It is said that toxicity is closely related to calcium deficiency in the blood of treated animals. There is preponderance of opinion to show that cattle on pasture have much more tolerance to larger doses; but this view is difficult to reconcile to the fact that, in the experiment under report, the cattle were living almost wholly in hilly pastures.

(f) *Curative effects observed 2 months after the administration of second dosage of Carbon Tetrachloride*.—During the period of two months following the administration of second dosage of the drug no death from the disease was reported amongst the treated animals which were, on the other hand, found to have made marked

improvement in their general health. It may be mentioned that owing to monsoons green grasses and fodder are available in abundance and the health of cattle is generally good in that season.

(g) *Cost of treatment with Carbon Tetrachloride*.—In the first dosage the drug was administered in capsules followed by saline solution of magnesium sulphate. This works out an approximate cost of Re. 0.2-5 per dose. In subsequent doses it was administered mixed in saline solution of magnesium sulphate deleting the cost of capsules and consequently approximate cost of one dose comes to Re. 0.1-6 when the cost of magnesium sulphate is calculated at Re. 0.2-0 per lb. The observations have proved that the mode of administration of the drug is just as efficacious. It has now become a routine method.

(3) Other prophylactic measures.

The following prophylactic measures were prescribed:—

- (a) Demonstrations were given to the villagers to destroy snails and cercariae of liver flukes with light solution of copper sulphate (1 in 5 to 20 millions);
- (b) Burial of carcasses;
- (c) Avoidance of wet pastures and water in known contaminated area.
- (d) Avoidance of contamination of water by the faeces of infected animals;
- (e) Administration of small quantities of salt daily;
- (f) Maintenance of health of cattle with nutritious diet and observance of veterinary sanitary measures in general.

III. CONCLUSIONS.

Prophylactic measures directed against intermediary host and propagation of ova on pastures have their advantages but are, in many cases, not easily and effectively carried out in practice in the field conditions obtaining in the hills particularly, and their employment does not do away with the necessity of medicinal measures which are obviously more practicable. Danistol is unquestionably much more efficacious and safer drug as compared with Carbon Tetrachloride. But its heavy cost rules it out in the wholesale treatment of cattle. Though Carbon tetrachloride produces uncertain effects attended with serious consequences which some times end in death it is decidedly a cheap and efficacious drug.

The beneficial effects noticed in the treated animals are encouraging enough to warrant its use for mass treatment in the absence of any other better and cheaper drug. As infestation is usually acquired by animals during and after rains, and as most of the deaths occur during cold weather, it would seem advisable to carry out wholesale treatment of cattle in the affected areas with

this drug every month or two commencing from September to March.

Thanks are due to Mr. F. Ware, Director of the Imperial Institute of Veterinary Research, Muktesar, for his kindly offering Danistol free to carry out the first part of the experiments and also to Mr. G. D. Bhalerao, Helminthologist, for the great help given to us during the course of investigation.

REFERENCES.

- Johnes, T. H. and Montgomerie, R. F. (1928). *Veterinary Record*, 8, 269-272.
 Leeb (1926) *Veterinary Record*, 7, 710.
 Norris, J. H. (1927) *Veterinary Record*, 7, 598-599.
Veterinary Record, 7, 679.

BACILLARY NECROSIS OR NECROTIC DERMATITIS IN HORSES.

BY

M. R. SEN, G.B.V.C.,

*Veterinary Officer, Bacteriological Department,
 Bengal Chemical Works, Ltd., Calcutta.*

Recently a number of cases of Necrotic Dermatitis attracted the notice of the writer and this paper is the outcome of the observations done and it is hoped it will be of some use to those interested in it.

Nature:—It is an acute inflammatory disease characterised by the formation of lesions on the extremities, usually around the coronet, with systemic disturbances due to *Bacillus necrophorus* in combination with other pathogenic organisms.

Bacteriology and infection:—Organism responsible for the disease is called *Bacillus necrophorus*. It produces many other gangrenous and inflammatory diseases about which no discussion is entered into in this paper.

The bacillus occurs in the soil in infected localities and frequently enters the tissues, particularly the lower extremities, through small wounds, abrasions, etc. The organisms are generally found mixed with other pathogenic organisms such as *Streptococcus* and *Staphylococcus*, etc. The bacilli stain well with Methylene blue (Loeffler) and dilute Carbol-fuchsin. They grow at the ordinary incubation temperature i.e. 37°C in suitable media. But the isolation of the organisms is difficult as it is mixed up with many other organisms. The isolation may be done by inoculation, preferably in rabbits. It is an anerobic, non-motile and gram negative bacillus. It does not form spores.

Idle horses kept in closed, dirty and moist stables are more susceptible than the working horses kept in clean, well ventilated dry

stables. I know a stable near Calcutta having idle horses, where a number of them died of this disease.

Symptoms:—The disease may occur in a mild form as to escape notice or it may be so severe as to cause death in the animals affected. Most of the acute cases are infected with other pathogenic organisms as well, of which *Streptococci* are the more important ones. The writer has seen some cases which had lesions simulating chronic lymphangitis and arthritis, which perhaps is due to the secondary infection of *Streptococcus*. At the onset of this disease, in the acute form, there is high fever 103°F to 105°F and great pain in the affected part or parts. Swellings or exudations are not usually seen at the outset, but within a couple of days these symptoms may appear, generally, at the anterior part of the coronets or in the heels. Some cases apparently appear like those of acute laminitis at first (until swelling or sloughing of the coronet appears.) In favourable cases the swelling terminates as an abscess locally and it may burst discharging foetid pus, when the temperature falls down within a week, and when proper care is taken, the wound may heal up within a fortnight. Sometimes the whole coronet is affected, slight discharge may be seen from the defused swelling, and if such cases are neglected they die within two or three weeks. In bad cases when the acute symptoms subside there may be present lymphangitis or arthritis or sometimes both.

Treatment:—The following treatment was found to be good by the writer:—

At first a foot-bath was given with warm water, in which some bleaching powder and boric acid in equal proportions were added. This also helps in sterilising the wound or abrasion in the foot. The foot-bath should be given atleast for an hour, then bandage the part with some dry dressings. This bath and dressing should be repeated twice or thrice daily. Internally small doses of Mag. Sulph. and Pot. Nitrate should be given until the acute symptoms subside. Within a week most of the cases take a favourable turn, the temperature falls down, swelling and pain subside and there is formation of an abscess which bursts or can be opened. Then dress it as an ordinary wound with antiseptics or better still with Tincture of Iodine for 1 or 2 days and later with some dry dressings. If lymphangitis or arthritis be present, the case improves when injected with *Streptococcal Vaccine*. The Vaccine should be repeated every third or fourth day starting with 200 Million to 2000 Million or even more.

It is difficult to say what preventive measures are to be adopted excepting to keep the stables &c., clean and to attend to wounds &c.

without loss of time. The horse once attacked has been observed liable to get similar attacks later; one horse with four attacks, invariably involving the same limb, has been observed.

Experience of other Veterinary Surgeons is solicited regarding the treatment &c. of such cases, through the columns of this journal.

CARE OF DOGS IN HEALTH AND DISEASE

BY

MR. G. S. BANERJEE, G.R.V.C.,

House-Surgeon, Dog Ward, Bengal Veterinary College.

Veterinarians are frequently called upon to give necessary advice to the dog owners as to how to take proper care of dogs in a tropical country like India. As a matter of fact there are certain points which are very essential for the management of healthy dogs and the negligence of which frequently brings about illness in them and causes much trouble to their masters. We should always remember the old proverb 'Prevention is better than cure' and act accordingly. In this article I shall try to deal with some general principles as to how to take proper care of dogs in this country.

Feeding of the healthy dogs:—Feeding of the dogs is one of the most important factors as many dogs suffer from bowel disorder and die prematurely due to improper feeding. Although from the biological point of view, dogs are classified with the carnivora, like men they are omnivora, being accustomed when domesticated to get their food according to environment, such as, some dogs live on meat diet, some on vegetable diet, some on milk diet, some on fish diet and so on. Diets also vary according to breed and habits of the animal. Above all meat is the ideal one and best suited for their stomach. The digestion of the dog is slow and it takes twelve hours to digest. In view of the above facts it is advisable to give meat once a day, in one meal. Raw meat is always preferable to cooked meat, being more easily digestible. Conjoined with regular feeding, supply of pure and fresh water is very important. Food should be changed from time to time as loss of appetite, constipation and digestive disturbances are often due to monotonous diet. Care should always be taken that they do not get pestrices and table food as these are likely to cause indigestion and loss of appetite &c. Overfeeding is as bad as underfeeding. Occasional fasting is necessary for proper digestion by giving rest to the digestive organs and is also a good appetiser. In health, dogs should get their food twice a day at regular hours both morning and evening. In the morning—light food like milk, lactol, butter milk, barley water, raw eggs, oat meal, biscuits etc., should be given. In the evening, raw meat, minced meat, meatscrap, tripe,

liver, sheep's head, vitaminous vegetables, rice, bread, biscuit, chappati etc., should be given.

Feeding of the sick dogs:—Regarding the question of the feeding of the sick dogs we should always remember that forced feeding of heavy nitrogenous diets is very injudicious, as it is the natural instinct for the sick dogs not to take any food when they are unwell. But in most cases they begin to take their food within a few days time. It has also been noticed that dogs are tempted to lap milk by first giving the milk inside the mouth with the finger. Nutritious food forcibly given causes bowel disorders and their strength is more spent for the digestion than for resistance of diseases and thereby they run from bad to worse state of health. Food voluntarily taken is likely to be digested and assimilated properly. Light and easily digestible food like milk, butter milk, whey, barley water, horlicks, malted milk, Brands essence of chicken, white of egg etc., are considered to be the best diet for the sick dogs. Little feeding at shorter intervals and variation of palatable diets should never be forgotten.

Feeding of the puppies:—Little feeding and often is the rule to apply to very young puppies increasing the interval as they grow old and begin to take more substantial food. Diluted cow's milk is considered to be the best for the puppies not over a week old. It is half milk and half water. After being boiled for two or three minutes a small amount of cane sugar is added. The concentration should be increased as the puppy grows older gradually, lactol, butter milk, milk, barley water, oat milk, minced meat etc., may be given and also for the formation of good bone and constitution, Codliver oil kalzana, Radiostall, vitaminous vegetable, Collosal Calcium cum vitamin D may be given in food which will give very satisfactory result. Bones and joints are very useful for the puppies to chew as they help in digestion and strengthening the teeth, occasional worming is very useful for these puppies because without this they get various kinds of troubles. The puppies should be kept always clean and plentiful of exercise should be given and they should not be chained up all along as they prefer freedom.

Bathing:—All healthy dogs should be bathed twice a week in summer and in winter once a month, but the animal should be kept clean by brushing and combing etc., and may be sponged occasionally. No irritating soap like carbolic soap should be used for healthy dogs for bathing. Coronolium dog soap, margo soap, soapex, kur-mange, neko soap are considered best for dogs, in this tropical country. Occasional bathing with potassium sulphurata prevents the dog from ticks, fleas and skin trouble. Dogs should be well dried up after bath.

Ticks and Fleas :—Ticks are one of the most dreadful parasites and they cause a great havoc in dogs in Bengal. Many dogs lose their lives prematurely from tick fever in Calcutta. Ticks can live without food for some months and when a dog is attacked with ticks it is very difficult to get rid of them. Keep a careful eye on them and pick up with a pair of forceps and dip the parasites in the strong phenyle lotion and give the affected dog bath with Soapex, Kurmange and rub pulvex which will help the dog from this trouble. Washing the floor etc., with kerosene oil will prevent from tick rash. Fleas are also very common in dogs and they are best prevented with the use of keating powder which should be brushed afterwards. Pulvex also is very good.

Ear, nose and eyes :—Careful examination and necessary attention also should be given to these organs, as these organs are very frequently affected and remain unnoticed. Ear should be occasionally cleaned with hydrogen peroxide or æther and if the ear is moist dusting powder is to be applied in the ear which will keep the ear dry and healthy and prevent otorrhoea, canker etc. Nose being the first organ of the respiratory system, always requires special attention, because dust, foreign bodies, microbes etc., pass into the lungs through the nose and cause many troubles. Occasional application of eucalypted vaseline act as disinfectant and keep the nose smooth and soft and prevent any crack. Running from the eyes is very common in summer as a result of irritation due to heat or dust. It is also noticed in other diseases. The eyes are kept very cool and such running can be prevented if eyes are washed every day with raw, pure and cold milk soaked in cotton wool.

Mouth :—Occasional cleaning of the mouth, gum and teeth is very important as many dogs suffer from pyorrhoea, foul smell, tartar and ulceration of the gum etc., which remain unnoticed and thereby become worse and create troubles. Occasional cleaning of the mouth and teeth with condys fluid, electrolytic chlorine in weak lotion, listerine, hydrogen peroxide and alum lotion is very useful and it helps in digestion, keeps the teeth clean and stronger and prevents decay.

Anus :—Careful examination of this part of the body is also very important. Dogs generally rub their anus on the ground due to sensation caused by the intestinal parasites and some times they suffer very badly from suppuration of the anal gland and if it is not immediately attended to the animal is sure to suffer from many troubles. The suppurated gland should be squeezed out, boric compress to be applied once a day and boro-glycerine to be applied inside the anus with the help of the finger and a dose of worm mixture or a purgative should be given immediately.

Exercise :—It is now generally known that plentiful of exercise is always necessary to keep up the spirit of all the healthy dogs. Sick dogs should get also exercise because when they play they generally forget about their ailments which helps very much to recover early from the disease. But over-exercise makes them much exhausted. There are also several classes of dogs with their characteristic spirit which should be encouraged to keep up their spirit.

PREVENTIVE INOCULATION AGAINST BLACK-QUARTER BY AGGRESSIN ALONE METHOD.

BY

P. SADASIVA BHAT, G.M.V.C.,

Veterinary Assistant Surgeon, Penukonda.

