

347

gd. No. M. 6953

347
2.58

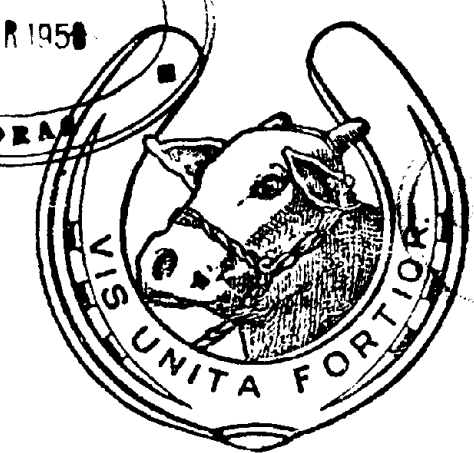
Vol. 35, No. 4

APRIL, 1958

THE INDIAN VETERINARY JOURNAL

(The Journal of the All-India Veterinary Association)

*A Monthly Record of
Veterinary Science*



(ESTD. 1924)

OFFICE:
23, FIRST STREET,
VIDYODAYA EAST, T'NAGAR,
MADRAS-17, (S. INDIA)

JL
KZ m2, N24 3743
NS8.35.4
79608

TO OUR CONTRIBUTORS

1. THE INDIAN VETERINARY JOURNAL is intended for the publication of papers on Original work, General and Clinical articles, Extracts, Reviews, Association News and other cognate matters pertaining to animal health and disease and the progress of Veterinary Science and the profession in general. The Editor, in his work of assessing papers received for publication, is assisted in an honorary capacity by a large number of Scientists working in various parts of India.
2. Papers are accepted for publication on the understanding that they have neither been published before nor are being considered for publication elsewhere.
3. Matter for publication should always be typed and sent in duplicate. The type-scripts should be on one side of the paper only with double spacing and one inch margin on the left side. They should be sent after careful revision and correction and without over-writings. Otherwise they are liable to be not considered.
4. Names of authors should be followed by their academic qualifications. Their official address or otherwise should also be stated to enable correspondents to communicate with them direct if they so desire.
5. The papers must be concise and not unnecessarily elaborate. To achieve this object extensive summaries of all available literature with numerous references should be avoided, wherever possible. *The bulk of the paper should record the actual work done by the author or authors.* If papers submitted are considered to be of excessive length, they may be returned to the authors for necessary reduction and re-submission. Papers are accepted subject to the right of minor editorial revision, if considered necessary. No reasons will be given in cases of non-acceptance of articles.
6. A copy of the page-proof will be sent to the author, only in cases where it is found necessary and it should be returned without delay, duly corrected. Extensive changes in the matter are not permissible at that stage.
7. Order for extra reprints should be placed at the time of the initial submission of the paper. Otherwise only the usual number of complimentary reprints viz. 10 will be sent to each author up to a maximum of thirty, irrespective of the number of authors over three.
8. Drawings and diagrams should be in Indian Ink on stout white drawing paper or on Bristol board.
9. A small number of blocks illustrating articles are normally paid for by the Journal; but the authors may however be required to pay the entire cost of blocks if they are far too many for a single article. Half-tone photographs should be included only when they are found essential and they should be on glossy paper, bringing out the differences clearly.
10. The number and size of tables, charts and plates should be strictly restricted as the cost of publication is mounting up every day. Coloured plates will not be reproduced, except under exceptional circumstances or when the author is willing to bear the entire cost.
11. Publication of group photographs of some news-value to the profession and of individuals will be undertaken only if space permits and the cost of blocks in such cases will be thankfully received from parties concerned.
12. Abbreviations and mode of references to Authors, years and journals should be on the model normally adopted in all international publications.

Note:—We request our Contributors to help us by observing the above rules, and they will then be facilitating early publication of their articles.

Vol. 35

April, 1958

No. 4

THE INDIAN VETERINARY JOURNAL

[THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION]

PUBLISHED MONTHLY

★

A Monthly Record of Veterinary Science
Devoted to the cause of the
Veterinary Profession

★

EDITOR

Rao Sahib T. VINAYAKA MUDALIAR, G.M.V.C.,
Office:—23, First Street, Vidyodaya East, T'Nagar,
Madras-17, (S. India)

✱

All communications should be addressed to the Editor.

Advertisements should be in the hands of the Editor on or before the 15th of the previous month.

Subscription payable in advance	{	Rs. 8.00 per annum to Members of profession.
		Rs. 12.00 per annum to Government and all public institutions. Single copy Rs. 2.00.
		Foreign: 25sh. per annum. Single copy 3s. 6d.

Members who do not receive the Journal regularly or who find it wrongly addressed are requested to communicate their correct address to the Editor at once. Non-receipt of a particular issue should be intimated before the close of that month.

ADVERTISEMENTS

VETERINARY SPECIALITIES
OF



FARBWERKE HOECHST
FRANKFURT/MAIN - HOECHST
GERMANY

NEMURAL

: A powerful anthelmintic against all types of tapeworms in dogs, cats and other furbearing animals and poultry. Has at the same time an aperient action. The living worms are generally expelled 20-40 minutes after administration.

Tubes of 10 x 24 mg. & 150 mg. and bottles of 100 x 24 mg. and 50 x 150 mg. tablets.

NOVALGIN

: An antipyretic, analgesic and antirheumatic of excellent tolerance. Also exerts an antispasmodic action, thus relieving colics. Indicated in painful and inflammatory processes, especially labour pains, lumbago and arthritis, joint-ills in calves and colts. For oral and parenteral application.

Tubes of 10 x 0.5g. tablets. Boxes of 5 x 20 cc. amps. (50% solution)

OMNADIN
ad. us. vet.

: A well tolerated preparation for non-specific immunisation, mobilising the defence forces of the system. Indicated in acute feverish conditions, mastitis in cattle, respiratory catarrh, pneumonia, pleuritis, bronchitis etc. Also for contagious hepatitis in dogs and laryngo-enteritis in cats. Given early in canine distemper it will abort the infection.

Boxes of 12 x 2 cc. amps., 5 x 5 cc. amps. and 5 x 10 cc. amps.

TONOPHOSPHAN

: A highly effective and non-toxic organic phosphorus preparation, tonic and metabolic stimulant. Indicated in conditions of debility and exhaustion, in anaphrodisia in young bulls, milk fever in cows, pre- and post-partum fever of cattle, pasture tetany etc.

Boxes of 5 x 10 cc. amps. Bottles of 100 cc.

Sole Importers in India:

CHOWGULE & CO., (HIND) PRIVATE LTD.,

P.O. BOX 1478, BOMBAY 1.

Branches:

P.O. BOX 8943, CALCUTTA 13.

P.O. BOX 3738, MADRAS 2.

When writing to advertisers, please mention *The Indian Veterinary Journal*.

ADVERTISEMENTS

WHEN IGNORANCE WAS KNOWLEDGE AND SUPERSTITION GUIDED ACTION

The peasant had his own crude methods for diagnosis and treatment of farm animals.

The "Cow Doctor" too, then, was no better, and operated largely on hunches and never was sure of the results of his treatment.

Today their places have been taken over by progressive farmers and skilled Veterinarians. Behind the latter, in the fight against disease, stands the vast resources of modern research aided by industries exclusively devoted to Veterinary and Animal Husbandry professions.

In doing our part, to make your practice sure and scientific, we offer all that is best and latest in instruments, appliances and equipments for use in Veterinary Surgery, Obstetrics, Gynachology, Artificial Insemination, Cattle Sterility and Poultry Husbandry.

Cirurgia De Lux Private Limited

Head Office:

24, CHOWRINGHEE ROAD,
CALCUTTA - 13.
(PHONE : 23 - 5552)

Branch Office:

Bombay Mutual Annexe Buildings,
4th Floor,
17, GUNBOW STREET,
FORT, BOMBAY - 1.
(PHONE : 263802)

Telegrams : "SURGIQUIP"

When writing to advertisers, please mention *The Indian Veterinary Journal*.

The Indian Veterinary Journal

(The Journal of the All-India Veterinary Association)

Vol. 35

APRIL, 1958

No. 4

CONTENTS

I. Editorial		PAGE
The Interim Indian Veterinary Council	...	E-13
Mysore is calling	...	E-15
II. General Articles		
The Anatomy of the Foetal Indian Elephant.—Part V. The Autonomic Nervous System.—By D. Mariappa	...	141
Production of Anti-Tetanus Serum.—By M. K. K. Menon and M. S. Jayaraman	...	149
Herd Infertility in Gir Cattle due to Copper Deficiency.—C. R. Sane, S. P. Deshpande, D. R. Deshpande and A. S. Kalkini	...	154
Leucocytozoon infection in Desi Fowl in Orissa.—By G. Biswal and B. C. Naik	...	161
Brucellosis and its control in Coimbatore District.—By V. Venkataraman	...	168
The Normal Pulse and Respiration rates and Body Temperature of native dogs.—By Arcadio C. Gonzaga and Vivencio S. Taca	...	167
Hump Sore in Kutch.—By H. S. Pannu	...	172
III. Clinical Articles		
Ambrasynth Lepetit Vitaminised capsules in canine practice.—By H. C. L. Srivastava	...	174
A Cyclops Monstrosity.—By H. R. Chandrasekhariah	...	175
IV. Abstracts		
Reflexions sur quelques cas de charbon bacteridien "Cryptique" chez des bovins. (Latent anthrax in cattle)	...	175
A mucosal disease of cattle	...	175
Some observations on the use of Chlorpromazine Hydrochloride in ruminants	...	176
The use of Proteolytic Enzymes in Mastitis in Dairy cattle	...	177
V. News and Views		
...	...	178
VI. Block Development Corner		
Fluke Diseases and their control.—By M. Anantaraman	...	182
Farm News Releases	...	184
VII. Association News		
The Bombay Veterinary Medical Association.—The 33rd Conference.—Proceedings of	...	186
The Mysore Veterinary Medical Association.—Proceedings of the meeting of the Executive Committee held on 25-2-58	...	190
VIII. The I.V.J. Reserve Fund		
...	...	191

Post Graduate Refresher Course in Veterinary Science and Animal Husbandry LIVESTOCK RESEARCH STATION - PATNA

1957-58



1st Row
Left to Right:—Dr. O. N. Singh, (R. O. Genetics) (Head of the Section of Anatomy) Dr. R. C. P. Yadava, (Head of the Section of Surgery) Sri S. M. Ishaque, (Principal B.V.C. & Head of the Section of Medicine) Sri H. R. Kapur, (Head of the Section of Pathology and Bacteriology & o/c. P.G. Class) Sri P. R. Kappuswamy, (Head of the Section of Parasitology)

2nd Row
Standing Left to Right:—(1) Shri M. C. Pathak, (2) Shri J. Sharma, (3) Shri R. N. Singh, (4) Shri R. B. P. Sinha, (5) Shri S. Faizuddin, (6) Shri A. Razzaque, (7) Dr. A. K. Verma, (Head of the Section of Perisilology)

Vol. 35

THE INDIAN VETERINARY JOURNAL

No. 4

Research Workers at the Madras Veterinary College



Dr. MOSTAFA FAR HANG FAR.

A 'Doctor in Veterinary Medicine' of Tehran University, he is now doing Research in Animal Nutrition at the Madras Veterinary College, under the Government of India Cultural Exchange Programme.



Sri R. VENKATAKRISHNAN, B.V.SC.

He is one of the two recipients of Government of India Senior Research Scholarship in 1957 for two years. He is doing research in Animal Nutrition at the Madras Veterinary College.



Sri R. NATARAJAN, B.SC., B.V.SC.

He is the other recipient of Government of India Senior Research Scholarship in 1957 for two years. He has taken up Research in Pharmacology at the Madras Veterinary College.



Sri RAM SHANKAR PATNAIK, B.V.SC.

Deputed by the Government of Orissa he is doing Research in Animal Nutrition at the Madras Veterinary College.