The prevention and control of Cattle Diseases such as Rinderpest, Black-quarter, Haemorrhagic Septicaemia, etc., is the chief object in view of the Veterinary Departments in the different provinces, and research work in this direction is being done by different workers, with a view to arrive at a decisive means to combat such diseases. Specific sera and vaccines are produced to overcome the diseases. Sera and Vaccines have been produced against Rinderpest, Haemorrhagic Septicaemia, Anthrax, etc. But all such sera are specifically known to produce a transient passive immunity extending from a few days to a few weeks and inoculations are being resorted to, in all such cases when the disease recurs after a short time. The result is a considerably large quantity of serum has to be used up at an enormous cost. Even in the case of Serum-simultaneous inoculation against Rinderpest, the period of immunity is said to be "lasting" which term is not encouraging in itself in field conditions. Major Stirling's Goat-virus alone inoculation method is a great promise which if stabilised (we wish the worker all hearty success), anti-serum which is being prepared at a large expense can be dispensed with.

Now, taking up Black-quarter as one item, it is well known to the profession that this disease is being fought out with Anti-serum alone or with Sero-Aggressin method. Serum alone method is said to give immunity only for 9 days, whereas Sero-Aggressin is believed to produce a longer duration of immunity, with no definite data, whereas Aggressin alone is believed to produce immunity which lasts for a year. Serum alone method and Sero-Aggressin method are said to be the safest and are the only methods practised in field conditions. Whereas it is elsewhere said that Aggressin alone is to be resorted to "on young animals, about a month before the onset of season when cases are known to occur, in doses of 5 to 10 c.c. per head of cattle

and 1 to 2 c.c. per head of sheep". At the same time the objection to the Aggressin alone method in actual outbreak (when deaths occur almost daily) is that animals so injected are more prone to infection. In this connection, I hold the view that if it is so, why not the same objection hold good in cases of human cholera outbreaks? Whereas preventive inoculations on human-beings during cholera epidemics with vaccine is extensively practiced with a determined effect. Whereas cholera vaccine is a product of the attenuated vibrios of cholera, *B. Q. aggressin* is only a *Bacterial Filtrate*. Reactions in either cases occur anywhere from 1 to 2 days, and immunity is produced in about 3 to 5 days or in other words after the reactions subside. Observations on Anti-cholera inoculations have revealed that inoculated persons were still susceptible to attack till the reaction subsided; hence the concerned authorities give advise to resort to hot food and drinks and to observe other fundamentals of cleanliness and hygiene. The result being, untoward effects, are negligibly few; whereas *B. Q. Aggressin* which is only a bacterial filtrate, cannot produce or cause disease even if the defensive mechanism of the body is low. Natural conditions are still more favourable to us, in that, if the inoculated animals are so managed as not to allow them to graze on infected pastures, which are difficult to be located, chances of attacks should be negligible.

In conclusion, I opine that if this method (*Aggressin* alone) be practised in actual outbreaks, a definite period of immunity with little cost, can be achieved with advantage, and I earnestly solicit the views of the members of the veterinary profession through the medium of the Indian Veterinary Journal.

Clinical Articles.

LONGITUDINAL FRACTURE OF SCAPULA IN AN ARAB RACE MARE.

BY

M. MOHEY DEEN, M.R.C.V.S.,

Professor of Surgery, Bombay Veterinary College.

An Arab race mare 'Sarkha' was admitted to the College Hospital on 10th February 1932, with the history that on 6th February, during the race, the animal while taking a turn at a bend on the right side stopped all of a sudden and fell down. It was dead lame on near fore and was taken to the owner's stables where it remained for four days and then brought to the Bai Sakarbai Dinshaw Petit Hospital for Animals for treatment on 10th February 1932.

Longitudinal Fracture of Scapula in an Arab Race Horse 135

The owner suspected rupture of the flexor tendons near fore. On examining, the tendons were found to be slightly sprained but the severity of lameness was out of proportion to the sprain of the tendons. The animal was unable to put weight on near fore. The limb was greatly swollen and the shoulder region was oedematous. The swelling extended upto the knee though it was not great as at the shoulder neither it was oedematous.

Moreover the part being painful, manipulation could not be carried out satisfactorily. The animal was put in slings and belladonna pigment applied over the region of the shoulder, chest and fore arm. In the absence of crepitus it was suspected to be a case of severe sprain of the shoulder.



Next day the animal seemed to be in great pain and exhausted, so much so, that it would not rest in the sling properly, but was swinging in it. The sling was let loose and the animal allowed to stand. It was noticed to be resting on its near toe, the point of elbow was dropped and the knee joint flexed. It was a typical posture of radial paralysis. The swelling had considerably come down and the part was not very painful. Manipulation of scapula, humerus, radius and ulna did not reveal fracture of any of these bones; but when the limb was rotated inward and outward by an assistant crepitus was clearly heard on auscultating the shoulder region. On

account of these symptoms it was diagnosed as a "fracture of first rib."

Because the animal could not stand on the slings constantly it was allowed to rest on the slings only for half an hour or an hour at a time and then let loose in the box.

The mare was given chloral hydrate and laxatives daily. On succeeding days the same treatment was followed and though the swelling was getting less every day, still the animal seemed to be in great pain and was constantly pointing towards the shoulder.

On 14th February 1932, the animal had temperature of 103°F. So it was given a febrifuge every day till the fever disappeared on 18th February.

On 15th February, the animal started putting weight on the affected limb without anybody giving support to the knee and by 18th February, she could move about on the affected limb as well, though with some difficulty.

The condition was improving every day and the result seemed to be quite flattering.

On 21st February, slight fever being present, febrifuges were administered till 29th, when the fever disappeared; but very hard swelling from the middle of the scapular region extending to the upper third of humerus still persisted. This swelling seemed to be subcutaneous in the sense that it was not attached to the bone. This persisted in spite of daily massage with liniments and absorbants.

The gait of the animal was improving every day, and at the time of moving the animal showed obvious signs of pain though manipulation of the part did not elicit any pain at all.

The animal used to be lying in the bed most of the time and was losing condition in spite of tonics and careful feeding.

About the middle of March, the animal seemed to be at ease and began moving about without showing any pain. All the same extension and flexion of the joint was restricted, and the indurated swelling did not show any tendency to decrease.

Eventually the mare was destroyed on the 30th of March 1932, at the request of the owner. On post-mortem, supraspinatus, infraspinatus, deltoid, and trapezius muscles were found to be indurated and on deeper dissection major portion of the muscles were found to be fibrosed and calcsified, and some callus formations were left about the lower third of scapula, and the shoulder joint was very much enlarged and out of shape.

As it seemed impracticable to dissect the fibrosed and calcsified muscles from the bones, humerus and scapula were detached from the body and allowed to mascerate. First rib was found intact and healthy which shows that the symptoms of radial paralysis were not due to fracture of the first rib.

When the bones were ready for examination the scapula was found to be longitudinally fractured, the fracture extending from the lower third of the bone into the glenoid cavity and dividing this cavity into five parts. Though the accident occurred nearly two months ago the fractured edges did not unite and callus formation on the bones was of the nature of rarifying osteitis. There was no ankylosis or an appreciable corrosion of the head of humerus, though there was callus formation on the neck of humerus and scapula.

Conclusion.—The fracture seems to have taken place as a result of excessive muscular contraction. To interpret the symptoms of radial paralysis is very difficult and sometimes misleading.

It is remarkable that, in spite of extensive fracture no ankylosis occurred and considering the extent of lesions the movements were not very much impaired. Severe sprain of muscles can easily lead to their fibrous degeneration and even calcification.

QUACKERY AND ITS CRUELTY.

BY

P. VEDA BHAT, G.M.V.C.,

*Veterinary Assistant Surgeon, Government Veterinary Hospital,
Bangalore.*

A she-buffalo was brought to the hospital on 17-1-32, for the treatment of eversion of the uterus and was admitted as an in-patient.

History of the animal as narrated by the owner:—The animal had a natural calving on the night of the 13th January 1932. After the shedding of the placenta the next morning, the owner noticed a fleshy mass of deep red colour protruding between the lips of the vulva. The animal was constantly straining and was restless. On further question, he said that none was allowed to meddle with the animal nor did anybody attempt to treat it.

The Animal showed the following symptoms:—Violent straining, restlessness, unwilling to move and falling down when forced to walk; unable to rise without help. On examination a portion of the uterus was found protruding with a foul discharge dribbling from it.

Treatment:—The part was first irrigated with cold water and carefully cleaned with Condy's fluid. After elevating the hind quarters the uterus was gently pushed inside by the fist of the right hand, until the part was set back to its original place. The uterus was then slowly douched with luke warm Condy's fluid. During the process, I felt inside the uterus, something hard and I cautiously drew it out and to my surprise found it to be a circular ring of hay

coiled all round with cocoanut fibre. It was 7 inches in diameter and 2 inches in thickness as seen in the photograph.



The uterus was dressed with the following:—

R

Boric Acid	...	30	gr.
Iodoform.	...	15	gr.
Alum.	...	1	dr.
Ext. Belladonna	...	$\frac{1}{2}$	"
Oleum Eucalyptus	...	$\frac{1}{2}$	"
Glycerine	...	1	oz.
Olive oil	...	4	"

m. f. t. dressing.

Hot fomentations were applied to the loins. The animal was kept raised on her hind quarters and was not allowed to move. Internally a dose of Chloral (one ounce) was also administered. In the evening as the animal showed straining, the dose of Chloral was again repeated and the fomentations and dressing continued. With this treatment straining was very much less, and the animal was given a mixture consisting of a full dose of Mag. Sulph and Nuxvomica. On the 6th day the animal was allowed to attend as an out-patient and at the end of a week's treatment it was discharged cured.

COMMENT ON GLYCERINE AND ITS USES IN SURGERY.

By

P. N. KAK, L.V.P., (HONS.).

B. G. Cavalry, Srinagar.

I came across an article on the uses of Glycerine in Surgery in *Veterinary Record* page 486 of April 1932. For nearly 4 months I gave a very extensive trial to this agent in my daily surgical practice avoiding as far as possible other antiseptic dressings. I arrived at the conclusion that Glycerine in the long run would prove a very very useful agent in the treatment of wounds, abscesses and fistulae in veterinary practice.

By the application of Glycerine, Mr. Wood, claims that nature is assisted in healing in her own way. The growth of bacteria is retarded and there is profuse outpouring of serum which washes them away. I feel that the explanation of the action of Glycerine is very convincing.

For the information of my colleagues, I give below a few cases which I treated in this way:—

(1) *An Australian Mare*, with fistulous withers. The case was treated by ordinary dressings for a fairly long time after opening it. But on reading about Glycerine treatment, it was adopted. The treatment was continued for two weeks and the rapid healing was marvellous.

(2) *Cocker Spaniel bitch*, with a flap of skin of the leg torn and hanging due to an accident. The hairs were clipped, the wound was given a wash with warm water and Glycerine was smeared over the entire surface. The detached flap was then sutured. Glycerine dressings were continued and the wound healed within 9 days.

(3) *A Chestnut Australian Mare*, with a wound an inch and a half deep over the shoulder caused by a nail peg. The area around was shaved and washed with warm water. Glycerine and warm water (1 in 4) was injected twice a day into the wound and it healed in two weeks.

(4) *A Spaniel Bitch*—with an open inter-digital cyst. The same line of treatment showed satisfactory healing in a week's time.

I would suggest to my colleagues to give a trial to this agent and record their observations.

AN OUTBREAK OF VERMINOUS BRONCHITIS IN SHEEP.*

BY

H. P. ABASI, G.B.V.C.,

*Veterinary Assistant Surgeon, i/c Wadia Veterinary Dispensary,
Kandhakot, Sind.*

A Baluch by caste came to the Wadia Veterinary Dispensary, Kandhakot, and reported the prevalence of disease in sheep. Accordingly I, in company with Veterinary Inspector Mr. Abdul Majid, proceeded to the scene of outbreak.

The owner stated that 52 sheep had died and the rest were suffering from cough. The sheep had been grazing on low lying pasture near the river Indus.

The surviving flock of 68 sheep was examined by us and the following symptoms were noticed:—General debility, severe cough, sneezing, mucous discharge tinged with blood from the nostrils and watery discharge from the eyes, diarrhoea, pendulous belly, appetite precarious and temperature abnormal.

A sheep was slaughtered and on autopsy the following lesions were found:—

Bunches and clusters of *Strongylus Filaria* in larynx, trachea and bronchial tubes. The mucous membrane of trachea was streaked with blood and at some places thickened. All other organs were in anaemic condition. A few *Haemonocous contartus* were also found in the fourth stomach.

The parasites were examined and identified to be *Dictyocaulus Filaria* (*Strongylus Filaria*). The phlegm was examined under microscope (low power) and millions of eggs and living embryos were seen. The disease was confirmed as Verminous Bronchitis and treated as under:—

R

Oleum Terebinth.	...	3i
Chloroform.	...	mx
Tr. Opii.	...	mxx
Glycerine.	...	mxx
Acid Carbolic	...	mx
Sweet oil	...	3ii
m ft. mist		

This mixture was injected into each affected sheep intratracheally, and for parasites in the stomach, cupri sulph and mustard solution was given per mouth. Tonic powders were supplied. After

* Read before the 1st Conference of Sind C.V.D., Subordinate Service Association, held at Jacobabad on 31st January, 1932.)

a month the owner met me and informed that the treated animals were alright.

Thanks are due to Mr. Abdul Majid, Veterinary Inspector, who helped me in carrying out this treatment.

HYGROMA OF THE ELBOW OF AN ELEPHANT.

BY

G. N. ROY CHAUDHURI, G.B.V.C.

*Professor of Surgery and Obstetrics, Bihar and Orissa
Veterinary College, Patna.*

A male elephant belonging to Babu Lachman Kissore was admitted in the College Hospital as an in-door patient on 7-9-32. Height was about 10 ft. and age 40 years.



The elephant had an enlargement at the elbow of the near fore leg, about the size of a small water melon and the swelling being infected, gave rise to a purulent bursal fistula, leading to a fibroma; it was painful to touch, the injury was reported to have been caused by a thorn which entered the skin while the animal was taken to a jungle.

Treatment adopted:—Hot antiseptic compress over the area twice a day and applying in the cavity Bin Iodide of Mercury Ointment 1-12, daily. This induced in a few days time the diseased

pulse rapid and feeble, respirations slow and stertorous. She lay in this state of extreme prostration until released by death on the following day i.e., the 9th day of illness.

The brain was extracted immediately and a part of it—Hippocampus and Medulla—was sent to the Director, Pasteur Institute, Coonoor, for microscopical examination who replied that the brain was positive for rabies.

Remarks:—The case has been mentioned on account of its rarity and the singular way in which it attacked the animal. I believe it will serve a guide to those in charge of elephants.

The disease started suddenly without any premonitory symptoms. Some of the commonest symptoms which were wont to appear in the smaller animals such as salivation, dropping of the jaw, hanging tongue, difficult deglutition, suspicious countenance and habits were totally absent to the very end. Sensibility and consciousness were retained to the last, so much so, the animal looked like one ailing from anything but rabies. Never did I dream that the animal would develop rabies despite the timely Anti-rabic treatment it had. So much so, when the animal exhibited the first symptoms of acute lameness I was led to believe that it was a simple case of acute rheumatism. But later on, when paralysis actually supervened the previous history came to my rescue to diagnose the case as one of Paralytic Rabies alone. Now a bullet could have saved the agony of the animal but since the animal was not harmful to the public and since the Negrie bodies in the brain might not develop fully till late in the course of the disease, I allowed the animal die a natural death. It needs no mention that symptomatic and palliative treatment was adopted during the sickness.

Date on which animal was bitten	... 16-1-32.
Date on which Anti-Rabic treatment was commenced	... 24-1-32 i.e. 9th day.
Date on which the first symptoms of illness were exhibited	... 27-2-32 i.e. 43rd day.
Duration of illness	... 9 days.
Date of death	... 6-3-32—51st day.

SUCCESS OF TR. LOBELIA AETHERIS IN TETANUS.

BY

MOHAMED DAOOD, L.V.P., (PUNJAB).

Veterinary Officer, Government Stud Farm, Kunigal (Mysore).

Subject:—Bay, Indian, Filly, 3 years and 3 months.

History and examination:—The filly was found on 11th November 1931, to be a little stiff, head extended, nostrils dilated, neck stretched out, tail raised and quivering, membrana nectitans protruding over the eye. The animal showed anxious expression, was excitable, temperature 103.2°F, mucous membrane injected, respiration accelerated, pulse frequent but weak. On searching well a scabed wound was noticed on the hock.

Prognosis:—Was favourable since the symptoms were not very exaggerated, animal still standing marked by the absence of any complication.

Treatment:—17—11—31.

(I) The animal was placed in a dark stall and soft bedding provided.

(II) The seat of the wound was scraped off well and the wound washed and cauterized with Carbolic Acid.

(III) After disinfecting the seat of injection a solution of 5 c. c. of Tr. Lobelia Aetheris and 5 c.c. of distilled water was injected subcutaneously. (Distilled water is added since the Tincture is very irritant and liable to cause severe swelling).

(IV) She was given boiled barley, bran mash, lucern and green dug grass to eat.

(V) Mag. sulph added in drinking water in 4 oz. doses.

1 P. M.:—A similar dose of the solution of Tr. Lobelia Aetheris and distilled water was injected in a different place; and a bucketful of clean water placed before the animal.

5 P. M.:—A similar 3rd injection was given; 4 ounces of Mag-sulph added to the drinking water; and the same food as in the morning continued.

18—11—31:—The filly was a bit easy.

8 A. M.:—The injection was repeated.

4 P. M.:—The second injection for the day was given, the dose being the same.

19—11—31:—The condition of the filly was better. The injections were repeated morning and evening with the same dose.

tissue to slough off and subsequently the wound was packed with a gauze smeared with Iodoform Ointment. The animal was not



allowed to lie down at night by chaining together the two forelegs. He made an uneventful recovery.

PARALYTIC RABIES IN AN ELEPHANT.

BY

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

Veterinary Assistant Surgeon, Parvatipur, Madras.

I feel it my duty to report the following unusual case of paralytic rabies in an elephant which was bitten by a suspected rabid dog on 16-1-32. The case differs from the types mentioned by Evans in his book on elephants and I trust this will interest the members of the profession.

A cow elephant aged about 25 years attached to the establishment of the Assistant Superintendent of Police, Parvatipur, was bitten by a rabid dog on 16-1-32, on the trunk, left fore-limb, hind extremities and tail. The dog made its escape. The wounds ranged

Photo taken by Mr. M. A. Hasan of H.E.H. the Nizam's C.V.D. Hyderabad, on Post-Graduate Training at the Bihar and Orissa Veterinary College.

from 1/8th of an inch to 1/4th of an inch in depth and were bleeding. The usual treatment of cautery was duly given immediately and I lost no time in procuring the anti-rabic vaccine. The animal was subjected to the treatment which was commenced on 24-1-32, and completed by 6-2-32. The injections were given in 60 c.c. doses in all places where the skin was loose and flabby, i.e., on the lower margins of the ribs, flanks, behind the elbows, and in front of the breast bone at the junction of the neck. The injections were followed by swellings—perchance reactionary—which took 4 to 7 days to come down. The bitten wounds healed without any trouble. The temperature of the animal during the period of vaccination ranged from 97°F in the mornings to 98.4°F in the evenings.

Till 26-2-32, the animal was perfectly normal in her habits and relished her usual fodder and ration. On 27-2-32, i.e., 43 days after the bite she developed sudden lameness in her hind limbs, but the bite she managed to return to her shed from the dispensary. The next day the lameness developed into paresis. There was trembling of the hind limbs with inability to stand. The poor huge creature dropped down on her stifles and got up with so much excruciating pain and agony that one could hardly bear this sight. This recurred every 10 or 15 minutes especially at the slightest attempt to move the hind limbs. The appetite was much impaired and she passed dung and urine. The next day her condition was the same. On 1-3-32, she looked much run down in condition with haggard countenance. She dropped down never more to get up but could recline on her stifles and elbows. She tasted a little green grass and drank water. The Mahout's commands were obeyed.

The next day i.e., the 5th day of her illness her condition was worse. She looked much exhausted and emaciated. Complete paralysis of the hind extremities and tail had set in. Oedema developed in these parts and there was neither movement nor sensation but yet the dung and urine were evacuated. She could still raise her head and neck and support herself on the fore limbs giving the picture of an animal with a broken neck. She was conscious and sensible and took a few wheat cakes and water proving that her senses of deglutition were not impaired. Same was her condition on the following day. The temperature of the animal ranged from 98.4°F to 99.8°F during all these weeks. On the 7th day oedema developed on the head, neck and abdomen, pulse was rapid and went up 70 per minute (normal 30-35). She made a few futile attempts to get up and took 1 or 2 pieces of sugar cane and a little water in that lying posture. Grave was her situation on the next day with symptoms of approaching death. She was drowsy and unconscious eyes sunken and watering, mucus membranes cyanotic, body cold,

20—11—31. The animal could move quite freely. Injections were stopped.

21—11—31. Symptoms were remarkably reduced.

22—11—32. All the symptoms disappeared; but the animal was reduced in condition and was debilitated.

Afterwards, nursing was continued with due care and attention; and the convalescent period extended up to three weeks more, when the animal was discharged as completely cured on 25—12—31.

During my absence on a month's leave, Mr. Krishnamurty, the Veterinary Inspector of the Town Dispensary treated another filly quite successfully. Both the animals are now quite hale and healthy.

FISTULA OF THE CORONARY BAND OF THE HORSE.

BY

JOHN RUTHERFORD ANDERSON, D.V.S.,

Macon, Georgia, U.S.A.

In the cold latitudes where the temperature ranges from 32°F to below zero for five months or more of the year, fistula of the coronary band of the horse is very common. The ice and snow continuously covering the ground maintains a near freezing point at the junction of the hoof and the soft structures. This condition impairs blood circulation and the slightest injury to the band results in necrosis. The cold applied continually is also conducive, by blocking the vein valves and capillaries. When warm weather returns the circulation is not wholly established, there are small areas left out in which structural changes occur resulting in death of the part. Grease heel is primarily from the same cause; secondarily from infection.

The successful treatment of fistula of the coronary band is simple and safe far superior to the liquid preparation in common use—with a cone shaped stilet made of some hard wood, four inches long with the small end flat and round, about one quarter inch across the slope from end to end, the larger end say five eighths or three quarters of an inch, inserted into each fistulous tract. (The object is to enlarge tubes and get at bottom of them) rotating the stilet as you bring pressure to insert. This done, place a piece of Bichloride of Mercury in tract and push with stilet the piece to the tract's bottom. Repeat until the tube is filled to the skin surface; pack in all the tube will hold. Fill every tract the same way; place one layer of bandage around coronet; tie same in front of the foot. The lump mercury should be crushed into suitable sizes before you begin to pack in order to proceed rapidly with the packing. The first piece of mercury put in usually makes the tube so dry that delay makes the balance difficult

to insert. In 24 to 36 hours a perfect cast of all the diseased area can be removed with a pair of broad jawed forceps, leaving a depression the surface of same being healthy, rosy, with luxuriant granulations which close the opening rapidly: bichloride never attacks the healthy tissues in these cases. The rapid absorption of it by the necrosed tissue prevents the dissolving of more than is taken up by the diseased tissue. Constitutional effects are never a result.

LIQUOR FORMALDEHYDE IN CASES OF CANCER (?) HORN.

BY

SUNDERLAL B. PANDYA, G.B.V.C.,

Veterinary Surgeon, Kadi, Baroda State.

Cases of what is ordinarily known as "Cancer Horn" in cattle are met with in one's practice in fairly large numbers. Without entering into the etiology and symptoms of this disease, I wish to record here the success I have had with Liqr. Formaldehyde in the treatment of such cases. I realise that most of the cases of broken or fractured horns with a certain amount of growth, which are put down as cancer horn, may not be cancerous at all. Whatever the condition is due to, either bacterial, parasitical or mechanical cause, I have been using 5 per cent. solution of Liqr. formaldehyde after amputation and thorough cleaning. The structures harden quickly forming a black layer which peels off later leaving behind a healthy granular surface and mere Carbolic oil dressing achieves the rest. Formalin not being favourable for growth of all sorts of putrifying bacteria, the exuberant growth is arrested and the wound heals up nicely.

TREATMENT FOR CHRONIC LAMENESS.

BY

S. SESHADHRI IYENGAR, G.M.V.C.

Veterinary Assistant Surgeon, Chidambaram, Madras.

Cases of lameness in cart bullocks occur commonly when driven fast with loads. The chief parts affected are generally the right shoulders and elbows and sometimes the left shoulder and hip joints. Such cases are brought to the infirmary after trying all quackery and only in a chronic stage. The owners want a quick cure in spite of this delay. Treatment with liniments and blisters are of no use in these cases as the sprain is of interior muscles, tendons and ligaments over the joint.

I have treated here more than 50 cases with intramuscular injections of Sodi salicylas Naturalis in 3i to 3ii doses dissolved in 20 to 40 c.c. Aqua Distillata into the seat of sprain alternately followed by injections of Camphorated oil, 3i camphor in 20 c.c. Olive oil or sterile cocoanut oil, with 3 days interval and well massaged.

I treated some cases with injections of one drug only. The recovery is not so quick. The recovery is very rapid when both the injections are given. Two injections of each will suffice in majority of cases. Chronic cases of more than a year duration were treated successfully with these injections.

A CASE OF MARKING NUT POISON IN A BULLOCK.

BY

S. SESHADHRI IYENGAR, G.M.V.C.

Veterinary Assistant Surgeon, Chidambaram, Madras.

Subject :—Mysore Bullock aged 7 years.

History :—The animal was used to be given 2 or 3 marking nuts once or twice a week preserved in neem oil as tonic as advised by a quack. This is done by many cattle owners of this taluk.

Three nuts were given to this animal on the day of occurrence at about 9 A.M. The animal was put to the carriage at about 11 A.M. The animal was not able to drag the bandy after journeying 2 miles and then it was brought to the dispensary at 1 P.M., for treatment.

The following symptoms were observed :—The whole body was swollen and greater on the head and ears; the animal was weak, mucous membranes of the mouth and rectum swollen and highly inflamed, vesicular like eruptions under the tongue and lower jaw; frothy discharge from the mouth and nostrils and frequent diarrhoea. Temperature 102.4°F.

The animal was given Pot. Permanganate in the evening and the next morning.

Conjee diet and a dozen eggs beaten in a pint of milk was also prescribed.

The animal made an uneventful recovery on the 3rd day.

Notices of Drugs.

SULFARSENOL IN THE TREATMENT OF SEPTICÆMIC INFECTIONS "POST PARTUM".

Extract from "L'Arsenotherapie" Ex-Medicine Canine Par Le "Sulfarsenol" by Charles Babb.

Very confident in the bactericidal property of Sulfarsenol, we are mentioning in this chapter a new therapeutic application which deserves to be thoroughly investigated, since post partum infections are quite frequent both in large and small animals.

Already in his thesis in April 1925, Dr. Leonardon Lapervenche pointed out the very favourable and preventive actions of Sulfarsenol in septicæmic post partum infections.

In a publication of June 1925, (Paris Medical) M. Professeur Maurice Riviere of Bordeaux also related the excellent microbicidal effects of arsenic, especially Sulfarsenol in puerperal infections. He concluded in these terms. "Arsenic salts seem to constitute the medicament of choice in puerperal infection. Since this is clinically established it is of importance to employ this method—Sulfarsenol will generally be sufficient to check the complications and to stop the infection from becoming worse".

"We are even now convinced that in treating preventively by subcutaneous injection, each woman who has had a more or less complicated confinement terminated by a difficult intervention and without waiting for the appearance of the infectious phenomena, we shall succeed in distinctly lessening obstetrical morbidity with our service."

This lecture made us try this treatment and since that time we have used Sulfarsenol in cases of "post partum" uterine infections which were brought to our clinic.

In twelve cases of bitches affected with dangerous metritis, and threatened with septicæmia with a discharge of an unpleasant and putrid nature, Sulfarsenol has given most successful results. A treatment of three to four days was sufficient to entirely dispel the infection and to change the nature of the uterine discharge which quickly became odourless and gradually stopped in two weeks.

In 4 cases which we thought hopeless only two cures were obtained concurrently with uterine douchings and hypodermic injections of Champhor in Oil or Caffeine.