THE Indian Veterinary Journal

(The Journal of the All-India Veterinary Association)

Vol. 35

APRIL, 1958

No. 4

Editorial

THE INTERIM INDIAN VETERINARY COUNCIL

The Second Meeting of the Interim Indian Veterinary Council was held at New Delhi on the 30th and 31st December 1957 with the Animal Husbandry Commissioner, Shri L. Sahai in the Chair. The agenda was no doubt heavy for a two-day meeting. But considering the important nature of some of the subjects that were due for discussion, one naturally expected a 'full house' and the Chairman only voiced the feelings of all those present, when he expressed his "disappointment at the rather limited attendance." There were only 15 members present out of a total of nearly 32. We wish to emphasise that the entire profession in India is vitally interested in the progress of this Council and is keenly watching its work. The Council is in its formative stage and as such needs all the care and support which the profession could extend. It is therefore incumbent on every individual member of the profession, nay, on every State Veterinary Association and on every State Government also, to render all possible help to set up this Scientific Council on a statutory basis in this land, without any further loss of time. The inordinate delay on the part of some of the State Governments to get the Veterinary Practitioners' Act passed and to bring into existence a State Veterinary Council is something which we are not able to understand. We consider it as a first step necessary to speed up the work of this Council, but it seems to be delayed beyond all reasonable limit. We are aware that the wheels of the Government move slowly but they seem to move slower still after our Independence. This is against all interests of a young nation in the making. The Secretary of the Council has been doing his very best to remind the

various State Governments. But we feel that it is the local Veterinary Associations and the top ranking Veterinary Officers in each State who should take more live interest in this affair and hasten the process. We appeal to them to be up and doing and bring to bear their influence on all concerned and convince the local Government of the urgency of this matter.

The meeting discussed in detail the Rules and Regulations prepared by the Drafting Committee, which were later scanned, scrutinised and passed by the Executive Committee. These rules and regulations are for the routine working of the Council and they were passed unanimously with a few minor additions and alterations, here and there.

The subject of the status of persons who have been admitted for what has been described as the 'Emergency short course,' received the utmost attention of the Council. The Council was strongly of opinion that unless and until such trainees, (with the necessary basic qualification) acquired a Degree in Veterinary Science through further training, the question of their registration as Veterinary Practitioners should not be considered at all.

We have been pleading against the institution of such short courses. We knew it would be creating fresh problems. Though Pandit Nehru said that such men would only be a sort of "annexe" to serve under duly qualified Veterinary Surgeons, we felt at the time the status of the profession as a whole in India would be under-estimated by the outside world, and that it would prove to be a big land-slide for the profession in Scientific circles. We have no reason to change that opinion now. We are however happy the Interim Indian Veterinary Council has expressed itself, without fear or favour, what it considers to be the right course. We invite such of those men who have the necessary basic qualification to get themselves admitted for the degree course without further delay and qualify themselves to become members of this honoured profession.

To the authorities concerned, we appeal, to abolish this short course of whatever duration it might be, as soon as the position with regard to the required personnel eases a little. Otherwise we make bold to say that it will continue to be a festering sore in the body-politic of the Veterinary Profession in India. An emergency course should in no case be longer than one year. This step should be taken

immediately by all the States. The rest could follow as the situation eases.

Another subject of importance which received the consideration of the I.I.V.C., is the question of representation of Veterinarians on Legislative Bodies. The Council strongly recommended "one seat in the Rajya Sabha and one seat in each state Assembly in consultation with the I.I.V.C., and the State Veterinary Councils / Associations, respectively". It would thus be seen how very necessary it is for each State to revitalise the existing association and try hard to bring into existence a State Veterinary Council as well. The hour must find the men ready and nothing should go by default on the part of the profession. Posterity will hold them responsible for all such lapses and point the finger of scorn at them.

The meeting recorded its appreciation of the action taken by the Government in granting representation for this Council on the Indian Council of Agricultural Education. The nomination of the representative was left to the discretion of the Chairman.

The feasibility of instituting a short-term course in the management of Zoo animals, at the Veterinary Colleges at Madras, Bombay and Calcutta, in collaboration with the Zoo authorities was strongly recommended by the Council. This is in pursuance of a resolution passed at the Agricultural Organisation Seminar held at Bombay in September 1955.

The other subjects dealt with were more of a routine nature. The Council has begun well and we are sure it will soon make its usefulness felt.

MYSORE IS CALLING

We invite the attention of our readers to the proceedings of a meeting of the Executive Committee of the Mysore Veterinary Medical Association, appearing elsewhere. The Silver Jubilee celebrations of the Serum Institute and the All-India Veterinary Conference are to come off in May 1958. We don't expect any further postponement. However it is better to be alerted in good time and the profession has no reason to complain of any want of time! Let us hope it is going to be a momentous session. Thank you, Mysore.

General Articles

THE ANATOMY OF THE FOETAL INDIAN ELEPHANT

Part V. The Autonomic Nervous System

By

D. MARIAPPA, G.M.V.C.,
Professor of Anatomy, Madras Veterinary College.

Introduction

The sympathetic nervous system was studied by Botar (1931) in two specimens of the Indian elephant. Rajagopal (1956) has studied part of the sympathetic nervous system — cervical and thoracic parts, in foetus F 3 of his study on four foetal specimens and has proposed to make a detailed further study later.

Thus, it is seen, that, meagre references that are available in literature have served both as a handicap and an advantage to the present study in which considerable time and attention have been bestowed to carefully observe and comment on minute details to the extent possible in this one specimen. The results given hereunder would show to what extent the author's patience and perseverance have been fruitful.

Parasympathetic System

This smaller component of the autonomic system has the cranial and sacral parts. The preganglionic fibres are found in (1) the oculomotor, (2) the facial, (3) the glosso-pharyngeal, (4) the vagus, and (5) in II, III & IV sacral nerves. The peripheral ganglia situated near the organs are (1) the ciliary, (2) the otic, (3) the sphenopalatine and (4) the submandibular ganglia. The postganglionic fibres arise from these ganglia and supply the organs.

Cranial part

The preganglionic fibres passing in the cranial nerves are similar to what obtains in other mammals.

In this study, it was possible to locate only two ganglia the ciliary and the otic, the other two being difficult of location and identification.

The ciliary ganglion.—This is a small ganglion placed in relation to the ventral branch of the oculomotor nerve and the inferior rectus muscle. It is pyramidal, red grey, measuring 0.5 cm. long and 0.25 cm. wide at the base, its apex being directed outward.

The otic ganglion.—It lies on the lateral face of the mandibular nerve at the foramen ovale. It is pyramidal, glistening grey, with its base against the foramen and the apex directed outward. It measures 0.75 cm. long and 0.5 cm. wide at the base.

Sacral part

The ventral primary branches of the II, III & IV sacral spinal nerves detach visceral branches which pass directly to the pelvic viscera. These branches unite with the sympathetic plexuses. Minute ganglia (peripheral) are situated at the points of union in the walls of the organs. In these ganglia the sacral parasympathetic fibres are relayed.

The fibres from II, III & IV sacral nerves unite to form the *Haemorrhoidal* and the *Pudendal* nerves to supply the rectum and the genitalia. The pudendal nerve accompanies the internal pudic artery over the ischial arch and continues on the anterior face of the corpus clitoridis. The pudendal nerve detaches a large branch which accompanies the artery of the urinogenital canal to supply it.

Sympathetic system

This is the larger component of the autonomic system consisting of two gangliated cords, their branches, plexuses and subsidiary ganglia having a much wider field of distribution. This is divided into the cranial part, the cervical part, the thoracic part, the abdominal or lumbar part and the sacral part.

Cranial part

This consists of the *Internal carotid nerve* and the *Internal Carotid plexus* on the medial and lateral faces of the internal carotid artery. The internal carotid nerve arises from the apex of the *Superior cervical ganglion* at the foramen lacernum, and accompanies the internal carotid artery into the cranium. It divides into two branches medial and lateral which form the internal Carotid plexus on the walls of the artery.

Cervical part

It comprises of three ganglia superior, middle and inferior; the cervical sympathetic trunk and the nervus transversarius.

The superior cervical ganglion.—This is the largest of the three ganglia. It is pyramidal, red brown, 1.5 cm. long and 1 cm. wide, placed below the foramen lacernum with its apex towards the foramen and base directed outward. The ganglion lies on the medial face of the internal carotid artery and lateral to the insertion of rectus capitis anticus minor. The vagus nerve is in front of the ganglion and the nodose ganglion of the vagus is at a higher level to it. The *internal carotid nerve* arises from its apex and accompanies the internal carotid artery into the

cranium. From the lateral angle of its base arises a large trunk which detaches a large *laryngo-pharyngeal* branch and continues as the *cervical sympathetic trunk* which joins the vagus below. From the other parts of the ganglion arise branches to unite with the *glossopharyngeal*, vagus, hypoglossal and I cervical spinal nerves.

The middle cervical ganglion.—It is a small nodular body partially fused with the cranial end of the base of the *stellate ganglion* on the left side, whereas on the right side it is distinct as a pear shaped body, 1 cm. long and is connected by an inter-ganglionic cord to the cranial end of the base of I thoracic ganglion. The cervical sympathetic trunk joins the cranial end of the ganglion. It is connected to the inferior cervical ganglion by the *Ansa subclavia* which winds round the base of the axillary (subclavian) artery. On the left side the ganglion detaches a long branch which supplies the brachiocephalic trunk and the *Ansa* supplies a large branch to the axillary artery and the aortic arch.

The Inferior cervical ganglion.—On the left side it is completely fused with I thoracic ganglion forming the apex of the *stellate ganglion*. On the right side it is distinct as a small round body connected below to the *Ansa* and above by the interganglionic cord to I thoracic ganglion.

The cervical sympathetic trunk.—The trunk arises from the lateral angle of the base of the superior cervical ganglion and joins the vagus about 1 cm. below the nodose ganglion to form the common cord of *vagosympathetic* which runs in the carotid sheath on the dorso-lateral aspect of the common carotid artery. It leaves the company of vagus about 5 cms. in front of the thoracic inlet, enters the thorax by its inlet and divides into two branches dorsal and ventral. The dorsal branch joins the middle cervical ganglion and the ventral branch unites with the *Ansa* and joins the inferior cervical ganglion.

The Nervus Transversarius.—This is a large nerve arising from the cranial end of the base of the *stellate ganglion* on the left side and from the cranial end of the middle cervical ganglion on the right side. It accompanies the vertebral artery in the *canalis transversarius* and supplies grey ramii to the cervical spinal nerves from VII to II.

Thoracic part

On each side, it consists of a gangliated cord of 19 ganglia lying below the vertebral ends of ribs (19) about 2 cms. above the Vena hemiazygos on the left and vena azygos on the right. It is subpleural, passing over the aortic intercostal arteries and veins. Each ganglion is connected above to the corresponding thoracic nerve by a grey and white ramus. Ventrally the ganglia detach branches to form the

cardiac, the pulmonary and the great splanchnic nerves. The first thoracic ganglion needs special mention. This forms a large *stellate ganglion* by its fusion with the middle and inferior cervical ganglia.

Stellate ganglion.—On the left side it is a large pyramidal body, red brown, placed medial to the vertebral end of I rib. It is 1.5 cms. long, 1 cm. wide, with its base dorsal and apex ventral. The cranial end of its base is connected by a very thick cord to the middle cervical ganglion indicating their partial fusion. Its apex is formed by the inferior cervical ganglion which is completely fused with it. The cranial angle of its base above the middle cervical ganglion detaches the *nervus transversarius* and grey ramii to VIII cervical, I and II thoracic spinal nerves. The caudal angle of its base is connected to II thoracic ganglion.

On the right side, it may be inappropriate to call it *stellate ganglion*, as it is a small pear shaped body about 1 cm. long but distinct from the middle and inferior cervical ganglia. As already remarked, *nervus transversarius* arises from the middle cervical ganglion.

Cardiac and pulmonary nerves.—Ventral branches from I, II and III ganglia descend by the mediastinum and form the cardiac and pulmonary nerves to form the cardiac and pulmonary plexuses to supply the heart and lungs.

The Great Splanchnic nerve.—The nerve is formed by the ventral branches from III to XIX ganglia. From the anterior series of ganglia from III to XII, the branches pass obliquely downward and backward and unite to form a trunk which runs downward and backward. From XIII to XIX ganglia, the branches pass downward and forward forming a trunk which runs forward and unites with the other trunk at the level of XII ganglion to form the great splanchnic nerve which reaches the lateral face of the *Celiac artery* (origin of the artery is from the thoracic aorta) and accompanies the artery through the diaphragm lateral to the crus and joins the *Celiac ganglion* in the abdomen.

Abdominal or Lumbar part

It consists of a gangliated cord of four ganglia on each side, subsidiary ganglia—*Celiac ganglia*, *anterior mesenteric ganglia*, *posterior mesenteric ganglion* and the subsidiary plexuses.

Thoracic sympathetic trunk passes through the diaphragm lateral to the crus below XIX thoracic vertebra and joins I lumbar ganglion. The lumbar part of the gangliated cord passes medial to the kidney and deeper to psoas parvus. Each ganglion is connected above to the corresponding lumbar spinal nerve by a grey and white ramus. The ganglia detach below branches to form the *adrenal plexus* and *renal*

plexus (from I & II ganglia) and two branches (from III & IV ganglia) to form a communicating trunk that joins the posterior mesenteric ganglion.

Celiac ganglia.—The ganglion on the left side is small, pyramidal, red brown, 1 cm. long and 0.5 cm. wide, lying on the left face of the celiac artery where it reaches the Saccus caecus of the stomach. It so lies that its base is cranialward and apex caudal. The ganglion receives above, the left great splanchnic nerve. It is confluent in front of the artery with the ganglion of the right side. Its cranial end receives a branch of the *dorsal oesophageal trunk* (vagus) and caudally it is connected by a cord to the left anterior mesenteric ganglion.

The ganglion on the right side is larger, placed on the right face of the artery. It is 2 cms. long and 1 cm. wide, red brown, and pyramidal with its base below and apex above, receiving the right great splanchnic nerve. Below its apex, it receives a branch from the dorsal oesophageal trunk. The base of the ganglion spreads below the abdominal part of the oesophagus. About its base it receives a branch of the *Ventral oesophageal trunk* (Vagus).

From the celiac ganglia, branches pass along the artery and its branches to form the gastric plexus, hepatic plexus, pancreatic plexus, splenic plexus and enteric plexus of duodenum.

Anterior mesenteric ganglia.—They are very large pyramidal ganglia, red brown, measuring 4 cms. long and 1 cm. wide at the base, placed on the lateral aspects of the anterior mesenteric artery. Both the ganglia are confluent behind the artery which they envelop like the two halves of an oyster shell. In front each is connected at its base to the celiac ganglion by the interganglionic cord.

The right great splanchnic nerve divides into two branches—an anterior small one joining the apex of the celiac ganglion (right) and a posterior large branch joining the right anterior mesenteric ganglion 1 cm. below its apex. The dorsal oesophageal trunk after detaching a branch to the left celiac ganglion, passes to the right side and joins the anterior mesenteric (right) ganglion about its middle. The ventral oesophageal trunk detaches a small branch to the right celiac ganglion and then joins the base of the right anterior mesenteric ganglion. Thus it is very obvious that greater number of parasympathetic fibres pass to the enteric plexus by way of right celiac and anterior mesenteric ganglia.

From the anterior mesenteric ganglia fibres pass along the anterior mesenteric artery and its branches to form enteric plexuses of different parts of the small intestine and large intestine except the terminal part of colon.

Posterior mesenteric ganglion.—It is a small unpaired ganglion lying on the anterior face of posterior mesenteric artery at its origin from the aorta. It is elongated, pyramidal, red brown, measuring 0.5 cm. long with its base cranial and apex caudal. The base at its lateral angles receive communicating branches from III and IV lumbar ganglia of both sides and about its middle it is pointed and connected by an inter-ganglionic cord to the confluent anterior mesenteric ganglia. Its apex divides into a ventral and two lateral branches. The ventral branch passes on the anterior face of the artery to supply enteric plexus of the terminal part of colon. The two lateral branches pass on the sides of the artery and unite behind to form a large trunk which divides into four large branches—two medial and two lateral. The two lateral branches pass back in the anterior parts of the broad ligaments of uterus and supply plexuses to the uterine horns, oviducts and ovaries. The two medial branches pass backward into the roof of the pelvic cavity by meso-rectum as the *presacral nerves* and reach the dorsolateral aspects of rectum.

Sacral part

It consists of a gangliated cord of four sacral ganglia on each side, the *ganglion impar* and subsidiary pelvic plexuses.

The sacral ganglia of left side are large and well defined from each other but on the right side they are small and confluent with each other. They are red brown measuring 0.5 cm. wide on the left side. The first ganglion is connected in front to IV lumbar ganglion. Each ganglion is connected to the corresponding sacral spinal nerve by a grey ramus. The ganglia detach branches ventrally which pass below sacrum and with similar branches of the opposite side and the presacral nerves form subsidiary pelvic plexuses. IV sacral ganglion is continued behind by a small branch which divides into a medial and a lateral branch. The lateral branch accompanies the lateral coccygeal artery as the *lateral coccygeal nerve* between the caudal muscles. The medial branch turns towards the median line and joins the anterior end of the *ganglion impar*.

Ganglion impar.—This is a small heart shaped body, light red grey in colour, lying on the body of I coccygeal vertebra and partly at the junction of IV sacral and I coccygeal vertebrae to the right of the median line. It receives in front, two branches from the IV sacral ganglia. Behind, the ganglion detaches two middle coccygeal nerves which accompany the middle coccygeal artery between the caudal muscles.

Pelvic plexuses.—An intricate plexus of nerves with numerous large ganglia on the lateral walls of rectum, uterus and vagina is seen. The contribution of nerves for this plexus is as detailed below.

The two presacral nerves pass from the dorsal aspect to the lateral faces of the rectum. The ventral branches from the sacral ganglia descend by mesorectum to the pelvic viscera. Along with these, parasympathetic fibres from II, III and IV sacral nerves (ventral primary branches) descend and unite with the former. These form an intricate net work with numerous large ganglia at the union of nerves on the lateral walls of rectum, uterus (body), vagina and pelvic part of urinogenital canal. From this plexus, nerves pass forwards to the urinary bladder and others pass backwards into the walls of urinogenital canal outside the pelvis.

Discussion

Botar (1931) has remarked that the superior cervical ganglion is not compact and homogenous but takes the form of a flattened net work. He has stated that the middle cervical ganglion is absent and has mentioned the presence of stellate ganglion.

Rajagopal (1956) has made a study of cervical and thoracic parts of the sympathetic system in foetus F3 and has proposed to make a detailed study later. He has described the superior cervical ganglion, cervical sympathetic trunk and remarked that the middle cervical and inferior cervical ganglia are fused with the first thoracic ganglion to form a *fusiform* ganglion. Other observations by him about the formation of splanchnic nerves are only of a general nature. He has described the ciliary ganglion.

In the present study, all the minute details of the parasympathetic and sympathetic systems have been studied with accuracy, with the exception of the sphenopalatine and submandibular ganglia. Study of intricate connections of the autonomic system on *only one specimen* as in the present study has its own limitations restricting the fields of exploration and observation. With this handicap, all possible efforts have been made to note important details. Para-sympathetic fibres passing in vagus and their distribution is similar to what obtains in other mammals and hence not included here but are dealt in a separate paper.

Summary

1. Parasympathetic and sympathetic systems have been studied in greater details.
2. The Autonomic Nervous system of the elephant bears greater resemblance to that of man rather than of domestic animals as is evident in several details.

The Anatomy of the Foetal Indian Elephant

BY
D. MARIAPPA

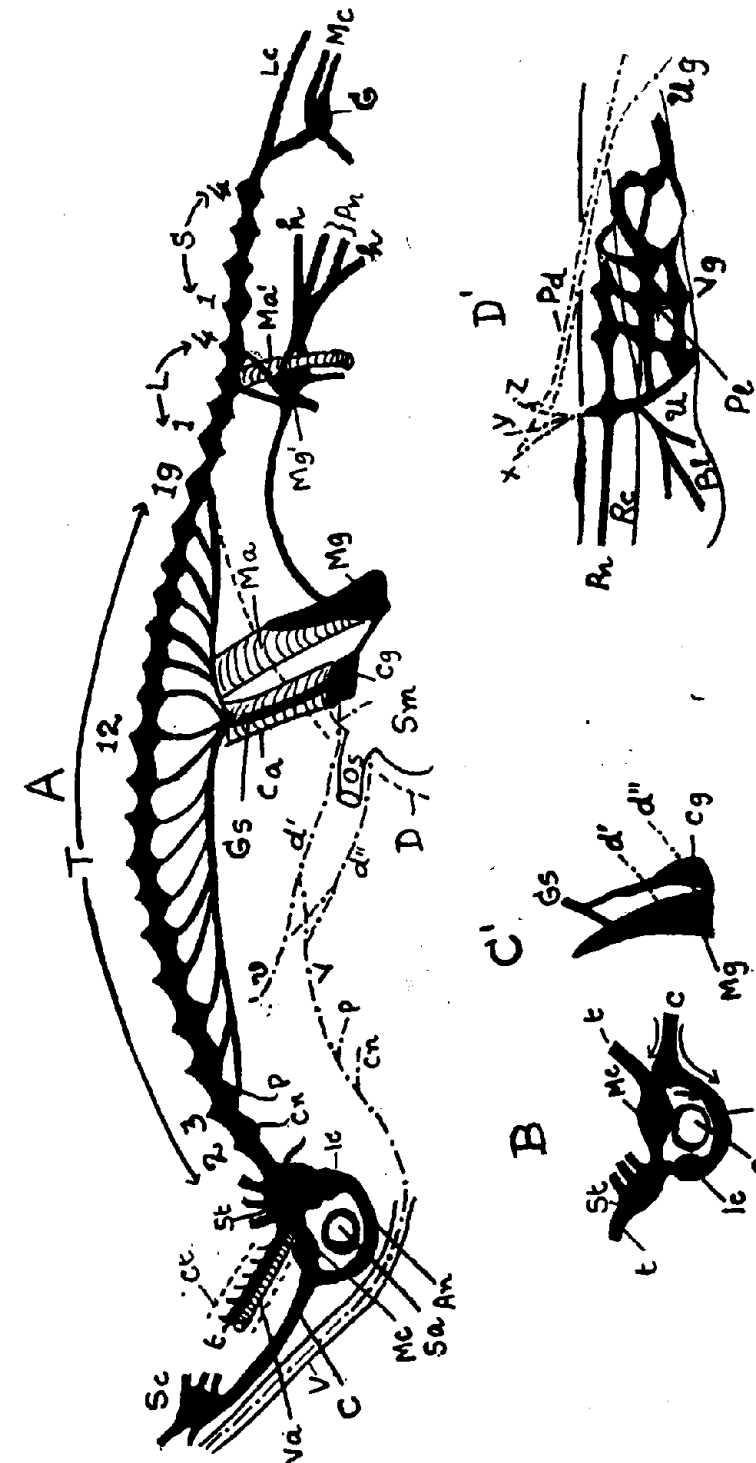


Fig 1

By



148

- A. Left lateral view of autonomic system.
- B. Right stellate ganglion showing its component ganglia and arrows indicate the direction of fibres of the cervical sympathetic trunk and ansa subclavia.
- C. Right caeliac and anterior mesenteric ganglia and termination of dorsal and ventral oesophageal trunks.
- D. Left lateral view of Pelvic plexuses on the walls of pelvic viscera.