Following our experiments we have treated preventively 8 patients during difficult and tardy whelping and we have had the opportunity of preventing septicæmic infections which were threatening. In these cases, Sulfarsenol was employed by the

intravenous route every 24 hours for the first three days followed by every 48 hours upto the time of cure. Here are three successful clinical observations :—

Case No. 1—A fox terrier bitch, three years old was brought to our clinic on the 1st July 1925. It was in the stages of difficult whelping, which had already started two days previously. By means of a forceps, the pups were removed; the uterine discharge which followed gave off a putrid and characteristic odour of septicæmic infection. The prognosis which was grave, was still more serious owing to a deep torpor where the operation was involved. Douching with solutions of Potassium Permanganate (0.5 per 1,000) was given three times a day. We tried intravenous injections of Sulfarsenol as follows :—

1st July	1st injection	0 gr. 04
2nd "	2nd "	0 gr. 06
3rd "	3rd "	0 gr. 06
5th "	4th "	0 gr. 10
7th "	5th "	0 gr. 12
9th "	6th "	0 gr. 12

The first two days passed without any improvement but without any bad effect. An injection of Camphor in Oil was necessary in the morning and in the evening to sustain the heart. On the 3rd day, the general state revived and the bitch showed a desire for the pups which up to that time she had not troubled about. Moreover the discharge had lost its putrid odour. On the 4th day the patient started to improve, and during the days following the general state gradually became better until 10 days after the operative intervention, the bitch was completely cured.

Case No. 2—A German sheep bitch, 5 years old, was brought to our clinic on 20th July 1925. The previous day she had given birth to seven well nourished pups to which she paid no attention. She was very much spent, refused all food and vomited without ceasing.

Temperature was 41°, the womb was very painful on palpation and vagino-uterine exploration brought about the removal in the midst of a sanious and evil smelling discharge—of the putridified placental matter.

In the face of this grave state, we advised the owner, who gave his consent, of Sulfarsenol treatment together with uterine disinfection.

Every day 3 douches of 2 litres of H₂O with 0.5 per 1000 of Potassium Permanganate were regularly given. To revive the general weak condition, a hypodermic injection of 25 cm physiological serum with 15 centigrammes of Caffeine was given in the morning and evening.

Intravenous injections were given as follows :—

20th July	1st injection	0.08 centigrammes	Sulfarsenol
21 "	2nd "	0.10 "	"
22 "	3rd "	0.10 "	"
24 "	4th "	0.12 "	"
26 "	5th "	0.16 "	"
27 "	6th "	0.18 "	"

From the 2nd day, the general state was better although the temperature remained at 40.5°. Vomiting had stopped however.

In the evening of the 3rd day, the animal took a little food of its own accord. The discharges became less abundant and absolutely without smell. During the following days, improvement was more decided, and on 30th July, treatment was considered unnecessary as the bitch was cured.

Case No. 3, another fox terrier bitch, 10 years old, from which it was necessary to take 3 dead pups, was treated with Sulfarsenol 3 days before the operation and 5 days after. The infection which was believed would be fatal, was not produced. The bitch was very quickly cured.

Notes.

Indications are not wanting to those who have eyes to see that the Veterinary profession in India is in immediate danger of breaking down under the weight of injustice and indignity heaped upon it from day to day. How long, can all its manly struggle keep it going? There is a limit to suffering and the present Retrenchment in the pay and prospects of the profession will only prove to be the proverbial last straw to break the camel's back.

Ill-paid, Over-worked, Discontented, already suffering from a sense of injustice extended to it, when compared with other professional services, the profession has been praying, petitioning, prostrating, in short, exhausting all the weapons in the armoury of Beggary, with the hope of touching the heart of the Government and getting something better. With what result?

The profession has lost what it had. If rumour is to be believed the initial pay is to be reduced still, and the Selection Grade is to be the laughing stock of all services. The number of hands has already been reduced. A number of hospitals has been closed. Recruitment to the service has been stopped. We wonder if a worse lot has ever

OL
KZM2, N24
N32.9.2

befallen any other service which is intended for the benefit of the ryots and live-stock industry in this country.

Fates have been too cruel against the profession. It is too much to expect the profession to survive this ordeal. We would respectfully warn the Government that it should not be surprised if there is a set back in the activities of the profession in the near future. What more can be expected from sinking souls!

The profession has been asking for Bread and it has been given Stone instead! Hideous Mockery! Is there none either amongst the officials or non-officials to come to the rescue of the profession? We appeal to the Hon'ble Ministers and Heads of Departments to do their utmost to exempt the Veterinary profession which is already miserably paid, from the proposed reductions.

We invite the attention of our readers to a communication that appears elsewhere in this issue, from an esteemed correspondent, who deplores the absence of any action on the part of the profession to represent its "peculiar difficulties" to the Government and thus make an attempt to ward off or mitigate the impending danger. We commend the suggestion to all concerned.

Will the profession now atleast realise that by killing the Associations they have killed themselves? Well, if there is none to plead for them, they have none to blame excepting themselves. It is never too late to mend.

We feel glad to inform our readers that the Graduates of the Bombay Veterinary College, residing at present in Bombay, were "At-Home" to Mr. V. R. Phadke, G.B.V.C., J.P., the first Indian to be the Principal of the Bombay Veterinary College, (which honour he rightly deserves), on Sunday the 25th September, 1932. Khan Sahib N. D. Dhakmarwala, G.B.V.C., retired Professor of the College, eulogised Mr. Phadke to which the latter responded in a fitting manner.

We are glad to note that Rinderpest has subsided in almost all the districts of Madras Presidency. This has given a chance to the touring staff to carry on S.S. inoculation systematically in every village. Till now the practice was to carry these inoculations only

in the infected villages. Since many villages get the infection almost simultaneously it is not possible to send the touring staff in time to all these villages. The result is that many villages suffer heavy loss from cattle mortality before the inoculation campaign is started there.

The Madras C.V.D., seems to have realised this ugly situation during the recent severe outbreaks. We understand now that arrangements are being made to start S.S. inoculation camps in as many villages as possible, as a true preventive remedy to help the poor ryot as fully as possible, without waiting for the breaking out of the disease. This is a commendable step in the right direction.

Owing to the absence of outbreaks of Rinderpest and other contagious diseases in the country parts, the Touring Veterinary Assistant Surgeons should find it possible to arrange such S.S. inoculation camps on a large scale. The newly started Madras Serum Institute should also be able to supply the necessary quantity of serum and virus. In the absence of threatening Rinderpest in a village, the ryots may not feel tempted to have their animals S.S. inoculated and the staff may find it difficult for some time to coax them; but the personal efforts of the District Veterinary Officers in the villages should be able to overcome this difficulty.

Unless advantage is taken of the present respite and S.S. inoculations are carried on over large areas, it will be difficult to justify the opening of a Provincial Serum Institute not to speak of the existence of a large number of District Veterinary Officers and subordinate touring staff. The Head of the Department seems to be keenly alive to this fact. We hope Madras will lead the other provinces in this matter. No doubt the absence of Compulsory Inoculation Act is a great handicap. Still the enthusiasm and energy of the District staff should be able to achieve much substantial results.

Many of the District Veterinary Officers in the Madras Presidency have been already carrying on the propaganda work very earnestly with the aid of the Lantern slides supplied to them for the purpose by the Department, but it is very unfortunate that they should not have been supplied with lantern but are asked to manage as they can, getting the loan of one from the nearest Health Inspector or some such official! We believe this is only a temporary make-shift and

soon lanterns will be supplied at least to each of these District Veterinary Officers before they feel the handicap and lose their enthusiasm.

* * *

Now that the propaganda work through lantern lecturing and visits to the village has become a chief plank in the programme of the District Veterinary Officers, it is desirable that Officers knowing the local languages should be posted to district work as far as possible. In some departments the Gazetted Officers have got to pass a second vernacular test. Introduction of similar test may soon become necessary in the Civil Veterinary Department if work should progress rapidly.

* * *

We understand that the Special Rinderpest Officer in Madras has submitted *an interim* report on some of his investigations. This is said to contain important suggestions for the guidance of the workers in the field. We wish that this report is given a wide publicity through the medium of the professional journals for the benefit of the workers even beyond the presidency. Reports on the results of such investigations are of special value for all scientific workers and therefore they are eagerly looked for by the profession. Conferences and Association meetings would be suitable occasions for bringing such reports to the notice of a large gathering of members. In the absence of these at least the Press should be taken advantage of. We hope our suggestions will find favour with the authorities concerned.

* * *

It is now realised by the heads of almost all the provincial C. V. D's and public men interested in the welfare of cattle; that the uncontrolled movements of cattle are fruitful sources of spreading infectious diseases among live-stock in this country. In the absence of such consensus of opinion, it is a wonder why attempts are not made either by officials or non-officials to bring in a bill to control the movements of cattle. The Veterinary Surgeons working in the rural parts should educate the public on this matter and create strong public opinion.

Correspondence.

To

THE EDITOR,

The Indian Veterinary Journal, Madras.

Dear Sir,

I was much interested in reading the Editorials in the July number of "The Indian Veterinary Journal." Your plea for a considerable development in Veterinary Research in the case of the Live-stock of India is, if I may be permitted to say so, thoroughly sound and should be welcomed by all who are interested in the improvement of Live-stock in this country.

As you are probably aware this Society is concerned with the improvement of the breed of horses in India. It is doing its best, within the limit of its resources, to promote this improvement by,

(a) stimulating the production of good horses by the establishment of a profitable market for the breeders, and

(b) by initiating scientific methods of mating and rearing; but its efforts are much handicapped by the lack of facilities in India for Research in the questions of genetics and equine disease.

From the statistics given in the little pamphlet which I enclose I think you will see what a valuable asset it would be for India if she could be self-contained in the matter of horses for all purposes, and I feel sure that you will agree that a higher standard of knowledge of genetics generally and more wide spread information on the subject of prevention of equine diseases would assist materially to this desirable end.

As you truly say the Governments' plea is "lack of money." But surely it would be worth while to strain every nerve to prevent the enormous annual wastage which takes place in India.

Yours faithfully,

S. B. JAMES,

Major General,

C.B., C.I.E., M.V.O.

NAPIER HOTEL, }
Poona.
30-7-32. }

THE NATIONAL HORSE BREEDING AND SHOW SOCIETY OF INDIA.

Some Facts About the Horse Situation in India.

1. There is a grave shortage of horses in India,
2. This means that India is very largely dependent on other countries across the sea for her horse supply. This is not consistent with the dignity and status of this great country.
3. This again means that large sums of money (over 70 lakhs) are sent out of India annually to purchase foreign horses.
4. Most of this large amount of money could be saved to India if the country were self-contained in horses.
5. To make India self-contained in horses, a great expansion of horse-breeding within the country is necessary.
6. The Society was founded with this object in view.
7. Consider the immense benefit it would be to India both economically and from the point of view of defence (India contains the Empire's land frontier), if the country produced within her own boundaries all the horses required.
8. To enable this to be done the whole country must combine to assist the Society to carry out its object.
9. There is also a shortage of good horses throughout the world, especially Polo Ponies.
10. Consider how advantageous it would be for India to be able to assist in supplying the world demand for horses and polo ponies, and so bring money into India instead of sending it out.
11. Everyone who has the interest of the country at heart should therefore join the Society.
12. In no country can horse-breeding progress unless it can produce its own stallions.
13. Therefore India must turn her attention to the production of her own stallions.
14. To enable India to produce her own stallions she must be able to test her potential stallions, and the racecourse is the only known modern test. It is useless to breed without this test.
15. At present there is not sufficient opportunity for testing the potential stallions of India, owing to the comparative lack of racing for Indian horses and of stakes (breeders' rewards) for the produce of the country.
16. The following figures prove the contention in para 15. 45 lakhs are given in stakes every year in India. Of this large sum less than 2 lakhs are given to Indian horses.
17. In addition to this there is only one Racing Class for Indian Horses in India as against 4 Classes for imported English and Australian Horses and 3 Classes for Arabs.

18. Therefore the horse-breeding industry in India does not receive adequate encouragement. In fact, the importation of horses is encouraged at the expense of Indian breeders.

19. With adequate support through racing the Country would gradually become self-supporting in horses.

20. During the short period of its existence the Society has accomplished a good deal; but its activities have been sadly curtailed by lack of funds.

21. Without entering into details, the operations of the Society have resulted in a very real and important increase of interest in Indian horses, and in a recognition of their merits throughout the world.

22. With general support throughout the country and a largely increased membership, the organisation of the Society could be expanded to cover the whole of India and to assist in the re-establishment or expansion of horse-breeding in all suitable areas.

23. The larger the membership of the Society the more it will represent the united voice of the country and form a solid body of public opinion to press the demands and requirements of the important home industry of horse breeding, and the better it will be able to assist the breeders, the agriculturists of India, to secure a more profitable market for their produce.

24. Therefore the Society appeals to everyone in India to appreciate the economic value of making the country self-contained in horses, to recognise the loss now being suffered by India owing to the shortage of home-bred horses and to join the Society. (See forms attached).

DEAR EDITOR,

What is it that is happening to our profession? The atmosphere is so thick with rumours! They say that there is to be reduction in our pay, recruitment, hospitals etc. Whatever "Reduction" might mean to other services, it is going to prove a Death-knell where we are concerned. The profession is to be hurled down the depths of oblivion, from which it may not be possible for it ever to recover. What are the Upper Ten in the profession doing? Can they not in collaboration with the Directors of Veterinary Services interview the Ministers, Secretaries, even Governors and save the profession, from this threatening calamity? They may say it is all "useless"; but need they be told the value of repeated representations? How is the Government to know the peculiar difficulties of our profession? Does any one believe that the Government will bestow every blessing on the profession, unasked and unrepresented? It is for the Upper Ten to plead for the Down-trodden in the service.

Amongst our men wiseacres were not wanting to foul their own nest in condemning the activities of Associations—Associations at least were putting forth the grievances of the profession before the Government in a bold manner which no individual in service can do. Such Associations were even called upon by Royal Commission to submit their proposals, which they did. Now there is none to voice the feelings of the profession. Will all those who took pride in killing Associations gloat over the present plight of the profession? Or, will they be men and come out and show what they can do during such crisis, now that the field is free for them from the obnoxious activities of inconvenient Associations.

I mean no spite to anybody. I only dread to think of the fate before us. Associations at such junctures could have strengthened the hands of well-meaning Directors of Veterinary Services, of whom some are nobly fighting single handed the battle of the profession. Without an Association, the profession is mute now, with none to plead on its behalf. One can only pray with the poet:—

Lead, kindly Light, amid the encircling gloom,

Lead Thou me on!

The night is dark, and I am far from home,

Lead Thou me on!

Yours faithfully,
"DOOMSDAY".

THE EDITOR,

The Indian Veterinary Journal, Madras.

Dear Sir,

Thank you very much for the congratulations that you have sent to me in your letter dated 21st. July 1932, and through the columns of the last issue of your journal, on behalf of the Indian Veterinary profession, on my success in Canada. I also thank you for the good wishes expressed for my future career in this country.

I did try my best to avail properly, the opportunity which was afforded to me, as an experiment, by the University of Toronto. The veterinary education that I received at the Punjab Veterinary Veterinary College, the training that I got at the I.I.V.R. Muktesar, and the professional experience of the Govt. Cattle Farm Hissar, in India, made by work much easier in Canada to get through the B.V.Sc., V.S. examinations of the University and obtain the first position.

The principal, Dr. McGilvary, and the professorial staff of the Ontario Veterinary College were very kind and sympathetic towards me during my stay with them, and I think I really added a great deal to my professional knowledge from there.

The course in Dairying that I am taking at the University and the British Dairy Institute, Reading, will, I hope, be of an additional use to me in my profession.

In October next I shall commence my studies at the Royal Veterinary College London, for the M.R.C.V.S. diploma, and I hope I shall do my best to utilise the concession granted to me by the R.C.V.S. Council in the most suitable manner.

Please let me extend, through the columns of your esteemed journal, my best wishes for the Indian Veterinary profession, its members and the journal.

THE UNIVERSITY,
Reading, (England).
17th August, 1932.

Yours faithfully,

R. L. KAURA, B.V. SC.L. V.P. Hons., V.S.

Extracts

RABIES IN THE MONGOOSE.

BY

S.D.S. GREVAL, B.Sc. (PUNJAB), M.D., Ch.B., D.P.H.
(LIVERPOOL), MAJOR, I.M.S.,

Officiating Director, Pasteur Institute of India, Kasauli.

Reports from Records including a report on the first positive brain of mongoose examined at Kasauli.

1. Case No. 2871 of 1932.

H.S., aged 60, male, of K.K., district Ludhiana. Bitten on 29th April 1932. Came for treatment on 1st May, 1932. Finished treatment on 14th May, 1932. He stated:—

'I was watering my oxen in the animal shed when a mongoose rushed in amongst them. I lifted it up and threw it away. I had hardly turned my back when it rushed back again, bit me behind and under the knee and held on. I removed the animal and squeezed the wound with the result that bleeding occurred and covered an area about the size of two pice. The blood was washed with water!

(Translated from Punjabi, by S.D.S.G.).

On examination four freshly formed small scabs, enclosing an area about 3—4 inch in diameter, were seen. No caustics or antiseptics had been applied. There was no sepsis. The patient was a tall and well built subject.

The mongoose, probably a male, had been killed and thrown away.

The bite was classed as *moderately severe* (class III, *Hempt*) and treated accordingly.

2. Copy of a letter received with the specimen No. 136 of 1932.

Sir,

'I am sending you for examination the brain of a suspected mongoose. This mongoose has bitten a girl badly. I suspect it must have been suffering from rabies as it would not stop attacking even when beaten off. At last it was killed. Please inform me by wire if the girl must be sent to Kasauli for treatment.

B., District Jullunder, }
3rd May, 1932.

G. S.
V.A.S.

(Translated from Urdu, by S.D.S.G.)

Sections from the brain, which was sent in spirit, showed Negri bodies of various sizes. This specimen was the first positive specimen examined at Kasauli. The girl never turned up for treatment, presumably due to the pressure of work in the village at the time of the harvest. The animal, as was ascertained later was a male.

3. Copy of a letter from M.O.H., C.B.M., dated 9th May, 1932,

Dear Sir,

Yesterday afternoon, I received a case from Meerut with the following history:—

A boy, aged 4½, was bitten on his bare buttocks by a mongoose. The mongoose attacked several other persons who escaped being actually bitten. The mongoose had been living in the compound of the house for a long time and the father of the boy had noticed that the mongoose, a few days previous to this incident, had begun to grow thin. After the incident the mongoose was caught and placed in a cage and died the next day.

As the wounds are superficial I have commenced the usual class II treatment. The question is whether this case should be continued as an ordinary class II.

I shall be much obliged if you would advise me in this matter, as I am not sure whether a mongoose is one of those animals which are capable of suffering from rabies.

Later, the patient was brought to Kasauli for treatment (Case No. 3298 of 1932) and the following additional facts were ascertained:—

There were no mongooses living in the hedge round the compound of the house. They were almost tame and used to come into the house for food. Latterly only one mongoose was left. It attacked people in the house unprovoked but was frightened off by the adults. The patient, a child, was bitten without provocation. When the mongoose was caught it was discovered that it had broken its teeth and was bleeding from the mouth. Presumably it had been fighting and had killed its companion.

The teeth marks and the scratches had all healed without leaving scars. Only one long scratch, presumably caused by tooth (It was found where the head of the animal had been during the attack) had looked red. Iodine had been applied almost immediately.

This case was also classed as *moderately severe* (class III *Hempt*).

4. Case No. 3387 of 1932.

S. R., aged 25, male, of M. near Thanesar, district Karnal, Bitten on 16th May 1932. Came for treatment on 24th May, 1932. Finished treatment on 6th June 1932. He stated:—

'I was repairing the fence of my millet crop (the millet is grown out of season for the cattle when grass is scarce) when I saw a long and fat mongoose, at a distance of about 10 yards, uttering sounds of cur-cur-cur-cur. The next moment it attacked me and climbing up my leg bit me on the thigh, through cloathing, and held on. I detached it and threw it away. It then made for a well about half a furlong away. Men were bathing there and it created a stir amongst them. My cousin killed it and we buried it. The wound looked red though no blood flowed from it.

Mongooses abound in my village. When provoked they often attack people specially children but are easily frightened off. I was surprised at the behaviour of this mongoose.

The animal was presumably a male (large size and no teats).

(Translated from Hindi, by S. D. S. G.)

On examination the site of the bite showed two linear scars about ½ inch apart. No antiseptics or caustics had been applied. There was no sepsis. This patient too was a tall and well built subject.

This case was also classed as *moderately severe* (class III. *Hempt*) and treated accordingly.

5. From the Annual Report of the Institute for year 1929, part, page 4.

* The second case was reported from Delhi and the following are the brief notes on the case as reported to us:—

"Mrs. B. P. (Indian), aged 35, was bitten on the left great toe by a mongoose possibly rabid, on 21st September, 1929. The wound was dressed and healed up within 3 or 4 days leaving small scar.

On 31st October, 1929, the patient fell ill and complained of pain in the left leg.

2nd November, 1929.—Pain in the left leg from pelvis to foot; feeling of anaesthesia; pain in uterus.

3rd November, 1929.—Pain over cardiac region. Itching in big toe (left). Feeling of constriction in throat. No temperature. Spasm of jaw; and unable to drink water. Restlessness; no sleep; fits all night.

4th November, 1929.—Fits ceased at 8-A. M., perspiration; death 12 noon."

The patient had not received any antirabic treatment. The case appears to have been undoubtedly one of hydrophobia and is reported since it is the first death to be recorded at Kasauli in a patient bitten by a mongoose.

6. A table showing mongoose bite cases and mongoose brain examinations at Kasauli during the last 10 years from 1922 to 1931.

Year.	Cases,	Brain examinations,
1922	4	0
1923	4	0
1924	4	0
1925	7	0
1926	0	0
1927	10	0
1928	0	0

1929	...	3	...	2 Negative.
1930	...	0	...	0
1931	...	0	...	0
Total.		32	...	2

During the same period :—

Total number of cases treated 67,326.

Total number of brains examined 4,708.

7. Identification of the mongoose.

There is no record of the identification of the animal in the Pasteur Institute, Kasauli. According to the *Fauna of British India* 'the only generic type within the Indian area is *Herpestis*, the various subdivisions such as *Urva*, *Taeniogale*, etc., raised to generic rank by Hodgson, Gray and others, not being distinguished by characters of more than specific importance'.

I. Comments including Speculation.

Does rabies come into civilization from the wooded wilderness?

McKendrick in the *Tropical Diseases Bulletin* for September 1931, quotes U. Toit's summary to the effect that the yellow mongoose of South Africa (*Cynictus penicillata*) has been proved to be the sole transmitter of rabies in that country at the present moment. The conclusion drawn, however, is that apparently the infection has become somewhat modified during its sojourn in the wild carnivore'. Could one not reverse the picture?

Burma where forests abound, has more than its fair share of rabies. In Arabia, where forests do not exist, one never hears of a death from rabies: such was my experience as a Specialist in Prevention of Diseases to the Aden Brigade for over four years: and such is the experience of the Civil Surgeon, Aden, who writes :—

'I have not seen or heard of a single case of rabies in Aden and the surrounding districts. I have been in Aden, now, for three and a half years.

From the information obtained from reliable and intelligent persons jackals are to be found in the interior of Southern Arabia. As regards, wolves, foxes and mongooses nobody seems to know if they are at all to be found in this part of Arabia'. (From a letter received on 30th May, 1932, Receipt No. 5422 of 1932).

Often one gets a history from patients, concerning their own rabid dogs, to the effect that their dogs never left the house unaccompanied and were never bitten by a stray dog. Could they not, then, have been bitten by a rabid mongoose in a bush in the compound of the house? In the localities where rabies occurs both in the dog and in the mongoose, a rabid dog biting a healthy mongoose, and letting it go to develop rabies later, is only a possibility, while a rabid mongoose biting a healthy dog, which will develop rabies later, is a reasonable likelihood.

Again, one occasionally hears of human cases dying from rabies, diagnosed by experts, with no history of a bite or even a lick from a stray dog. I heard of one such case at Rangoon. The victim, a son of a well-to-do Burmese family, kept rabbits as a hobby. Was he ever bitten by a mongoose?

Popular belief, in the Punjab at any rate, attributes rabies in the dog to a bite from a wild-carnivore, a female jackal with young ones (*phonhin*) being specially incriminated.

A very strong argument against this hypothesis is the fact that rabies in a country can be stamped out by legislation against dogs. Like the production and

the use of fire which in ancient India was procured from a forest and then kept going in the village, could the genesis of rabies in the wild carnivores be one thing and its very rapid spread in the humanised carnivores another? Possibly the strong instinct of mutual distrust in the wild carnivores and the unsuspecting sociability of the humanised carnivores are responsible for the seeming state of affairs and the usual belief held. Or there may be some other biological factor at work making the disease smoulder in the forests and flare up in the populated areas. Aetiology in medicine is a very small fraction of ecology in biology.

III. Bearing on Treatment.

A mongoose, though a carnivore and possessing the carnivorous dentition and inclinations, has smaller and finer teeth than a dog or cat. The bite will draw blood and yet not look like a bite one is accustomed to see in an antirabic clinic. Besides, the bites appear to heal without any apparent sepsis. Within a few days all evidence of damage to the skin may disappear. In my opinion all cases of mongoose bite, when the animal has shown zeal and energy in inflicting the bite, should be treated, at least, as moderately severe (class III, Hempt).

Summary.

1. Three new cases of mongoose bite have been described. One positive mongoose's brain has been reported. Attention is drawn to a death presumably from mongoose bite in an untreated case. All mongoose bite cases treated and mongoose brains examined at Kasauli during the last 10 years, from 1922 to 1932, are tabulated.

2. The possibility of rabies coming into the domestic carnivora from the wild carnivora is discussed.

3. The suggestion is made to the effect that a mongoose bite should be treated as a serious bite.

REFERENCES.

- Blandford, W. T. (1888-91). The Fauna of British India Mammalia, p. 119.
 McKendrick, A. G. *Trop. Dis. Bull.* Vol. XXVIII, p. 742-43.
Twenty-ninth Annual Report of the Pasteur Institute of India, Kasauli.
 1929. I. M. G. August 1932.

THE INFECTIVITY OF MILK AND MEAT IN RABIES.

To the Editor, The Indian Medical Gazettee.

Sir,

Can you inform me through the columns of your journal whether the virus of rabies may be present in the meat of a cow or pig bitten by rabid dog: if so, for what period, and whether such meat could be safely eaten? This question is constantly asked by patients and the public, and no definite views about it appear to prevail. A consultation with a Veterinary Surgeon has not improved my knowledge, and hence my request.

Is it safe to drink the milk of a cow bitten by a rabid animal and to eat the eggs of a fowl similarly affected?

I should be very grateful for an authoritative opinion on this subject. Yours, etc.

A. F. COELHO, M.B.B.S.

Father Muller's Charitable Institutions,
 Kankanady. P. O. Mangalore,
 5th May, 1932.

Note—We are not sorry that our correspondent has raised this question, for it is one which is constantly being asked. The following abstract from 'Rabies and Antirabic Treatment in India' by Lieutenant-Colonel E.D.W. Greig, C.I.E., I.M.S. (retd.), published when he was Director of the Pasteur Institute of India, gives the authoritative opinion asked for:—

"In the body of a rabid animal the virus is found in the nervous system, that is to say in the brain, spinal cord, and large nerves, also in the salivary glands, and in certain of the internal organs such as the pancreas and suprarenal glands. For practical purposes the blood and other structures of the body such as bone, muscle, etc., do not contain the virus in sufficient quantities to convey infection.

The virus passes from the brain to the salivary glands and thence into the saliva of the infected animal. The saliva of human beings and herbivora contain practically no virus. Before infection can occur, the virus must gain entrance into the body through some broken surface in the skin or abraded mucous membrane. This is usually brought about by the bite of a rabid animal where the skin is penetrated by the teeth and virus thus gains access into the body through this route. The chance of infection from a lick through a cut or abrasion is very much smaller than that of a bite. In these cases the cut or abrasion must be fresh, as granulation tissue in a healing wound forms a barrier to the passage of the virus.