C.	Cervical sympathetic trunk.	
D.	Diaphragm.	
G.	Ganglion impar.	
h.	Lateral branches of posterior mesenteric ganglion that enter anterior part of broad ligament of uterus and supply ovary, oviduct and uterine horn.	
L.	Lumbar ganglia—I & IV are numbered.	
S.	Sacral ganglia—I & IV are numbered.	
T.	Thoracic ganglia—II, III, XII & XIX are numbered.	
X.	Parasympathetic fibres from II sacral nerve.	
Y.	" " III "	
Z.	" " IV "	
Sc.	Superior cervical ganglion.	Sm. Stomach.
Mc.	Middle "	Ca. Celiac artery.
Ic.	Inferior "	Ma. Anterior mesenteric artery.
V.	Left vagus nerve.	Ma' Posterior " "
v.	Right vagus nerve.	Pn. Presacral nerves.
t.	Nervus transversarius.	Lc. Lateral coccygeal nerve.
Va.	Vertebral artery.	Mc. Middle coccygeal nerves.
Ct.	Canalis transversarius.	Rc. Rectum.
Sa.	Subclavian artery.	Bl. Urinary bladder.
An.	Ansa subclavius.	U. Uterus.
St.	Stellate ganglion.	Vg. Vagina.
Cn.	Cardiac nerves.	Ug. Urogenital canal.
P.	Pulmonary nerves.	Pd. Pudendal nerve.
d'	Dorsal oesophageal trunk.	Cg. Celiac ganglion.
d''	Ventral "	Mg. Anterior mesenteric ganglion
Gs.	Great splanchnic nerve.	Mg' Posterior mesenteric ganglion
Os.	Oesophagus.	
Pl.	Pelvic plexuses with peripheral ganglia in the walls of viscera.	
Sympathetic nerves.	—————	Solid black line.
Parasympathetic nerves.	— . . . —	Interrupted line with dots.
Diaphragm marked.	-----	Interrupted line.

1. Botar, J. (1931)	...	"Sympathetic System of <i>Elephas indicus</i> ", <i>Bull. Mus. Nat. Hist. Paris</i> , T. 8, Third series, 722-726.
2. Eales, N. B. (1926)	...	The Anatomy of the Head of a Foetal African Elephant, <i>Elephas africanus</i> (<i>Loxodon africana</i>). <i>Trans. Roy. Soc. Edin.</i> Vol. 54-1926. P. 491-551.
3. Gray, H. (1956)	...	Gray's Anatomy. Descriptive and Applied.
4. Rajagopal, M. D. (1956)	...	Unpublished Thesis submitted for Part I of the Ph.D. Degree in Anatomy of the University of Madras.
5. Sisson Grossman (1956)	...	The Anatomy of the Domestic Animals.

PRODUCTION OF ANTI-TETANUS SERUM

BY

M. K. K. MENON, M.B.B.S.,

Assistant Director,

and

M. S. JAYARAMAN, B.V.Sc.,

Department of Anti-Toxins, King Institute, Guindy.

The object of this paper is to place on record for the information of the members of the Veterinary profession, procedural methods adopted at the King Institute, Guindy, Madras in the production of Anti-Tetanus Serum with the basic principles underlying the same.

Selection of the animal for production:—Of all the large animals the horse is the animal of choice because of the manner in which it responds to immunization, the ease with which it can be controlled for the same and for the quantity of serum yielded under each bleeding schedule.

Selection of the horse:—The horse selected should at least be three years of age, of fairly good size, vigorous and healthy. Advanced age and breed of the animal do not count in the selection of the animal. But younger the animal the greater will be its period of utility and thus more economical to the establishment.

Before taking the horse on rolls it is subjected to a thorough clinical examination. It should also pass through the mallein test with a negative result.

Maintenance of the horse:—A horse receives daily except on Sundays rations consisting of 7 lbs. of crushed oats, 2.5 lbs. of wheat bran, 1 oz. of shark liver oil, 2 ozs. of common salt, 1 oz. of Churn Brand '105' Mineral Supplement (I.C.I.) and 10 lbs. of Hariali hay in two divided feeds, both morning and evening. Lucerne at the rate of 1 lb. per horse is also given daily. On Sunday afternoons, omitting oats, each horse receives 3.75 lbs. of Wheat Bran made into a mash with linseed gruel and with 4 ozs. of Mag. Sulph added to it.

Horses are groomed daily. Except on Sundays and on days they are included in immunization or bleeding protocols, they are exercised for one hour by being led by syces. The temperature of the horses is recorded daily.

Materials for immunization of horses:—Anti-Tetanus Serum (Tetanus Anti-Toxin) is produced by immunizing horses with the

antigenic agents, viz. Tetanus Toxins and Toxoids. Methods of production of these will be dealt with before describing how the horse is actually rendered hyperimmune.

Production of Tetanus Toxin:—Potent Tetanus Toxin is produced by inoculating the broth obtained by the peptic digestion of beef (or preferably veal as per its availability) and enriched with 0.5% glucose, with the 24 hour old seed culture of toxigenic strain of *Cl. tetani* under aseptic conditions. Seed culture for final inoculation is obtained after sub-culturing the stock culture on three successive days in glucose broth containing 0.5% Agar.

Inoculated flasks are left in the incubator at 37°C. for seven days for the development of maximum toxicity. After satisfying microscopically by slide examination the purity of the growth, the filtration of the culture is proceeded with in two stages. The first one is through rag pulp to remove the coarse particles and the second and the final is by using Seitz pads 'Ek.' at 10 lbs. pressure. The sterile filtrate obtained contains the toxin.

Standardization of Toxin:—The potency of the toxin is evaluated in terms of 'Minimum Lethal Doses' as follows. A series of progressively increasing dilutions of the toxin is made in buffer saline solutions. White mice weighing 15–18 gms. are injected with 0.5 c.c. from each aliquot of dilutions. The animals are observed for four days for symptoms of Tetanus. The final readings are analysed on the basis of the definition of MLD which is the smallest amount of toxin required to kill a mouse weighing 15–18 gms. in 96 hours after inducing typical symptoms of Tetanus.

Preparation of Tetanus Toxoid:—To toxin lots sufficient 10% Formalin is added so as to give a final concentration of 0.35–0.4%. They are left in the incubator for about six weeks. By this time detoxification of toxin generally occurs. But its antigenicity remains unaffected.

The product is then tested as to its atoxicity by injecting subcutaneously 5 ccs. of toxoid into at least two guinea-pigs (300–350 gms.) and observing them for the development of any symptoms of Tetanus.

Since toxins are too toxic for initial administration, Toxoids are preferred in initial immunization schedules.

Basal Immunization of horses:—It has been observed that strong artificial immunity is much more easily established in animals possessing some measure of initial antibody titre.

To induce a similar state the process of what is known as basal immunization is adopted.

The horse is given subcutaneously 25 ccs. of Tetanus Toxoid. After 3 to 4 weeks the dose is repeated. But from now on the toxoid carries with it 1% Tapioca which potentiates the action of the former by creating a 'depot stimulus.' The animal is rested for a period of 3-6 months and then taken up for hyperimmunization.

Hyperimmunization of horses:—To start with 50 ccs. of Tetanus Toxoid is given along with Tapioca. Graduating the series with an increase of 25 ccs. till the stage of 200 ccs. and thereafter by 50 ccs. successive injections of Toxoid are given at rapid intervals, taking into consideration the constitutional, local and thermal reactions when drawing the protocols.

After the dose of 250 ccs of T. Toxoid has been reached, trial bleedings are taken from the horses to ascertain whether satisfactory levels of anti-toxin have been attained or not. If the assay reveals a titre of more than 200 i.u./cc (equivalent to 400 i.u. of 1928) the animal is considered to be fit for large bleedings to be drawn.

The next higher dose of T. Toxoid viz. 300 ccs is given and two large bleedings are taken on the sixth and eighth days after injection.

The first bleeding totals 6.75 litres and the second bleeding amounts to 4.5 litres. Blood is collected in 17% citrate solution. Final concentration of citrate is 1.7% since for every nine parts of blood one part of citrate solution is used. After the second bleeding the next higher dose of antigen is injected after a period of rest for at least fifteen days. From this stage bleedings and injections alternate.

After the maximum volume of 400 ccs. of T. Toxoid has been administered, at every subsequent injection the dose of toxoid is reduced by 25 ccs. and T. Toxin is substituted for it. Injections of Toxoid-Toxin mixtures along with Tapioca are continued till in course of time the animal begins to receive toxin alone. For the toxins the non-specific stimulant added at the time of injection is CaCl_2 in 0.83%.

Rest to animals:—Periodically the animals are rested for three months during summer from April to June. This helps the horse in maintaining good titre over a long period.

Hyperimmunization after rest:—When animals are taken for hyperimmunization after long rest it is usual to commence with a smaller dose of the antigen (100 ccs.) and then work up to the previous level (400 ccs.) in 2 or 3 injections in rapid succession and then bleed the animal as usual. The same procedure is also adopted for animals showing falling titres (titres going below 200 i.u./cc). Series of increasing doses of injection has much better effect in boosting up low titres than a single large dose of antigen.

Animals refractory to immunization:—They are reassigned after a period of rest, if in good health for Anti-Gas-gangrene serum or Normal Serum or against any other antigen.

Euthanasia by exsanguination:—Horses showing falling titres and/or progressive deterioration in health are bled to death from the carotid artery under general anaesthesia. Those unfit for bleedings are otherwise destroyed.

Processing of Blood for Anti-Toxin:—The citrated blood collected is left as it is for 48 hours to allow the cells to sediment. Now the supernatant plasma is carefully siphoned off. Sufficient 10% solution of phenol is added to give a final concentration of 0.3% in order to act as a preservative.

Serum concentration:—When sufficient quantity of plasma accumulates convenient volumes (100—120 litres) are taken up for concentration. By this process the specific protein, viz., pseudoglobulin with which anti-toxin is associated, is isolated and the other protein fractions viz. euglobulin, albumin etc., which are non-specific and capable of giving rise to anaphylactic reactions are eliminated. Concentration also helps in increasing the potency of anti-toxin per c.c. and thus to reduce the volume of the material for injection.

Separation of the different protein constituents is accomplished by fractional precipitation with ammonium sulphate.

Precipitation of Euglobulin:—To pooled plasma, water is added to half its volume and pH is adjusted to 8. To the plasma sufficient quantity of saturated ammonium sulphate solution is added so as to bring it to 29% level. At this point euglobulin and fibrinogen are precipitated. The material is stirred for 15 minutes. Toluene is added at this stage and this helps in the removal of lipoids which have a tendency to impart turbidity to anti-toxins. The temperature is raised to 58°C to hasten granulation and precipitation. The other protein fractions viz. pseudoglobulin and albumin remain unaffected. The material is cooled to 40°C and filtered through cheese cloth. The precipitate is washed with 31% Sat. ammonium sulphate and the washings are added on to the original filtrate.

Precipitation of Pseudoglobulin:—The concentration of ammonium sulphate in the filtrate is now raised to 50%. At this level of saturation pseudoglobulin precipitates. After the bottles are allowed to stand for 4 hours to ensure complete precipitation, filtration is done in automatic filtration racks. The precipitate obtained which is mostly pseudoglobulin with traces of euglobulin is then pressed between beds of filter paper in the wooden presses so as to eliminate as much water and ammonium sulphate as possible.

The pressed material is then distributed in the cellophane bags and dialysis is carried out in running cold water for a period of 4-5 days till the concentration of ammonium sulphate in the dialysed material is not more than 0.2%.

The contents of the bags are then pooled and the whole material is made up to the original volume of plasma with water.

Isoelectric precipitation of euglobulin:—To remove the traces of euglobulin that may be present, recourse is made now to isoelectric precipitation. pH of the material is brought to 5.8-6 by adding N.HCl. At this pH these traces of euglobulin held in solution granulate and precipitate. The whole material is left in the cold room overnight. Subsequently it is filtered.

Second precipitation of pseudoglobulin:—pH of the filtrate from the above is raised to 8 and sufficient saturated ammonium sulphate solution is added to bring the same to 50% saturation. This results in pseudo-globulin precipitating.

Once again the processes of drying by pressing and dialysing are repeated. The final dialysates are pooled and tricresol is added to a concentration of 0.35%.

pH of the material is adjusted to 7.3-7.4 by using 18.5% Na_2CO_3 solution and the material is rendered isotonic by adding sufficient sodium chloride. Both are added at the same time and under constant agitation of anti-toxin to avoid any precipitation.

The anti-toxin is then allowed to age in the cold room for a period of three months during which any unstable non-specific proteins precipitate.

After this, the material is centrifuged and then clarified by passing through "K" pad in Seitz filter. Final bacteriological filtration is done through EK pads in Seitz filter.

Before the product is ampouled tests are done to ensure safety, potency and sterility of the product.

Safety Test:—1. To 4 guinea-pigs 5 ccs of the anti-toxin is injected subcutaneously.

2. To two mice 0.5 c.c. of the product is given subcutaneously and to another two the same dose is administered intravenously.

3. To one rabbit is injected intravenously 3 ccs of A.T.S. per kg. body weight.

All the animals are observed for a week.

Potency Test:—To perform the potency test L10 dose of the toxin is first determined. This is the smallest quantity of toxin which

when combined with 1/10 unit of Standard anti-toxin produces death of mice weighing 15-18 gms in 96 hours with progressive symptoms of Tetanus.

This test dose of the toxin is now combined with varying dilutions of the anti-toxin to be assayed and tests on mice are carried out and results are analysed to establish the number of units of anti-toxin per c.c.

Estimation of total solids, colorimetric estimation of the concentration of the preservative and turbidity and viscosity tests are also performed on the product.

The product is finally filled in ampoules in stated volumes for prophylactic and therapeutic purposes. It is then labelled as per Drug Rules that are in force giving details about the batch number, fill number and dates of manufacture and expiry.

Potency is once again estimated by random selection of ampoules and after performing the identity test the serum is declared fit for human use.

HERD INFERTILITY IN GIR CATTLE DUE TO COPPER DEFICIENCY

By

C. R. SANE, G.B.V.C., F.R.V.C.S., (Sweden),
Cattle Sterility Officer, Bombay State.

S. P. DESHPANDE, G.B.V.C., Assoc. I.D.R.I.,
Vice-Principal and Professor of Medicine, Bombay Veterinary College.

B. R. DESHPANDE, B.Sc. (Vet.), Hons.
Veterinary Officer i/c Key Village Artificial Insemination
Centre, Kopergaon.

and

A. S. KAIKINI, B.Sc. (Vet.), Hons.
Research Assistant, Cattle Sterility Scheme, Bombay Veterinary College.

Introduction

It is usually taken for granted that diet which is adequate for the maintenance of normal health and growth in young animals and health and production in adults is also sufficient to develop normal reproductive functions. When reproduction is impaired due to some specific dietary deficiency, it is then observed that there is a general derangement of bodily functions also. It is difficult to say if this dysfunction is a specific effect of the deficiency or merely one of the many results of the general

break down. It has been noted that diets which are qualitatively deficient prove insufficient for maintenance and growth and cause infertility in adults if fed for long. As a result of this dietetic error in young females, puberty is delayed and in adult females the oestrus cycle may become irregular, oestrus periods transient and ovaries may become quiescent. Specific deficiencies such as calcium, phosphorus, cobalt, copper and vitamin A, if encountered during prepuberty age may delay the onset of maturity and may result in permanent impairment of the reproductive functions. Our knowledge about such deficiencies and their effects on health and reproduction in cattle under Indian conditions is very scanty. The authors therefore desire to place on record in this article their findings on 'herd infertility in gir cattle due to copper deficiency.'

Literature

The deficiency of trace elements particularly that of copper is a very complicated one. Bennetts and Chapman (1937) in Western Australia demonstrated that "Enzootic Ataxia" of Lambs was associated with a pasture deficiency of copper. It was proved that this was related to a low level of copper in blood and liver of affected lambs and their mothers. Pathologically, "Enzootic Ataxia" is the same as "Sway Back of lambs" in Britain which is due to a cerebral demyelination. However, there is one essential difference between the disease that occurs in Australia and that in Britain. In Australia it is found amongst those that are grazed on pastures deficient in copper while in Britain, it is found to be prevalent even amongst animals grazed on pastures of normal copper content. In both the cases the maladies are controlled by feeding copper salts to the ewes while in pregnancy. It is not clear if some obscure factors limit the absorption of copper in England or if sufficient fodder is not made available to the animal to keep up the required balance in its blood of this trace element.

Ill effects on health, due to copper deficiency in cattle have been reported from U.S.A. (Florida), Holland, Newzealand, Australia and Great Britain.

Clinical symptoms of deficiency type, low blood values, analysis of fodder and response to copper sulphate treatment are the criteria reported by almost all the workers. It is well known that Molybdenosis brings about hypocupraemia.

Allcroft (1949) has described hypocupraemia in dairy cows which responded to copper supplement.

There are exclusive references on copper deficiency in sheep and cattle from various countries. In India, Sahai and Kehar (1951) have studied the distribution of copper in several common animal fodders.

Straws and hays commonly used in India are found to be low in copper contents.

Reports of Research Officer, Trace Element Study Scheme at the Indian Veterinary Research Institute, Izatnagar records incidence of low blood and liver values in copper in some cases and low values in straw and grass samples analysed at the Institute. These reports however do not suggest any bearing of this deficiency on impairment of fertility in animals.

Daily copper in-take of an average adult animal weighing 800 lbs. has been worked out to be 45-60 mg.

Materials and Methods

Infertility due to copper deficiency was detected in two herds of Gir cattle at Kopergaon, Ahmednagar District, Bombay State.

In response to a Government scheme, two farmers of Kopergaon purchased 12 Gir heifers and a bull each, from a farm at Bategaon in Thana district in November 1954. The age of the heifers at the time of purchase varied from 3 to 4 years. Heifers though of proper age did not settle down even after an year of their arrival at Kopergaon i.e. upto January 1956. Both the farmers thought that the animals were unfit for breeding and therefore practically decided to dispose of the stock. The Veterinarian in charge of the Key Village Scheme, Kopergaon, who examined these animals a number of times reported the matter to the Cattle Sterility Officer, Bombay State, in February 1956. The matter was thereupon undertaken for investigation.

Clinical Observations

Herd No. I

It was found on successive examinations in the herd of Farmer A holding 12 Gir heifers, that 8 heifers showed anoestrus conditions and 4 exhibited irregular weak heats. The condition of the animals was not very satisfactory inspite of ample food. The animals were on ranching system while at Bategaon they hardly received any greens except during monsoon. They were not receiving any concentrates and they were practically fed on hay grown locally. On arrival at Kopergaon, the conditions changed to a very great extent. Kopergaon tract is a very heavy sugarcane growing area and there is hardly any land for grazing the cattle. The heifers were getting sugarcane tops (in season), Jowar *kadbi* Hay and lucerne in adequate quantities. Grazing was scanty and available only for couple of months. Concentrates such as Bran and Thur Chuni were started only late in December 1955 to improve the condition of the stock. With all this feeding and good management, the condition of the heifers was not satisfactory.

The varied symptoms observed led to the suspicion of some mineral deficiency. The following symptoms were noticed:—Unthrifty condition; skin haggard and scurfy, hairs rough and standing, considerable change in the coat colour from reddish to dirty brown (Achromotrichia), unkempt condition of the coat, mucous membrane pale in a few and a few had diarrhoea occasionally. Granular vaginitis was detected in 9 out of 12 heifers. In majority of the heifers, uterus was flabby, atonic and ovaries small, soft and anoestrus. 8 heifers though between 3½ to 5 years of age exhibited no heat at all. The rest of the 4 heifers exhibited weak heats at irregular intervals.

It was observed on successive examinations that these heats were unovular. All the animals maintained fairly good appetite. When no improvement was noticed until March 1956, the symptoms exhibited gave rise to a suspicion of some deficiency when blood samples were collected for estimation of trace elements. Clinical symptoms were indicative of copper deficiency.

Laboratory tests confirmed the suspicion. The normal blood copper level should range between 0.1 to 0.150 mg. per 100 cc. but it ranged between 0.04 mgm to 0.09 mg per 100 cc. Laboratory tests clearly indicated that the infertility and the unthrifty condition of the animals were due to copper deficiency.

TABLE I

Table showing the blood copper level of heifers of Herd No. I.

S. No.	Heifer	Copper in mg. per 100 c.c.		Remarks
		Before Treatment	After Treatment	
1	KPG-26	0.067	Not taken	0.08 mg. is taken as subclinical range. Below 0.08 mg. is considered as low. Haemoglobin estimations were not done. Pallor of muns. was taken as criterion of anaemia.
2	KPG-28	0.117	Not taken	
3	KPG-29	0.067	0.145	
4	KPG-30	0.045	0.130	
5	KPG-31	0.067	0.104	
6	KPG-32	0.057	0.104	
7	KPG-33	0.117	Not taken	
8	KPG-34	0.067	Not taken	
9	KPG-35	0.080	Not taken	
10	KPG-36	0.045	0.110	
11	KPG-37	Not taken	0.130	

Treatment:—It was decided to administer 10 grains of copper sulphate and 2 grains of cobalt sulphate daily to each heifer. The treatment was undertaken from 20th March 1956 when three heifers were aged 5 and 9 heifers were aged 4 years. Before treatment, eight heifers showed anoestrus conditions and four exhibited irregular weak heats. With the commencement of treatment, four heifers exhibited heats and settled in about 2 months time, three in 4 months time, one in

the 5th month, one in the 7th month and one in the 9th month, after treatment.

Ten out of twelve heifers responded to the treatment though at variable periods and not only improved in the condition of their health but also returned to fertility. Of the lot that responded to the treatment, six heifers have delivered, four are pregnant, of which heifer KPG-35 that has settled to service in April 1956 died on 5th August 1956 due to bloating.

TABLE II

Progress chart of heifers of Herd No. 1.

S. No.	Heifer	Age in yrs.	Date of commencement of treatment	Date of Service	Date of calving	Remarks
1	2	3	4	5	6	7
1	KPG-26	5	20 - 3 - 1956	30- 5-57 2- 7-57	28-10-56	
2	KPG-27	5		7- 5-56	19- 2-57	
3	KPG-28	6		20- 8-55 28- 6-56	14- 4-57	
4	KPG-29	5		10- 4-57		Confirmed Pregnant 28-6-57
5	KPG-30	6		20- 4-57		Confirmed Pregnant 28-6-57
6	KPG-31	6		16- 3-56 4- 4-56	24- 8-56 (abortion)	
				12- 9-56 20-10-56		Confirmed Pregnant 17-12-56
7	KPG-32	5		25- 2-56 22- 1-57 12- 8-57		Confirmed Pregnant 28-4-57
8	KPG-33	5		9- 4-56	20- 1-57	
9	KPG-34	5		20- 8-55 2- 7-56	15- 4-57	
10	KPG-35	7				Pregnant 5-8-56 Died August 1956 due to bloating.
11	KPG-36	5		2-10-57		Empty C.L.R.O. 26-11-57.
12	KPG-37	5				Tonic uterus Follicles R.O. 26-11-57.

One of the heifers KPG-31 that had settled to service on 4th April 1956, aborted on 24th August 1956. Blood test was negative for Brucellosis. Cause of abortion probably seemed to be mechanical. After abortion, the heifer first came on heat on 12th September 1956 and again on 20th October 1956 and settled to the later heat.

Heifer KPG-36 first came on heat after treatment on 2-10-57 when she was served, but examination of genitalia on 26-11-57 revealed that she had not settled to this service.

Heifer KPG-37, though improved in condition has shown no ovarian activity upto December 1957.

It will be seen from the above, that the treatment has proved beneficial and majority of the animals not only improved in condition but also have returned to fertility. The average daily milk yield of the six heifers that have delivered is 16 lbs which is very satisfactory.

Herd No. II

Similar deficiency was observed in another Gir herd belonging to another farmer B of Kopergaon. 12 Gir heifers and a bull were purchased by him from Betegaon and brought over to Kopergaon along with those of Farmer A, in November 1954. Feeding of these animals was of a similar pattern as that of Farmer A. Sugarcane tops dominated in the total quantity of feeds. The owner was unwilling for investigations and did not allow blood samples to be taken for copper level estimations until February 1957 nor was he willing for any treatment. Similar symptoms as those noticed in Herd No. I were observed in this lot also.

Analysis of the blood samples from 7 heifers showed marked copper deficiency. As the owner of this herd was not very co-operative work could not be pursued with precision. The incomplete figures are therefore not tabulated.

However, this herd was divided into two lots of 6 each one was taken for experimental trial and the other kept as control. As suggested by Dr. Ray of Nutrition Division, Indian Veterinary Research Institute, Izatnagar, 4 grains of copper sulphate and $\frac{1}{4}$ grain of cobalt chloride were administered to each heifer daily from October 1957. After six weeks of treatment, the heifers started showing gradual improvement in the condition of their health. Heifer No. CP-2 came on heat for the first time on 2-11-57 when she was inseminated. It is hoped that by and by the rest also will improve in condition and return to fertility. No improvement has been observed in the control group.