The milk of animals suffering from rabies has seldom been shown to contain the virus, which probably exists in the milk in very high dilution, so, if no recent cuts or abrasions are present on the lips or mouth, such milk can be drunk with impunity. In the milk be boiled, the virus, even if present, is killed, thereby eliminating even the remote chance of infection by this unlikely route.

The virus is not absorbed from the unabraded alimentary tract and is killed by digestion. In answer to our correspondent, therefore, we may say that the flesh of animals bitten by a rabid animal, if cooked, the milk of such an animal, if boiled, or the fowl's eggs if cooked, would be perfectly safe. Raw flesh, milk and meat would only be dangerous—and that only extremely rarely—if there were fresh cuts or abrasions on the lips or mouth or tongue.

One case in the literature shows that the saliva of herbivora may very rarely contain the virus; it was reported by Cunningham, in the *Annual Report of the Pasteur Institute of India, Kasauli, for 1926*, on p. 5. The patient, a mason by trade, was brought into the Lahore antirabic centre suffering from hydrophobia said to have been the result of contact with a rabid buffalo eight months previously. The man died of hydrophobia after two days illness. Searching enquiries were made, and the following facts elicited. The patient's hands were usually freshly cracked and abraded owing to his handling lime with a brush whilst slaking it. When he was giving medicine to the buffalo his cracked hands came in contact with the animal's saliva. The buffalo died three days later of rabies; it had been bitten on the nose by a dog a month previously. No bite was observed on the man's hands at the time, nor did he mention that he had been bitten. He never mentioned to his relatives at any subsequent period that he had ever been bitten by a dog, cat, or jackal at any time before or after being licked by the buffalo.

In this case infective saliva apparently came into contact with fresh abrasions on the hands, and the case is on a par with that of a British sergeant, mentioned by Cornwall, who was indirectly infected through saliva of a rabid dog present on its leash. [Editor, I.M.G.] *I.M.G. August, 1932.*

A RAPID PARAFFIN TECHNIC

BY

W. L. McNAMARA, M.D., HINES, ILL.

While the commonly employed methods for paraffin impregnation of tissues following rapid dehydration are suitable for surgical diagnosis, they cannot be used for minute histologic study or photomicrography. This is due to the shrinkage of the tissue with resultant distortion and loss of cell definition.

The necessity for a rapid method, yet one which would permit of detailed histologic study arose during a period of insufficient technical assistance and led to experimentation along these lines. This resulted in a method, which, in our hands, has given highly satisfactory results and has been adopted routinely in this laboratory to the exclusion of all other methods.

The procedure is as follows:—

10 per cent formalin fixation.

Cut pieces for section 2 mm. in thickness.

80 per cent alcohol fifteen minutes.

95 percent alcohol forty-five minutes (40 x as much solution as tissue).

Acetone c. p. for fifteen minutes. Pour off and add 40 x as much fresh acetone as tissue for seventyfive minutes.

Paraffin (hard 54°) in oven one hour. One paraffin only is used.

Imbed and section.

In removing paraffin from slide preceding staining, one xylol only is used.

The usual staining processes may be employed.

Sections are blotted following graded alcohol and cleared with some essential oil (cloves, origanum, etc.).

The secret of success in this method lies:

1. In the avoidance of any of the commonly used clearing agents (xylol, chloroform, tuluol, benzol, etc.).

2. The least possible time in oven heat. The clearing agents and prolonged heat are the factors largely responsible for tissue shrinkage.

When no clearing agent other than an essential oil is used, paraffin impregnation takes place rapidly and is complete in less than one hour, thereby obviating long continued oven heat. Acetone, being highly volatile, is rapidly driven off by the heat of the oven; hence, there is no necessity for more than one change of paraffin.

The preceding technic carefully followed, results in rapid dehydration and paraffin impregnation with a minimum of tissue shrinkage and cell distortion.

"The Journal of Laboratory and Clinical Medicine." Vol. XVII. No. 11.

A PRACTICAL STAINING METHOD FOR INTESTINAL PROTOZOA.

BY

H. TSUCHIYA, SC. D., ST. LOUIS, MO.

As contrasted with the time-consuming procedures employed for securing permanent preparations of intestinal protozoa by means of iron-hematoxylin stain, the following method is found to be simple, rapid and efficient, especially when protozoa are required to be stained quickly for diagnostic work.

The technic is described as follows;—

1. Smear a bit of stool on a clean slide, and make a thin moist film (thin enough to read newspaper print through) by using a drop of normal saline as diluent. Keep the preparation moist at all times during this and subsequent steps. This is vitally important.
2. Fix immediately in warm Schaudinn's fluid (65 c. c. of saturated $HgCl_2$ and 35 c. c. of 95 per cent alcohol to which 3 c. c. of glacial acetic acid is added before use, and this is heated to $60^\circ C.$) for ten minutes in case of trophozoites and fifteen minutes in case of cysts.
3. Remove sublimate by immersing for ten minutes into 70 per cent alcohol to which several drops of the tincture of Iodine are added.
4. Wash in running tap water for one minute.
5. Mordant in a 4 per cent aqueous iron alum (ferric ammonium sulphate) for twenty minutes.
6. Wash in running tap water for three minutes.
7. Shake off the excess water from the slide and immediately apply Wright's stain in a similar manner as for blood smear, i.e., one minute with Wright's stain and five minutes after an addition of equal number of drops of distilled water.
8. Wash in running tap water for one minute, and shake off the excess water from the slide.
9. Dehydrate by graded alcohol; fifteen seconds each in 70 per cent, 95 per cent, and absolute alcohol.
10. Clear in two changes of xylol for three minutes each.
11. Apply a coverslip gently over a drop of neutral balsam, and leave in an incubator at $37^\circ C.$ until examined.

Contrary to the hematoxylin methods, this method does not require differentiation of Wright's stain by means of a mordant, the process of which is considered difficult by those who are inexperienced. Furthermore, Wright's stain gives a very clear picture, and enables one to recognise readily the structural characteristics of an organism in question. Such may be well illustrated by the nuclei of various endamebae in which the karyosome, chromatin granules, and linin network are brought out in dark blue color against a pinkish back ground of eosin.

By virtue of the simplicity and the brevity of time spent for the technic together with vivid color contrasts of various structures, this method can advantageously be employed in a final diagnosis of intestinal protozoa, whenever it is difficult to determine with certainty the species present.

"The Journal of Laboratory and Clinical Medicine." Vol. XVII, No. 11.

OUTLINE OF DIAGNOSIS AND CONTROL OF COMMON POULTRY DISEASES.

BY

FRANK BREED, LINCOLN, NEBRASKA.

The following outline is intended to assist in the diagnosis of the common poultry problems. The descriptive matter gives the clinical symptoms together with the mode of discrimination and some of the means of control, while the tables contain summaries of the outstanding clinical symptoms and autopsy findings.

It must be remembered that this is only a working outline, showing only the salient symptoms and pathological changes encountered in these conditions.

Fowl Cholera—Avian Hemorrhagic Septicemia.

A disease of the fall and winter.

Incubation period.—From 12 hours to three or more days.

Symptoms.—Depression; the face, comb and wattles usually become darkened and discolored; there is increased thirst; the respiration is increased and later labored; some elevation of temperature; complete prostration just prior to death sometimes death is so sudden no symptoms are manifested.

Symptoms and Lesions.—Drooping wings, lameness. (localized cholera); emaciation, (chronic cholera); diarrhoea, (white discharges); elevated temperature; congested, deep-red comb; congestion and hemorrhage of intestinal mucosa, congested lungs and kidneys; petechia on the heart.

Mode of spread.—The organisms are eliminated from the body through the bowel discharges, contaminating the soil, feed and drinking water.

Control.—Strict policy of isolation of sick birds; cleaning and disinfecting of houses and premises and the use of germicide in the drinking water. The treatment, of sick and well birds with immune sera, has been tried with success in some instances. Vaccination against the disease may produce a temporary artificial immunity, but conflicting results have been reported on this method of treatment (Kaupp.)

Fowl Typhoid (Klein's Disease).

A disease of the autumn and early spring.

Incubation period four to six days, and the duration of symptoms in fatal cases from four to twelve days.

Symptoms.—In the initial stages, the symptoms may be overlooked if the birds are not alarmed. The bird shows signs of dozing, and does not present the normal facial appearance if disturbed—the action of the head being of a nervous type. If disturbed the bird shows a weakness of gait. The bowel discharges are sulphur-colored and the temperature as high as $114^\circ F.$ Loss of flesh may be rapid, affected birds may become partially comatosed; and if sitting, the head may fall forward until the beak touches the ground: or the coma may be complete when the bird lies on its side with the head curved under its breast; complete loss of the use of the muscles of the neck and inability to walk. The face, wattles and comb usually are highly anemic.

Autopsy Findings.—Grayish spots on the heart; severe intestinal catarrh; enlarged liver showing white spots; spleen enlarged; kidneys enlarged.

Mode of Spread.—The infectious organism is eliminated in large quantities by bowel discharges; contaminating soils; feed and drinking water. The disease may be introduced into a flock by the addition of new fowl or eggs, and by birds eating carcass of birds dead of the disease.

Control Measures.—Strict sanitation is to be recommended; all sick birds should be isolated or destroyed; and antiseptics should be added to the drinking water and the healthy birds removed to new grounds if possible. Epsom salts administered to the flock is commendable. The use of a bacterin prepared from the fowl typhoid organism or a combination of the typhoid and cholera organisms have given satisfactory results.

Tracheitis.—Infectious Bronchitis—Laryngotracheitis.

An acute infectious disease most common during the spring and autumn, especially at concentration points for shipping and in fattening batteries. This condition may spread very rapidly from battery to battery.

Symptoms.—A rattling sound may be heard in the region of the trachea or or bronchi. The affected bird will be seen to extend the head upwards with the mouth open gasping for air. Pseudomembranes may form in the mouth which may have the appearance of canker. As the disease progresses, the appetite is lost, fowl becomes dull and loses in flesh.

Autopsy Findings.—Hemorrhagic inflammation of trachea with an exudate and bronchitis.

Treatment.—One grain quinine sulphate three times daily. Place the bird in warm, clean comfortable quarters, free from drafts. Give plenty of clean water and soft feed such as bread or middlings moistened in milk, to which has been added two grains of blackantimony for each bird. Feed twice daily.

In the early stages, the disease may respond to subcutaneous injection of 3 c.c. to 5 c.c. of a solution of acriflavine, repeated once a day. (Kaupp).

Avitaminosis.

Vitamin A is a fat soluble vitamin and its absence from the diet results in a condition known as "nutritional disease." The development of this condition is rather slow. It has been found, by experiments, that it requires about 158 days to develop a typical case of nutritional disease, when the birds are fed on a diet entirely lacking this vitamin.

Symptoms.—There is a loss in weight; the comb becomes pale, the feathers ruffled, and the birds show progressive weakness. In the late stage of the condition, diarrhoea may be observed, the droppings containing considerable white material (urates). The eye usually shows improvement, which is manifest by a pronounced swelling; the exudate is white and does not have an offensive odor. This affection should be differentiated from ocular roup, in which the exudate is yellowish and accompanied by an offensive odor.

One of the most important diagnostic factors in this condition is the presence in the esophagus of small white or yellowish raised nodules of about the size of a millet seed. These may be few or many in number and located near the upper end of the esophagus or over the entire surface. The kidneys are usually involved in this condition. They appear large, pale in color and streaked with a network of white lines. The network appearance is due to excessive urate deposit. In some instances the urates may be distributed throughout the body and the surface of internal organs appear as if sprinkled with a white powder.

Autopsy Findings.—White cheesy pustules in the esophagus and white deposits (urates) on the heart, liver and kidneys. There is congestion of the latter organs.

Treatment.—This consists entirely in correcting the diet. This vitamin is present in large amounts in butter, yolk of eggs, green leaves, cod-liver oil, yellow corn, and good leafy alfalfa.

Polyneuritis.

Vitamin B, which is water soluble, when lacking in the diet, results in a condition in fowls called polyneuritis. It appears that the bird reacts much quicker to the lack of this vitamin, than to lack of vitamin A. It has been shown experimentally that birds will develop polyneuritis and die in 54 days when kept on a diet deficient in vitamin B.

Symptoms.—The affected birds exhibit extreme nervous symptoms and inability to coordinate certain muscular movements. Sometimes a paralysis of the muscles of the neck develop. Eye lesions are lacking. The loss of muscular co-ordination is not so pronounced as in botulism or limberneck and the development is slower. The feathers present an unthrifty or unkempt appearance: the wings droop; emaciation ensues and the temperature is subnormal. There are no lesions of the abdominal or thoracic organs.

Treatment.—This consists entirely in correcting the diet. This vitamin is present in yeast, milk, green leaves, eggs, fruits and the coverings of most grains.

Rachitis.

Vitamin D, fat soluble, plays the all important part in the proper development of the bony structure of the growing fowl. A deficiency of this vitamin in the diet results in a lack of proper assimilation of lime salts which results in rickets.

Symptoms.—Swollen joints, lameness, stiffness, lack of growth, unthriftiness, weakness, walk a few steps and sit down, inability to walk and finally death. The failure of the bone to properly calcify may be due to lack of sufficient calcium or phosphorus with an undue amount of calcium or of vitamin D. There are no lesions of the thoracic or abdominal organs.

Treatment.—Vitamin D may be supplied in form of direct sunshine, cod liver oil, green feed or the ultra-violet lamp.

Coccidiosis.

A protozoon disease affecting fowls, rarely at less than three weeks ago. It appears that the greatest loss takes place between the ages of three weeks and six months.

Symptoms.—The chick is weak; feathers unkempt; wings droopy, due to muscular weakness; loss of appetite, or in some cases, birds may continue to eat. The droppings are fluid and of a whitish or whitish brown color and paste up the vent. The discharges may be streaked with blood. In the older chicks comb and wattles become pale. The adult fowl is less susceptible to coccidia infection, probably due to an immunity acquired by the ingestion of small numbers of oocysts.