Discussion

Similarity to the clinical symptoms described by Allcroft (1946-1951), experience of one of the authors, the low copper contents of

straws and hays in general and absence of other abnormalities, led the authors to suspect and carry out the above (experimental) trials. It was a difficult job to pursue the owners to allow us to repeatedly collect blood samples hence blood samples collected before the treatment had to be taken as basis strongly suggestive of a case of copper deficiency and response to copper supplement as convincing of copper deficiency. Cobalt was used as a safety measure as cobalt estimations were not done. Experimental work done so far in this country does not lead one to infer existence of cobalt deficiency whereas there is ample evidence of the likelihood of copper deficiency being present in this country. The present work is a strong evidence of the existence of copper deficiency leading to infertility—a fact which has hitherto not been recorded.

2. Conditions described as teart pastures, coastal areas, prairies, reclaimed areas may not be present in this country. It is likely that the pastures in general and the land under cultivation is getting low in trace elements due to continuous harvesting (for ages no special effort being made to use fertilizers containing trace elements). Another important factor likely to operate is lowering or diminution of mineral contents in general in the process of lignification in the mature stage of growth which is a repeatedly described fact under tropical conditions. This statement is borne out by the fact that green stages are generally found to be higher in mineral contents.

3. As regards the line of treatment, single dose treatment as suggested by Laing and others is not found beneficial by the authors and as such, taking into consideration the ruminant digestion, it was considered that a moderate daily dose of 10 grains of copper sulphate and 2 grains of cobalt sulphate per head was decided upon in the case of Herd No. I. The treatment has proved beneficial in this herd.

The results of the trial with low dose treatment in herd No. II are inconclusive so far.

4. The old notion that repeated administration of copper sulphate (10 grs to an ounce) as a treatment for parasitism, resulted in toxic effects is negatived by this work.

5. Specimen photos of animals before treatment and after treatment are included. There are other photos of this type with the authors.

6. Controls:—Controls could not be kept in herd No. I as farmer A desired that his entire stock should be treated to avoid economic loss.

Conclusion

In this investigation, it has been shown that mass infertility as a result of copper deficiency is likely to occur under environmental

conditions, difficult to be assessed either in the soil or fodder grown in the area.

An extensive investigation of this problem is necessary to determine the best possible remedial measures.

Summary

Herd infertility in Gir Cattle in two herds due to copper deficiency has been detected. Symptoms of hypocupraemia were observed. Treatment with copper sulphate and cobalt sulphate was found effective.

Acknowledgment

Thanks are due to Shri. V. C. Garud and Shri. Chandar Patil from Kopergaon for their excellent cooperation. Thanks are also due to Dr. Ernst F. Palsson and Dr. H. G. Aalfs, F.A.O. Experts, Shri. M. R. Marathe, Chief Veterinary Officer, Government Milk Colony, Aarey and Prof T. W. Gullickson, (Nutrition Expert T. C. M.) for their keen interest in this work.

REFERENCES

- | | |
|--|---|
| Allcroft R. (1946) | ... <i>Nature</i> 158, 796. |
| Allcroft & Parker (1949) | ... <i>Br. Jr. of Nutrition</i> , 3, 205. |
| Becker R. B., Neal W. M. & Sheely A. L. (1931) | ... Florida Agri. Exp. Stn. Bull No. 231. |
| Bennetts H. W. & Chapman F. E. (1937) | ... <i>Austr. Vet. J.</i> 13, 138. |
| Bennetts H. W. & Hall H. T. B. (1939) | ... <i>Austr. Vet. J.</i> 15, 152. |
| Cunningham I. J. (1944) | ... <i>Newzealand J. Agric.</i> 69, 559. |
| Cunningham I. J. (1946) | ... <i>N. Z. J. Sc. Tech.</i> 27, Sect. A, p 381. |
| Kehar N. D. & Momin (1950) | ... <i>I. J. V. Sc.</i> xx. |
| Mac Callum E. V. <i>et al</i> (1946) | ... <i>Newer knowledge of Nutrition</i> P. 234-35. |
| Sahai K. & Kehar N. D. (1951) | ... <i>K. J. V. Sc.</i> Vol. 121, Part IV. p. 235-42. |
| Sen K. C. (1953) | ... <i>Animal Nutrition Research in India</i> . |
| Sjollem B. (1933) | ... <i>Biochem Ztschar.</i> 267, 151. |

LEUCOCYTOZOOM INFECTION IN DESI FOWL IN ORISSA

By

G. BISWAL,

Orissa College of Veterinary Science and Animal Husbandry, Cuttack,

and

B. C. NAIK.

Three species of *Leucocytozoon* have been described from the chicken. *Leucocytozoon caulleryi* was described by Mathis and Leger (1909). The host cell is round in this species, and measures about 20

Herd Infertility in Gir cattle due to copper deficiency

By

C. R. SANE and Co-WORKERS.



Case No. CP-2
Before Treatment.



Case No. CP-2
After Treatment.

Leucocytozoon Infection in Desi Fowls in Orissa

By

G. BISWAL and B. C. NAIK



Fig. 1

Chicken Blood—*Leucocytozoon caulleryi* (round form) and *Leucocytozoon sabralesi* (spindle-shaped form — Microgametocytes. Giemsa's stain; x 2600.



Fig. 2

Chicken Blood—*Leucocytozoon caulleryi*—Microgametocytes. Giemsa's stain; x 2600.

This interesting photograph was sent to us

By

SHRI H. K. LALL, B.Sc., M.R.C.V.S.,
Lucknow.

This dog was born in Village Sikhada in Meerut district and is aged one year. He was one of the five puppies of the same litter—the other four and the mother are quite normal. Call this Hunch-back?

Hump Sore in Kutch

By

H. S. PANNU



[To face page 172]

A Cyclops Monstrosity

By

H. R. CHANDRASEKHARIAH



[To face page 175]

by 20 microns, while parasite itself measures 15.5 by 15.0 microns. *L. sabrazei* was described by the same authors (1910), and further information was given by them in another paper (1910). The host cell is spindle shaped, and measures about 67 by 6 microns, while the parasite itself measures about 24 by 4 microns. Both these species were found in Indo-China. The third chicken species, *L. andrewsi*, was described by Atchley (1951). Some authors doubt whether Atchley was justified in setting this form up as a separate new species. It has round gametocytes and is probably *L. caulleryi*. Kuppuswamy (1936) found *L. sabrazei* in Penang and Wellesley Province. Ramanujachari and Alwar (1953) reported a case of *Leucocytozoon* infection in a desi fowl in Madras. The morphological description of the protozoan by them is suggestive of both species, the rounded and the spindle shaped. Later Ramaswami (1955) reported *Leucocytozoon* infection in a fowl in Madhya Pradesh.

All the birds in a flock of 8, belonging to a private owner kept for egg purpose, died within 3 to 4 days of sickness. One dead bird was presented to the first author for a post-mortem examination.

The history presented by the owner was that all these birds showed drowsiness, diarrhoea, violent unrest with their wings striking against the ground, paralysis of the wings and limbs, and death.

On post-mortem examination nothing unusual was seen to be suggestive of any infectious disease. Blood smears were collected for microscopical examination.

The smears were stained by Giemsa's stain and they on examination revealed numerous organisms varying in shape and size, parasitizing the leucocytes. Both the chicken species of leucocytozoon were present. Those with the round host cells were *Leucocytozoon caulleryi*, while those with the spindle shaped host cells were *Leucocytozoon sabrazei*. Fig. 1 shows microgametocytes of both species, while Fig. 2 shows microgametocytes of *L. caulleryi*.

Summary

Both the chicken species, *L. caulleryi* and *L. sabrazei* parasitizing the leucocytes of the chicken, are found in the case under report. From a perusal of literature indicates that this is the first report recorded from the State of Orissa.

Acknowledgment

Grateful acknowledgement is recorded to Dr. N. D. Levine, Professor of Parasitology, College of Veterinary Medicine, University

of Illinois, U. S. A., for his kind cooperation in examining the slides and furnishing us some of the valuable early literature.

REFERENCES

- | | |
|--|---|
| Atchley, F. O. (1951) | ... <i>Jour. Parasit.</i> 37 : 483-488. |
| Kuppuswamy, A. R. (1936) | ... <i>Ind. Vet. Jour.</i> 13 : 24-35. |
| Levine, N. D. (1957) | ... Personal communication. |
| Mathis, C., and Leger, M. (1909) | ... <i>C. R. Soc. Biol.</i> , 67 : 470-472. |
| Mathis, C., and Leger, M. (1910) | ... <i>C. R. Soc. Biol.</i> , 68 : 22-24. |
| Mathis, C., and Leger, M. (1910) | ... <i>Bull. Soc. Path. Exot.</i> 3 : 504-570. |
| Ramanujachari, G., and Alwar, V. S. (1953) | ... <i>Ind. Vet. Jour.</i> 30 : 93-96. |
| Ramaswami, G. R. (1955) | ... <i>Ind. Vet. Jour.</i> 32 : 48-49. |

BRUCELLOSIS AND ITS CONTROL IN
COIMBATORE DISTRICT

By

V. VENKATARAMAN, G.M.V.C.,
Veterinary Disease Investigation Officer
(Cattle), Ranipet.

The term, Brucellosis, represents all diseases caused by the three species of the genus *Brucella* viz., *Brucella abortus*, *melitensis* and *suis*, without specific regard to the species of animals affected or to the clinical picture. The affection usually commences in the form of a bacteraemia and continues in a sub-acute or chronic form producing organic changes of an inflammatory and necrotic character in the animals affected.

The disease is widely prevalent in almost all countries where livestock breeding is predominant. In India also, it is prevalent in an alarming proportion in some of the states. The economic loss caused by this disease is enormous to a cattle breeder by way of loss of valuable calves and milk and the affected cows becoming sterile besides the loss in production and the loss in work as a result of synovitis when bullocks are affected. This disease gains added importance from the public health point of view and it is communicable to human beings producing "Undulant fever" in them. But this is not commonly noticed in India due to the general practice of consuming milk only after boiling. Due to the above facts, it was considered to be an urgent necessity to control this disease effectively in the Madras State where it is found to be prevalent on a wide scale.

A short description about the spread of disease among cattle will go a long way to understand the problem and its control. The disease is caused by a Coccobacillary organism, *Brucella abortus*, having gram-

negative staining character. It affects mostly cows and the concentration of the organisms is found to be in the gravid uterus, udder, placenta and sometimes in the joints of limbs. In bulls, the organisms are commonly found in the testis and epididymus, and sheath of affected animals. When a cow aborts, a large number of organisms are discharged along with the placenta, amniotic fluid and uterine discharges. The whole area and pasture get contaminated and healthy animals get infected when they have access to such areas. The organisms survive in the vagina of aborted cows for a long time. When a healthy bull serves such cows, it picks up the infection and when such bulls are used for further service on healthy cows, this disease is transmitted to those cows also. The meconium and urine passed by the new born calves from infected dams and the milk of infected cows also contain the organisms for a considerable time. The infection spreads in a herd practically unnoticed because the first case of abortion or premature birth, is not followed by another for a long time and hence attracts little attention, and immediate precautions against the spread of infection are neglected. Due to these various factors it is found that the control of the disease is a little difficult. However, an attempt was made in our State, to control this disease in some of the areas where it is found endemic.

As a result of preliminary survey carried out in the state to find out the exact incidence of the disease, it was found that the cattle of Coimbatore, Mathurai, Ramanathapuram, Salem and Tirunelveli are affected, by this disease. In certain areas, the percentage of infection is found to vary from 10 to 40. Another interesting finding was that the incidence was mainly confined to hilly tracts and villages bordering hills. The animals from these villages and the plains when they go for grazing to the hilly tracts contract the disease. Since the staff of the department were busy all along with the control of other important diseases of livestock and there was no special staff to take up the control work on Brucellosis, much progress could not be made to control this disease. However, attempts were made to control the disease by carrying out a large number of vaccinations in the highly endemic areas with a vaccine manufactured at the Institute of Veterinary Preventive Medicine, Ranipet and adopting suitable sanitary measures. The result obtained were encouraging and the percentage of abortion in some of the herds came down considerably and in certain places, it was very low and less than 1% as compared to unvaccinated herds, in which it was more than 8%. Due to the encouraging results obtained, it was decided to launch a scheme in the Coimbatore district as an experimental measure to control and eradicate the disease from the district and the same started functioning from 2-12-54.