In the adult fowl the disease usually assumes a far more chronic type. The fowl develops a gradual and progressive listlessness and loss of activity with emaciation. The comb becomes pale and the bird has periods of dejection during which it stands in an isolated position. Appetite may remain normal or may be ravenous when fowls are aroused at feeding time. Leg weaknesses and paralysis may accompany the disease. Emaciation becomes marked after a time, there is a persistent diarrhea with bloody droppings. Death may occur in from one to three weeks.

Mode of Spread.—This protozoon is excreted in the faeces, contaminating the soil, runs or floors, also the drinking water and food. The infection takes place through the digestive tract.

Control.—One of the most important factors in the control of this condition is sanitation. This disease peculiarly lends itself to sanitary control due to the life cycle. If the chickens become infested with coccidia but once they will be rid of all the germs in 10 to 15 days. The organism does not continue to multiply in the intestines as many other infections do, but completes its cycle in a definite time and is passed out with the feces. Fresh droppings cannot produce the disease. The spores, which are the infective stage, are developed in the coccidia outside the body in 48 hours. Therefore, if by sanitation the cycle is broken at this point, the disease can be stopped.

Treatment.—The use of acidophilus milk; dried milk powder, to the extent of 40% of the diet; catechu 1/3 teaspoonful to each gallon of drinking water, or ipecac in same proportion; quinine sulphate 1/3 grain; bichloride of mercury 1 to 10 thousand, or phenoluslphonates with bichloride have given satisfactory results in the treatment and control of this condition.

Entero-Hepatitis.

A protozoon disease mostly in turkeys but does occur in chickens.

Period of incubation.—Usually from 10 to 12 days.

Symptoms.—The first symptom noticed in the poults, which are the most susceptible, is a lagging behind the flock, a sign of weakness. This is followed by more pronounced weakness as shown by the slow careful gait, drooping wings and a tendency to stand in one spot. Now follows a loss of appetite and also a loss of weight. No elevation in temperature. In adult birds, the symptoms are not manifest until the disease has progressed to a considerable extent. They appear dull, wings and tail droop, feathers ruffled and they sit around much of the time. Diarrhoea of the greenish yellow color sets in, followed by loss of appetite, and the bird gradually grows weaker and usually dies in from three to ten days after appearance of the first symptoms.

Mode of spread.—The protozoon escapes from ulcers in the ceca and passes out with the droppings to contaminate the soil, food and water. This contaminated food and water is the means of transmission. The infection usually takes place in the ceca, then extends to the liver, causing inflammation and degeneration of these organs.

Turkeys of all ages are susceptible to blackhead but the young suffer most. Cases seldom appear before the 13th day. The most critical period begins at about the thirty-fifth day after hatching.

Treatment.—In this condition, as in coccidiosis, sanitary control measures are all important. Do not allow young poults to run with older turkeys or chickens as there may be chronic carriers among the adult birds. On premises where chickens and turkeys have ranged for some time, it is advisable to yard the young birds. This should be done on non-infected soil if possible, otherwise cover the yard with about 9 to 12 inches of gravel.

Sulphocarbolates with bichloride of mercury give good results. The bichloride should be in a dilution of 1 to 20 thousand.

Hypodermic injections of tryparsamide, an arsenical compound, have been successfully used, the dose being 1 gram per kilogram of live weight.

"Veterinary Medicine", Vol. XXV11, No. 9.

CONTRIBUTION TO THE SYMPTOMATOLOGY AND THERAPY ON PIROPLASMA CABALLI.

BY

A. BERGTHAL,

Government Veterinary Officer, Department of Agriculture,
Forestry and Fisheries, Palestine.

Recently numerous cases of an illness among police horses came under my notice, the disease manifesting itself in jaundice, indigestion, and a high temperature. The clinical appearances suggested the presence of some blood parasite, although such parasites could not be found after several blood examination. In the majority of the cases the suffering animals were countrybred horses, and this have been found to possess a more or less natural resistance to disease caused by protozoa. Only in this way could it be explained that numerous horses which became ill, with symptoms of slight fever, indigestion, colic, and yellowish discoloration of the mucous membranes, recovered without any treatment, or otherwise the disease lasted in the same stage for weeks, and even months. During the summer of 1931, a number of police horses in the Ramle division became sick, showing symptoms of icterus and high temperature, indigestion, sometimes accompanied by colic, which later on was diagnosed as *Piroplasma caballi*. Tick fever is known to exist, and to be widespread among the cattle of Palestine, and it can now be diagnosed and treatment instituted. This condition is seldom, however, ascertained in equines, as the diagnosis of equine piroplasmosis is difficult in local animals, and rarely can the existence of parasites in the blood be verified. The two forms of equine piroplasmosis known to exist in Palestine are *Nutallia equi*, found sometimes in horses, asses and mules, and *Piroplasma caballi* which is more rare. During the present year there was a great invasion of ticks in Palestine, and tick fever thus took a form more serious in character. The disease appeared and spread among the horses during the summer months from May to August, and even September.

At the onset of the illness a high temperature of 40-41.3°C., with a pronounced dullness, is notified. The animals keep in a corner, droop their heads, and tears ooze from their half-closed eyelids. If urged to move they walk lazily and with some difficulty, and frequently the gait is staggering. Oedematous swelling of the scrotum and that of the hind legs over the hind fetlocks has often been noticed. The conjunctiva and the visible mucous membranes become yellow. Icterus varies from a slight yellow to an orange-yellow colour, proportionate to the severity of the affection. Numerous petechiae are to be seen on the conjunctiva (*Membrana nectitans*) and in the mucous membranes of the nose and mouth, quite similar to that which are seen in petechial fever. Heart action in acute phases of the disease is greatly accelerated. The thorax presents signs of infiltration of the lungs, and the respiration is laboured and of the costo-abdominal type. Auscultation reveals intensified vesicular breathing rales, sometimes indefinite breathing sounds. From the beginning of the acute stage of the disease the appetite is depressed, whereas the thirst is increased. At first there is constipation, during which the faeces are dry. Later they become softer, and constipation alternates with diarrhoea and colic symptoms. The urine is dark yellow in colour.

Courses of the disease.—After the initial rapid rise of the temperature, associated with an appearance of dullness, the temperature remains for some three to ten days at 40-41.3°C., whereupon in some cases it gradually returns to

normal, or it becomes chronic. In this form it may last for weeks, and even extend over a period of several months, with main symptoms of chronic indigestion colic, emaciation, anaemia, and swelling of hind legs and scrotum. These swellings, and the haemorrhages on the mucous membranes often remain for some considerable time after disappearance of other symptoms. The animal shows an inclination to ingest sand. The majority of horses exhibit only a moderate temperature of 39-35.5°C., with diminished appetite. Slight yellow discoloration of all mucous membranes, as well as symptoms of indigestion, have been observed. In such cases the illness may pass even unnoticed, and patients recover rapidly after the disappearance of the described symptoms, or, as mostly happens, it makes a chronic course, and lasts for several months.

Diagnosis:—The disease may be recognised by the presence of marked icterus and fever, the recognition of which, however, is only possible by the demonstration of *Piroplasma caballi* in the red blood corpuscles, which in the cases observed by me were reported to be very rare. The following is a report received from the Government Veterinary Laboratory with regard to examinations carried out on blood of horses which were affected: "Blood slides received from you taken from the following horses; Nos. 338, 303, 365 and 612, showed the presence of *Piroplasma caballi*. These were present in very small numbers, the most heavily infected showing about five or six parasites after prolonged search of several slides. In the other cases it was only after examining two or three films that a piroplasm could be demonstrated".

It may be pointed out that the assertion of Descazeaux, that the severity of the illness stands in no proportion to the number of parasites in the blood corpuscles, and that it depends only upon their virulence, has been corroborated by the present outbreak.

Treatment:—The first treatment consisted of large doses of quinine sulphate 15-20 gr., which did not always prove successful, as many relapses occurred, and in some instances the temperature, after having dropped, would rise again. My attention was then drawn to a new remedy, which has a specific effect in piroplasmosis in cattle and is known as trypanflavin (3,6 diamino-10 methylacridinum chloride). Trypanflavin has been applied intravenously in an aqueous solution, 50 grammes of a 2 per cent. solution. The result of the treatment becomes manifested by the rapid fall of temperature and disappearance of the symptoms of dullness. It is also marked by the disappearance of the parasites in the blood, as confirmed by the laboratory examination. The temperature becomes normal, and an astoundingly quick improvement follows. Trypanflavin is injected into the jugular vein. The necessary amount is dissolved in sterile boiled water, and applied with a sterile syringe the excretion of the drug occurs within a few hours, through the urine, which assumes a yellowish-green to brown colour. Trypanflavin spreads in the organism in the same way as a vital dye, e.g., it colours almost all the organs, and therefore is also seen in the urine. Great care must be exercised with trypanflavin when injected intravenously that not even the smallest quantity should be injected outside the vein, as it causes extensive swellings of the peri-vascular tissues. Altogether ten horses were treated with trypanflavin, and the history of three of them is given as follows:

Horse No. 612:—Country-born stallion, six years old. The horse was reported to be sick and not feeding. Jaundice, haemorrhagic spots on the conjunctiva, temperature 41.1°C. Blood examination revealed the presence of *Piroplasma caballi*. **Treatment:**—On August 9th, 1931, an injection, intra-jugular, of 50 c.c. 2 per cent. solution of trypanflavin. Temperature dropped by next morning to 38.3°C. The horse recovered completely.

Horse No. 365:—Country-born stallion, five years old. Was reported to be off food on August 8th, 1931. Temperature was 41°C. Jaundice with haemorrhagic spots on the conjunctiva. Blood examination proved that the horse was suffering from *Piroplasma caballi*. **Treatment:**—At the beginning consisted of quinine sulphate. No improvement being noticed, an injection of 50 c.c. 2 per cent. trypanflavin solution was administered. The temperature dropped within the following two days to normal, and the horse quickly recovered.

Horse No. 338:—Country-born stallion, nine years old, which was reported on July 20th, 1931, to be sick. Temperature 41.3°C. General jaundice and haemorrhagic spots on the conjunctiva and on the mucous membranes of the mouth. The horse appeared to be very ill. Blood slides examined in the Government laboratory proved that the animal was suffering from *Piroplasma caballi*. **Treatment:**—This consisted of an intravenous injection of 50 c.c., 2 percent, trypanflavin. The temperature dropped by next morning, and gradually became almost normal. A rise of temperature occurred on July 25th, due to an extensive swelling of the place of injection, but the animal recovered completely after one injection of trypanflavin.

In conclusion, it would appear that the intravenous injection of trypanflavin constitutes a very useful form of treatment in piroplasmosis of the horse due to *Piroplasma caballi*.

"The Veterinary Journal," Vol. 88, No. 7.

ERRATA.

Page 10, Vol. IX, in the Scale given in the drawing of *Poroccephalus* species in the Muscle of a Fresh-water Fish. "Head," read 0.1 0.2, 0.3, and 0.4, instead of .01, .02, .03, and .04.

We regret we left out the following paragraph in extracting the article on "Diseases of Human Beings carried by Milk" by Mr. Thos. DaCosta, G.B.V.C., in our last number of July 1932. It should be read as sub-para 2 under paragraph 2 in Chapter 2.

"Thus the disease which are communicable in this way are the above stated animal diseases in addition to the three common ones, viz Septic sore throat, Scarlet Fever and Diphtheria, and the usual human diseases such as Tuberculosis. Paratyphoid Fever, Epidemic cerebro-spinal meningitis, Small-pox and even Measles".

Page 29 Vol. IX. line 15, Read Ol. Terpentine, 1½ for 10½.

" " " 16 " Tr. Asafoetida. 1½ for 10½.

" " " last line, " Liq. Adrenaline Hydrochloride ½ oz for 1½ oz.

College News.

MADRAS VETERINARY COLLEGE.

List showing the names of students who graduated from the Madras Veterinary College in the special examination held in October 1932.

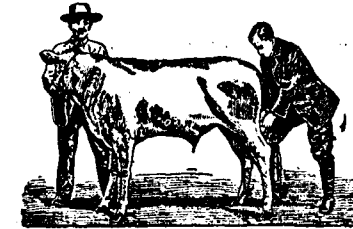
- | | |
|-------|-----------------------|
| I. | Mr. A. Subba Rao. |
| II. | „ K. P. Balakrishnan. |
| III. | „ G. Raghavan. |
| VI. } | „ B. K. Dasappa. |
| | „ M. Sundararajan. |

TRADE
MARK

"BURDIZZO"

BLOODLESS
CASTRATOR

Invented and solely made since 1910 by Dr. N. Burdizzo, the pioneer of
Modern Bloodless Castration



The "BURDIZZO" is backed by 20 years of success
from all parts of the Pastoral World.

The "Burdizzo" is not a serial make. Every pair is specially assembled and tested in Dr. Burdizzo's laboratory by a process based on anatomical and physiological knowledge. Pincers not stamped with our trade marks are not "Burdizzo." Beware of imitations.

TRADE



MARK

TRADE
BURDIZZO
MARK

Illustrated Booklet, Price List free on request, from
Dr. Pangal's Veterinary Institute, 26, Wallajah Road, Mount Road, Madras.
Representative and Distributors for Madras Presidency.

Messrs. Sitaram Pai Bros., Chemists & Druggists, "Muslim Hall" Bangalore City.
Distributors for Mysore State.

Inventor and Sole Maker—Dr. Burdizzo, Corso Sebastopoli 187, Turin. (Italy.)

THE INDIAN POULTRY GAZETTE.

The Indian Poultry Gazette. Published Monthly. Subscription Rs. 5/ per annum. Specimen copy As. 8, post free. It is the only Poultry Journal, printed in English, circulating in India and the East. Devoted purely to poultry matters. It contains at least a dozen articles every month, written by the most expert Poultry Breeders in the world.

The Best Medium for Advertisement for Poultry Enthusiasts.

All communications should be addressed to the
Honorary Editor,

INDIAN POULTRY GAZETTE,

Lucknow,

U.P.

When writing to advertisers, please mention this Journal.

Manufactured By:—
WILLOWS, FRANCIS, BUTLER & THOMSON, LTD.,
LONDON, ENGLAND.

CHLOROCAIN



Sole Agents for India:—
SMITH STANISTREET & CO., LTD.,
18 Convent Road, Entally, CALCUTTA.