Initially a thorough survey of the disease in a number of villages in the district was taken up to study the extent of infection in these villages. In this survey about 150 villages in the district were found to have the infection in an endemic form. The percentage of infection ranged from 5 to 10 on an average and in some villages it was as high as 25. During this survey as many as 1406 samples of sera and 358 samples of synovial fluid were tested to assess the extent of infection. Name of the Villages in which the disease in highly endemic is given below:—

Name of villages.	Percentage of infection.	Name of villages.	Percentage of infection.
1. Kowdahalli	20	8. Semmedu	15
2. Sethumadai	20	9. Ramapuram	10
3. Malayandipatnam	20	10. Odayarkulam	10
4. Hassanur	15	11. Chinnathadagam	5
5. Bailur	15	12. Govanur	5
6. Lokkanahalli	15	13. Vettakaranpudur	5 to 10
7. Gobichettiur	15	14. Kurichikkottai	5 to 10

In the above villages, vaccination of heifer calves under the age of 2½ years and a few adult cows were taken up with Cotton Strain No. 19 supplied by the Institute of Veterinary Preventive Medicine, Ranipet. A total number of 15336 animals were vaccinated with the above vaccine. The animals tolerated the vaccine well and the result obtained was very satisfactory. Some of these vaccinated animals were tested for the agglutination titre on the 1st, 3rd, and 6th month after vaccination and they were found to start declining from the 3rd month onwards and disappeared completely by the 6th month.

The common sequela of this disease is in a certain percentage of cases sterility. A correct estimate of the number of cows that become sterile, could not be collected since many of the ryots dispose of such animals, as being uneconomical to maintain. The statistics so far collected give a percentage of 2 to 8 in the villages. The other common sequela is synovitis, of the joints which is more common in male stock. The percentage of this affection is found to vary from 3 to 12. A study of the cases of synovitis reveals that knee joints are mostly affected followed by fetlock, hock, and stifle joints. The percentage of affected joints are given below:—

Name of joints with synovitis	Percentage of affection.
Knee joint	42
Fetlock joint	32
Hock joint	16
Stifle joint	10

Summary

Brucellosis is widely prevalent in a highly endemic form in Coimbatore district and mainly in the hilly tracts of the district.

Vaccinations of calves and adult cows were conducted in the infected villages with *Brucella abortus* vaccine (Cotton strain No. 19) to bring down the incidence of infection.

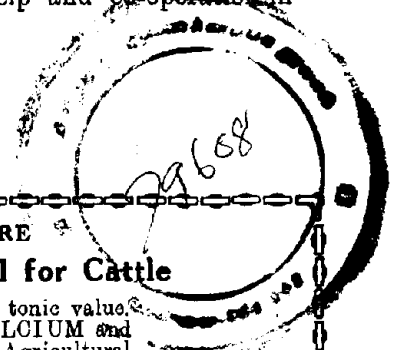
No untoward results were noticed after vaccination and the agglutination titre in the vaccinated animals started declining from 3rd month onwards and disappeared completely by the 6th month.

No abortions were noticed among the vaccinated animals and some of the vaccinated cows which were having abortions regularly calved normally.

The percentage of abortions in some of the villages have decreased considerably and in some cases, it was even less than 1%.

Acknowledgment

My thanks are due to Sri D. Pattabiraman, Director of Animal Husbandry, Madras, Sri I.D. Mantramurthi, Deputy Director of Animal Husbandry (Veterinary) Madras, Sri S. Vancheswar Iyer, Superintendent, Institute of Veterinary Preventive Medicine, Ranipet, for their kind advice and continued interest in the scheme. My thanks are also due to Sri S. Sivaramasubramaniam, and Sri B. Purushothaman, Veterinary Assistant Surgeons for their kind help and co-operation in working the scheme.



STANES MINERAL MIXTURE

Stanes Sterilised Fine Bonemeal for Cattle

The only Tonic at low prices with high tonic value.
Prevents diseases due to deficiency in CALCIUM and PHOSPHORUS. Largely used by all the Agricultural Research Stations in Madras, and by the Veterinary Departments.

Sold in bags of 14 lbs., 28 lbs., for supply in the Madras Presidency.

For further particulars apply to:—

T. STANES & CO., LTD.,
COIMBATORE

OL
KZMS 112 10
1958-3-11

THE NORMAL PULSE AND RESPIRATION RATES AND BODY TEMPERATURE OF NATIVE DOGS

BY

ARCADIO C. GONZAGA, D.V.M., Ph.D.

*College of Veterinary Medicine, University of the
Philippines, Quezon City,*

and

VIVENCIO S. TACA, D.V.M.

Manila Health Department, Manila.

It is well known that the pulse and respiration rates and body temperature give information as to the internal physiological status of the animal body. They are often influenced by disease. Their variations are easily determined and serve as useful aids in the diagnosis and prognosis of morbid changes in the organism. To appreciate such variations, however, the normal values must first be known. Such physiological data will serve useful not only to veterinarians but also to students of comparative physiology.

A survey of the available literature showed that there has been no study along this line on native dogs in the Philippines. Heretofore, Physiological standards on foreign dogs have been used as guides. This practice, however, is not scientifically rational, since dogs in foreign countries live under different conditions and environment, and differ in many other respects from the Philippine native dogs.

The object of this study is to determine the normal pulse and respiration rates and body temperature of native dogs in the Philippines.

Materials and Methods

The observations were made on one-hundred twenty-six apparently healthy, native dogs—sixty-one males and sixty-five females—ranging from one month to ten years in age. They were mostly from the different districts of the City of Manila, and the rest were from Balintawak, San Francisco del Monte, Alabang and Pasong Tamo, Rizal Province. All received ordinary care and feeding.

The records were taken in the morning (7:00-9:00), at noon (11:00-1:00), and in the afternoon (4:00-6:00), when the animals were at rest or had not been excited or exercised just before the examination. Five to ten dogs were observed a day.

Taking the Respiration Rate.—This was accomplished by counting the rise and fall (taken as one) of the flank while the animal was standing unmolested or lying down on its side. Simultaneously, the time on a watch held close to the body of the animal was noted carefully,

and the counting was stopped at the end of one minute. The counting was repeated every time it was interfered with. Duplicate readings were taken and the average recorded for that time of the day.

Taking the Pulse Rate.—The pulse rate was obtained while the subject was standing quietly or in recumbent position. The index and middle fingers of the right hand were placed over the femoral artery on the medial side of the left thigh. The frequency was counted for one minute, and repeated when interfered with. Two counts were made, taking the average as the record for that particular instance.

Taking the Temperature.—The body temperature was taken while the dog was standing quietly or lying down on its side, with the aid of a clinical thermometer (U.S. made, Taylor Bond) graduated in degrees Fahrenheit. After shaking down the column of mercury, the instrument was wet with water or oil and then inserted cautiously almost full length into the rectum and allowed to remain there for three to five minutes. Then, the thermometer was withdrawn carefully from the rectum and the registered temperature read. Two readings were taken each time and the average recorded.

Results and Discussion

The data gathered in this study are presented in Table 1, which shows the pulse and respiration rates and body temperature of all the dogs observed.

TABLE I

*The Pulse and Respiration Rates and Body
Temperature of Native Dogs.*

	Minimum	Maximum	Average
<i>Pulse Rate</i>			
A.M. ...	65	124	90
Noon ...	72	151	110
P.M. ...	78	174	120
<i>Respiration Rate</i>			
A.M. ...	10	50	21
Noon ...	12	52	25
P.M. ...	11	60	29
<i>Temperature (°F.)</i>			
A.M. ...	99.50	101.00	100.03
Noon ...	99.50	102.10	101.18
P.M. ...	101.60	102.50	102.08

The difference between the results obtained in the present study and some foreign standards may be found in Table 2.

The average pulse range of native dogs as found in the present work falls within the limits reported by foreign authors, with the exception of those of Brumley (1), as shown in Table 2. The average morning pulse rate of 90 is the same as the minimum rate given by Smith (6), while the average afternoon pulse rate of 120 is the same as the maximum rate given by Dukes (3), Malkmus (4), Muller and Glass (5), and Udall (7).

TABLE II
*Comparison Between the Results of the Present Study
and some Foreign Standards.*

Authors	Pulse	Respiration	Body Temperature
Brumley (1)	60 - 200	12 - 24	
Brumley and Snook (2)			101.30°F. (38.50°C.)
Dukes (3)	70 - 120	10 - 30	100.50 - 102.50°F. (38.09 - 39.11°C.)
Malkmus (4)	60 - 120	10 - 30	99.50 - 102.20°F. (37.50 - 39.00°C.)
Muller and Glass (5)	70 - 120	12 - 28	99.50 - 102.20°F. (37.50 - 39.00°C.)
Smith (6)	90 - 100	15 - 20	99.50 - 103.00°F. (37.50 - 39.44°C.)
Udall (7)	70 - 120	10 - 30	99.50 - 102.20°F. (37.50 - 39.00°C.)
The Writers (Present Study)	65 - 174 (90-120 Ave.)	10 - 60 (21-29 Ave.)	99.50 - 102.50°F. (37.50 - 39.11°C.) 100.03 - 102.08°F. Ave. (37.79 - 38.93°C.)

It can be seen that the average morning respiration rate of 21 is higher than any of the minimum rates of the authors cited, while the average afternoon rate of 29 is a little lower than the maximum rates given by Dukes (3), Malkmus (4), and Udall (7), but higher than the maximum rates of Brumley (1), Muller and Glass (5), and Smith (6).

The average morning body temperature of 100.03°F. is higher than the minimum temperature stated by Malkmus (4), Muller and Glass (5), Smith (6), and Udall (7), but almost similar to the minimum

reading given by Dukes (3). The average afternoon reading of 102.08°F., on the other hand, is lower than the maximum temperatures mentioned by Dukes (3), Malkmus (4), Muller and Glass (5), Smith (6), and Udall (7). Hence, one may mistake the normal pulse and respiration rates and body temperature of native dogs for abnormal ones.

Recorded in Table 3 are the minimum, maximum and average body temperature, and pulse and respiration rates of dogs below and above one year, and of males and females, in the morning, at noon, and in the afternoon. The data presented in this Table were taken from Table 1.

TABLE III
*The Pulse and Respiration Rates and Body Temperature of Dogs
Below and above One Year, and of Males and Females.*

	Below One Year Old (24 Dogs)		Above One Year Old (102 Dogs)	
	Range	Average	Range	Average
<i>Pulse Rate</i>				
A.M. ...	94 - 124	107	65 - 111	86
Noon ...	103 - 151	130	72 - 136	105
P.M. ...	109 - 174	141	78 - 160	115
<i>Respiration Rate</i>				
A.M. ...	16 - 50	31	10 - 32	18
Noon ...	20 - 52	34	12 - 38	23
P.M. ...	22 - 60	41	11 - 43	26
<i>Temperature (°F.)</i>				
A.M. ...	99.60 - 100.90	100.12	99.50 - 101.00	99.99
Noon ...	100.00 - 102.00	101.21	99.50 - 102.10	101.17
P.M. ...	101.70 - 102.30	102.07	101.60 - 102.50	102.08
	65 Females		61 Males	
<i>Pulse Rate</i>				
A.M. ...	65 - 121	92	70 - 124	88
Noon ...	72 - 150	111	75 - 151	109
P.M. ...	78 - 174	122	80 - 160	118
<i>Respiration Rate</i>				
A.M. ...	11 - 50	22	10 - 40	19
Noon ...	12 - 52	27	16 - 49	24
P.M. ...	11 - 60	31	19 - 50	27
<i>Temperature (°F.)</i>				
A.M. ...	99.50 - 101.00	100.06	99.50 - 100.50	100.00
Noon ...	99.50 - 102.10	101.20	100.10 - 102.00	101.17
P.M. ...	101.70 - 102.50	102.07	101.60 - 102.40	102.05

It is evident from the data given in the Table that the pulse and respiration rates were higher in young and in female dogs than in adult and male dogs, with the body temperature remaining almost the same. This is an agreement with the statements of Malkmus (4) and Smith (6), who stated that age and sex affect the pulse and respiration rates of animals, being higher in young than in adult, and in females than in males. According to Muller and Glass (5), the pulse and respiration rates are higher in smaller and younger dogs than in larger and older ones. Malkmus (4) is of the opinion that the body temperature is not affected by age, sex and temperament. However, Dukes (3) and Muller and Glass (5) said that the temperature is higher in young than in adult animals. According to the results obtained in the present study, the body temperature did not seem to have been affected materially by age and sex.