THE LOCAL ANÆSTHETIC OF THE CENTURY

Cheapest House in Southern India
The Madras Drug Stores

DISPENSING CHEMISTS AND DRUGGISTS

98, Nainiappa Naicken Street, P. T. Madras.

Direct Importers of

Pharmaceutical Preparations, Patent and Proprietary
Medicines, Surgical Instruments, Rubber Goods, Laboratory
Requisites and Appliances, Pure Chemicals and Reagents,
Photographic Sundries etc., etc.,

PATRONISED BY MOST VETERINARIANS

Catalogue sent on application.

Telephone 3447.

Telegrams "Tincture."

When writing to advertisers, please mention this Journal.

HORSE BREEDING.

The Journal of
**THE NATIONAL HORSE BREEDING & SHOW SOCIETY
OF INDIA.**

Deals with the important subject of horse-breeding in India, which is
languishing from lack of support by the country generally and by racing
in particular; to the extent that 70 lakhs of Indian money leave the
country annually for the purchase of horses from overseas.

It also deals with all forms of Horse Sports.

Published quarterly.

Subscription Rs. 5/- per annum. *Post Free.*

Single Copy Rs. 1/8.

Apply to:

THE SECRETARY,
National Horse Breeding and Show Society of India,
CLARKE'S HOTEL,
DELHI.

Veterinary Medicine

Established (1905)

EDITED BY

D.M. CAMPBELL, D.V.S.

A magazine for those interested in the practice of Veteri-
nary Medicine.

SUBSCRIPTION

price \$ 4'00 a year

PUBLISHED BY

VETERINARY MAGAZINE CORPORATION,
75 E. Wacker Drive. Chicago, U.S.A.

INDIAN VETERINARY JOURNAL

A RARE OFFER

Do not fail to get the back volumes of the Journal, only a limited
number being available, to complete your set,
at half the usual rate, with postage extra.

Apply at once to the Editor, to
avoid disappointment,

When writing to advertisers, please mention this Journal.

The Madras Agricultural Journal.

THE PREMIER MONTHLY AGRICULTURAL
JOURNAL IN INDIA.

Published at the Agricultural College and Research Institute, Coimbatore.

Subscription Rs. 4/- per annum.

Single Number As. 6/-

Specimen copies free on request.

Apply to:—

THE MANAGER, MADRAS AGRICULTURAL
JOURNAL,

Lawley Road, P.O., Coimbatore.

A New Rabies Vaccine

(Veterinary)

- MORE EFFECTIVE
- CHLOROFORM-KILLED
- CONTAINS OVER 60 %
MORE IMMUNIZING SUBSTANCE

Mulford Rabies Vaccine (Veterinary) is a Chloroform-killed rabies vaccine prepared according to the method of Major R. A. Kelser of the U. S. Army Veterinary Corps. It contains 33 1/3 % rabies brain and cord tissue, the virus having been killed by chloroform.

DOSAGE

Before Exposure: For average-sized dogs, inject 5 cc. subcutaneously. Dogs weighing over 40 pounds and all larger animals should receive a 10-cc. dose.
After Exposure: Use the same size dose as above, injecting one dose daily until at least six doses have been given.

SOLE AGENTS:
INDIA, BURMA, CEYLON, VOLKART BROS., BOMBAY, KARACHI,
MADRAS, CALCUTTA, COLOMBO.

SHARP & DOHME

SUCCESSORS TO H. K. MULFORD CO.,
PHILADELPHIA—BALTIMORE, U. S. A.

When writing to advertisers please mention this Journal.



Crown 8vo.

Cloth

Rs. 6-8.

With 12 plates and Text Illustrations.

THE EXAMINATION OF HORSES FOR SOUNDNESS.
FOR THE USE OF VETERINARY STUDENTS AND PRACTITIONERS.

With a Chapter on the Law relating to Horses etc.,

BY

A.D.G. MACGREGOR, F.R.C.V.S., I.V.S.,

Principal, Bengal Veterinary College.

NOW READY

Fifth Edition

Price Rs. 6-8

TWEED'S COW-KEEPING IN INDIA.

Revised by S.N. SINHA, B. V. S.,

Professor of Surgery and Obstetrics, Bengal Veterinary College, Belgachia

With Illustrations of the Best Breeds.

A simple and Practical Book on the Care and Treatment of Cows and the means of rendering them profitable.

A large stock of Veterinary books always available.

THACKER, SPINK & CO., LTD.,

(In voluntary liquidation.)

P. O. Box 54, CALCUTTA.

PROMPT SERVICE.

MODERATE CHARGES.

PAUL'S ELECTRO WORKS.

39, Jorapuker Sq Lane, Calcutta.

Specialists in Veterinary Instruments, Electroplating,
Repairing and Sharpening.

Stockists of Veterinary Instruments and Electroplating materials.
Contractors and Suppliers to Hospitals, District Boards and
Government

For particulars apply:—

Post Box No. 11406, Calcutta.

Sole Agents for

Original Burdizzo Castrators.

Agents for

Doctor Eschino's Italian Castrator.

ALL KINDS OF VETERINARY EQUIPMENTS AND BOOKS CAN BE HAD
REPAIRING ALL KINDS OF VETERINARY INSTRUMENTS IS OUR
SPECIALITY.

Apply for particulars:—

RELIANCE MEDICAL STORE,

328, Budhwar Petth,

POONA CITY.

Dr. PANGAL'S VETERINARY INSTITUTE.

26, Wallajah Road, Mount Road, Madras.

A FEW OF Dr. PANGAL'S AND OTHER SPECIALITIES.

To all Lovers of Horses, Cattle and Dogs.

1. **Equitona** :—A well-tryed and the only genuine tonic powder for horses. Quite indispensable to horse-owners to keep their animals healthy, active and in tip-top condition. This creates good appetite, expels all worms from the stomach and improves the coat wonderfully.

Price per 2 lbs. Tin Rs. 3-12-0 1 lb. Tin Rs. 2.

2. **Dhum-Dhum** :—A specific for dhum i.e., heavy breathing so common in horses Acts like magic.

Price per 2 lbs. Bottle Rs. 4. 1 lb. Bottle Rs. 2.

3. **Hoof Ointment** :—This strengthens the hoof and is a specific for brittleness.

Price per tin Rs. 2-0-0.

4. **Cough Electuary** :—A specific for cough and catarrh in Horses. Works wonderfully.

Price per 1lb. Tin Rs. 4.

5. **Electric Mange Cure** :—An excellent remedy for all kinds of mange, and is a specific for follicular mange in conjunction with Aricyl injections. Acts like magic.

Price per Bottle Rs. 2.

6. **Pulver (Tick Specific)** :—A wonderful tick destroyer.

Price per tin Rs. 1-4-0.

7. **Canogen** :—An excellent Pick-me-up for dogs.

Price per Bottle Rs. 1-8-0.

8. **Canatone** :—A Vitamin Mineral Food for Dogs containing Calcium, Phosphorus Chlorine, Iron and Iodine—best to keep the dogs fit and free from worms and skin affection.

Price per 1½ lb. Tin Rs. 1-8-0.

9. **Concentrated and Scented Shampoo for Dogs** :—Indispensable for cleansing the dogs and keeping them fit and best suited for preparing the dogs for show purposes.

Price per Bottle Rs. 1.

10. **Bovotone** :—Best tonic powder for cattle and growing calves and is a good lactagogue. This improves the appetite and general condition of the animal. Fattens the cow, sweetens its milk, and at the same time increases the yield of rich and creamy milk.

Price per 4 lbs. Tin Rs. 3-8-0. 2 lbs. Tin Rs. 1-12-0.

11. **Specific for Fowl-Pest or Ranikhet Disease** :—Acts wonderfully well.

Price per 8 oz. Bottle Rs. 3. 4 oz. Bottle Rs. 2.

12. **Eczemine** :—A best remedy for Eczema in dogs.

Price per 8 oz. Bottle Rs. 1-4-0. 1 lb. Bottle Rs. 2-8-0.

13. **Dr. Pangal's Pain Balm** :—A wonderful specific for all kinds of pains and sprains.

Price Rs. 8 a Bottle.

Sole Agents for Mysore State :—

Messrs. SITARAM PAI BROS., Chemists & Druggists,
Muslim Hall, Bangalore City.

When writing to advertisers, please mention this Journal

The Indian : : : Veterinary Journal

The Organ of the All-India Veterinary Association.

(Established 1924.)

The Only English Veterinary Journal in India.

A Quarterly Record of Medicine, Surgery and of
General Veterinary Intelligence.

DEVOTED TO THE INTERESTS OF THE VETERINARY
PROFESSION IN THE INDIAN EMPIRE.



EDITED BY

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

Veterinary Surgeon, Madras, South India.

Office :— 26, Wallajah Road, Mount Road,
MADRAS.

THE INDIAN VETERINARY JOURNAL occupies a unique place in Indian Veterinary Medicine. It is the only English Journal of its kind devoted to the subject, and holds an unequalled position in that it has world-wide circulation and it numbers among its subscribers and readers not only the Veterinary Profession in India, but practically every Research Institute, and Library and leading Veterinarians throughout the world. Similarly amongst its contributors, are some of the most eminent men in the profession in India and abroad.

THE INDIAN VETERINARY JOURNAL contains Original Articles, Reports of interesting Clinical cases, Suggestive Editorials, Veterinary Society Reports, Extracts from scientific Periodicals, Reviews of notices of Books, New Veterinary inventions in Medicine and Surgery, Therapeutic Notes, Service Notes and Correspondence, etc.

THE INDIAN VETERINARY JOURNAL visits Government, Municipal and Local Board and Private Hospitals, Dispensaries and Charitable Institutions and Stock owners in India and abroad, Rajas and Maharajas in private States. These factors give the INDIAN VETERINARY JOURNAL an advertising value, which, because of its unique nature should command your support.

THE INDIAN VETERINARY JOURNAL is essentially suitable for advertisements relating to Drugs, Fine Chemicals, Surgical Instruments and Dressings, India Rubber, Surgical Goods, Disinfectants, Soaps, Veterinary Books, Hospital Furniture, Appliances, Proprietary Medicines, Toilet Goods, Optical Goods, Veterinary Publications, Dietetic Preparations, Laboratory Fittings etc.

Advertisements of a select character only are admitted into the Journal.

All correspondence relating to advertisements should be addressed to :—

The Editor, 26, Wallajah Road, Mount Road, Madras.

N. B.—The Editor reserves the right to exclude from the Journal any advertisement, which, in his opinion, is contrary to the ethics of the Veterinary Profession.

This leaflet is the size of the Journal.

The space within the frame is the size of advertisement page.

The Volume begins from July of every year.

Copy of advertisement and Instructions should reach our hands by the 1st of the month preceding publication.

The minimum space reserved is a quarter page.

Whole Page per insertion	...	Rs. 15.
Half Page " "	...	" 8.
Quarter Page " "	...	" 5.

Payment must be made **in advance**, except when approved accounts are opened and in such cases all bills are to be paid within 15 days of presentation.

The Editor declines any responsibility in the event of one or more of a series of advertisements being omitted from any cause whatever and he also declines to account any responsibility for damage to or loss of blocks.

No guarantee is given that an advertisement will appear in any special issue, but care will be taken to meet the advertiser's wishes.

No deduction may be made from advertisement bills on account of alleged defective insertions; claims on such account will be adjusted by extra free insertion.

All extra space used during the period of the contract will be charged *pro rata* to the existing contract.

No advertisement contracted for a certain period shall be withdrawn by the advertiser before the expiry of such period and if withdrawn shall be charged at a rate at the discretion of the Editor.

All sums due under the contract shall be recoverable either from the advertiser or from the Agent.

VOUCHER COPY FREE.

SPECIMEN COPY FREE.

Customs duty to and fro, postage on blocks, preparing blocks cost of mounting unmounted blocks, preparing blocks from matrices and bank commission on cheques will be charged to the advertisers' account.

ORDER FORM.

To

The Editor,
The Indian Veterinary Journal,
26, Wallajah Road, Mount Road,
MADRAS.

SIR,

Please reserve.....page space in THE INDIAN
VETERINARY JOURNAL for.....insertions at.....
per insertion.

I enclose copy herewith and remittance to the value -

Yours faithfully,

Name.....

Address.....

Date.....

79769



Dr. PANGAL'S VETERINARY INSTITUTE.

26, Wallajah Road, Mount Road, Madras.

**A FEW OF Dr. PANGAL'S AND OTHER
SPECIALITIES.**

To all Lovers of Horses, Cattle and Dogs.

1. Equitone.—A well-tried and the only genuine tonic powder for horses. Quite indispensable to horse-owners to keep their animals healthy, active and in tip-top condition. This creates good appetite, expels all worms from the stomach and improves the coat wonderfully.

Price per 2 lbs. Tin Rs. 3-12-0

1 lb. Tin Rs. 2.

2. Dhum-Dhum.—A specific for dhum i.e., heavy breathing so common in horses. Acts like magic.

Price per 2 lbs. Bottle Rs. 4.

1 lb. Bottle Rs. 2.

3. Cough Electuary.—A specific for cough and catarrh in Horses. Works wonderfully.

Price per 1 lb. Tin Rs. 4.

4. Electric Mange Cure.—An excellent remedy for all kinds of mange, and is a specific for follicular mange in conjunction with Aricyl injections. Acts like magic.

Price per Bottle Rs. 2.

5. Pulvex (Tick Specific).—A wonderful tick destroyer.

Price per Bottle Re. 1-4-0.

6. Bovotone.—Best tonic powder for cattle and growing calves and is a good lactagogue. This improves the appetite and general condition of the animal. Fattens the cow, sweetens the milk and at the same time increases the yield of rich and creamy milk.

Price per 4 lbs. Tin Rs. 3-8-0. 2 lbs. Tin Re. 1-12-0.

7. Dr. Pangal's 'Ligamentin' for Horses.—A marvellous remedy for sprained Tendons, Ligaments, Splints, spavins Sore Skin, etc.

Price per Bottle Rs. 6.

People's Printing & Publishing House, 132, Big Street, Triplicane, Madras,—1932.

RZ m2, N24

N32-9-2