It is of interest to note that the pulse and respiration rates and body temperature of the dogs observed were generally lowest in the morning, gradually rising at noon, and reaching their maximum late in the afternoon. The variation in body temperature found support in Malkmus (4), who stated that, as a rule, the temperature is generally lowest in the morning and highest in the afternoon at about five o'clock. According to Malkmus (4), Muller and Glass (5), and Smith (6), the respiration rate varies with the atmospheric temperature.

Summary and Conclusions

1. A study of the normal pulse and respiration rates and body temperature of one-hundred twenty-six, apparently healthy, native dogs—sixty-one males and sixty-five females—ranging from one month to ten years old, is herein reported.

2. The pulse rate varied from 65 to 174 with an average of 90 in the morning and 120 in the afternoon; the respiration rate, from 10 to 60 with the average ranging from 21 in the morning to 29 in the afternoon; and the body temperature, from 99.50 to 102.50 °F. with the average varying from 100.03 °F. in the morning to 102.08 °F. in the afternoon.

3. The pulse and respiration rates were higher in dogs below one year than in older ones, and in females than in males, with the body temperature not essentially affected.

4. The pulse and respiration rates and body temperature were lowest in the morning, gradually rising at noon, and reaching their maximum in the afternoon at about four to six o'clock.

Acknowledgment

The writers wish to thank former Dean A. K. Gomez of the College of Veterinary Medicine, University of the Philippines, for giving them encouragement; the owners of dogs used in this study; and those who extended help during the progress of the work.

BIBLIOGRAPHY

1. Brumley, O. V. ... A Textbook of the Diseases of the Small Domestic Animals. (1931) 611 pp. Lea and Febiger: Philadelphia.
2. Brumley, O. V. and J. H. Snook ... Book of Veterinary Posology. (1913) 190 pp. R. G. Adams and Co.: Ohio.
3. Dukes, H. H. ... The Physiology of Domestic Animals. (1937) 695 pp. Comstock Publishing Co. Ithaca, N. Y.
4. Malkmus, B. ... Clinical Diagnosis of the Internal Diseases of Domestic Animals. (Revised English translation of the eleventh German edition by John Mohler and Adolph Eichhorn). (1936) 312 pp. Alexander Eger: Chicago.
5. Muller, G. and A. Glass ... Diseases of the Dog and Their Treatment. (1923) 506 pp. Bailliere, Tindall and Cox: London.
6. Smith, R. M. ... The Physiology of Domestic Animals. (1921) 938 pp. F. A. Davis: Philadelphia.
7. Udall, D. H. ... The Veterinarian's Handbook of Materia Medica and Therapeutics. (1922) 180 pp. The Macmillan Co.: New York.

"HUMP SORE" IN KUTCH

By

H. S. PANNU, B.V.Sc.,

Gaushala Development Officer, Bhuj (Kutch).

Pande (1935) published a scientific account in cattle of a clinical picture of "Hump Sore" a chronic parasitic skin infection. A year later (1926) he described the causative worm-*Stephanofilaria assamensis* though much earlier (1928) Dey had recorded a similar condition of the bovine skin under the name "Calcutta Sore" or "Dum Dum Sore". The disease was later seen in the eastern parts of India but has not so far been recorded on the western coast.

During the author's eight years of professional experience in Kutch he has come across several bullocks and cows suffering from this malady.

Hump Sore in Kutch has been seen to affect cattle of all breeds all over the District but the condition is more commonly met with in

coastal areas. The disease lasts throughout the life of untreated animals. Bullocks having well developed humps are more prone to the disease than the lean ones.

Hump Sore is a chronic cutaneous affection appearing as a localised tumour over hump or yoke place. The author has not seen generalised lesions on the body. The disease is at its worst during the scanty rainy season of Kutch when lesions get active and subside in the winter months.

Lesions at the hump usually appear in the form of a local patch of inflammation, which is very itchy to the animal and it rubs the affected part against fixed objects like the trees, corners of wall, etc. leading to a wound which is aggravated by the pecking of crows and ultimately ending in persistent ulcers. The latter are circular in outline and become a constant feature of the animal.

Lesions on the yoke appear as hard painful red nodules which may be of the size of a small potato which bleed when the animal is yoked. Sometimes several such tumours are seen at the hump and yoke place. In fly season they get infested with maggots which frequently burrow deep into the neck muscles.

The author tried the following lines of treatment with varying success.

1. Surgical removal of the affected skin followed by actual canter of surrounding and deeper tissues. The progress of the wound in earlier stages was satisfactory but in many cases small tumours appeared after two weeks.

2. Antimony tartarate ointment 1:6 was applied on the affected part. The ointment caused sloughing of the whole ulcer and acted quite deeply. After three applications the wound was treated as an ordinary open wound and cases discharged as cured in a fortnight.

3. In a few cases two intravenous injections of 20 c.c. of 1% aqueous solution of antimony tartarate at an interval of 10 days accompanied by dressings with antimony tartarate ointment (1:6) at intervals of 4 days effected a complete cure.

Acknowledgment

The author wishes to thank late Shri P. R. K. Iyer, Research Officer, (D.I.), I.V.R.I. for confirming the disease during his official tours of Kutch and the suggestion to put the incidence on record.

REFERENCES

1. Dey Debakar Rai Sahib (1928) ... *Ind. Vet. J.* 4, No. 4.
2. Pande, P. G. (1935) ... *Ind. J. Vet. Sci.* 5, 364-375.
3. " (1936) ... *Ibid.* 6, 346-351.

Clinical Articles

AMBRASYNTH LEPETIT VITAMINISED CAPSULES IN CANINE PRACTICE

By

H. C. L. SRIVASTAVA, G.B.V.C.,
Veterinary Hospital, Kanpur (U.P.)

On 1-10-57, an Alsation pup aged 5 months was brought for treatment. Its temperature was 102°F and the dog was passing mucus and blood, with faeces.

After an opening dose of castor oil emulsion, the dog was given Sulphaguanidine, Enterovioform and Yeast tablets and this resulted in the disappearance of mucus and blood but the diarrhoea continued to exist.

On 9-10-57, a dose of castor oil emulsion was given again and one tablet of Sulphamycetin thrice daily was given for three days. The result again was the same—the diarrhoea persisted.

The case needed special attention and it was decided to use Ambrasynth Lepetit vitaminised capsules.

The dog was again given a dose of castor oil emulsion on 14-10-57 and the next day it was given Ambrasynth Lepetit vitaminised capsules thrice daily. The next day, improvement in dysenteric stools was noticed and the capsules were continued for three days resulting in complete recovery. The appetite of the dog also revived and it returned to normal life soon after these capsules.

(2)

The Use of Vitamin 'B' Complex in Canine Practice

Vitamin 'B' complex was found to be of use in dogs as a uterine tonic. A Nepal-bred bitch was brought to the Hospital on 20-9-57 with the complaint that it had whelped a month back and was still discharging blood through its vaginal passage. The bitch was examined. Its temperature was 101.8. There was blood-coloured discharge at the vulval orifice and the condition was diagnosed as a case of metritis. She was douches with Dettol lotion for three days and vitamin 'B' complex T.C.F. was injected 1 c.c. daily for 10 days resulting in complete recovery.

The use of vitamin 'B' complex in bitches before and after delivery may be helpful to improve the tone of the uterine muscles.

A CYCLOPS MONSTROSITY

By

H. R. CHANDRASEKHARIAH, G.B.V.C.,
Veterinary Hospital, Dharwar.

On 3rd October 1957, I was called to attend on a case of Dystokia in a cow at Navlur village close by.

With the usual antiseptic precautions, I managed to extract the calf alive but it had a great surprise for me in store. It was a full-grown calf but had only one eye in the centre of the fore-head! Its upperlip and nostrils were absent, presenting a hideous look. All the other organs were normal. Its head is preserved in formalin at this hospital and it attracts large crowds.

Abstracts

Reflexions sur quelques cas de charbon bacteridien "Cryptique" chez des bovins. (Latent anthrax in cattle.) *Rev. Elev.* 10, 26-28. (English and Spanish summaries.)—Provost, A. & Trouetie, M. (1957). *The Veterinary Bulletin*, October 1957, Item No. 2885.

Enlarged abdominal lymph nodes were observed in a zebu ox which, before slaughter, had a temp. of 40°C. Long chains of Gram-positive, capsulated bacilli similar to *B. anthracis* were seen, but the Ascoli test was negative. S/c injection of cultures of the bacillus killed g. pigs within 24 hours and sheep in 36 hours. The same organism was isolated from other zebu cattle, in which no clinical symptoms had been observed, and in which P.M. examination revealed only slight adenitis of the prescapular, precrural or mesenteric lymph nodes. It is recommended that all cases of suspected adenitis in slaughtered animals should be submitted for microscopic inspection.

P. KRISHNA RAO.

A mucosal disease of cattle.—R. A. HUICK, B.Sc., M.B.C.V.S., *Vet. Rec.* 69, No. 49, part 2, December 7, 1957.

The author has described a disease in bovines caused by a filterable virus and characterised by changes in the digestive tract. Clinically the disease has been classified under three headings: mild, severe acute and chronic. In mild outbreaks the symptoms were pyrexia, mucoid nasal discharge followed by scouring of short duration, associated with ulceration of the mouth. Morbidity was high but

mortality was low. In severe outbreaks, mostly seen in animals 4-18 months of age the disease was characterised by pyrexia, anorexia, mucoid nasal discharge which later became thickened and dried to form encrusted debris on the muzzle. The condition was associated with thirst and diarrhoea with voiding of blood stained mucus. The chronic form had a prolonged course upto several months, mainly affecting adult animals, which showed at frequent intervals high temperature, scouring, ulceration of oral cavity and loss of condition.

Post mortem lesions varied from a mild catarrhal inflammation of the intestines to a severe haemorrhagic gastro-enteritis with ulceration of all or parts of the alimentary tract. Cultures from intestines proved negative for bacteria on both aerobic and anaerobic cultivation. However it was possible to reproduce the disease in susceptible animals by parenteral inoculation of citrated blood, lymph node suspensions and lymph node plus brain suspensions. Serial passages of the virus through goats and sheep were possible but pigs and small laboratory animals were refractile. It was also observed from the number of strains isolated from field outbreaks that there was a close relationship between the various strains on cross immunity tests.

While diagnosing mucosal disease in an outbreak it is essential that the condition should be differentiated from the following as there are many features in common between these diseases. The conditions commonly mistaken as Mucosal disease are Malignant catarrh, common poisons, coccidiosis, Rinderpest (there is no cross immunity between these two conditions) tick borne fever and winter scours.

Finally the author had compared the mucosal disease with the virus diarrhoea of New York.

P. K. R. IYER.

Some Observations on the Use of Chlorpromazine Hydrochloride in Ruminants.—By T. M. D. MARTIN, B. SIMPSON, and J. H. REID, *Vet. Rec.* 70, No. 1, January 4, 1958.

The authors have discussed the use of Chlorpromazine Hydrochloride as a sedative in ruminants before surgical interferences. They have used this drug to correct the dislocation of the shoulder in cattle at the rate of 500 mg. per 1,000 lb. body weight. 20 minutes after injection there was complete relaxation of the limb and the animals remained under sedation for about 2 hours. The drug has been used successfully in three cases of choke in cattle and the dosage used was

500 mg. per animal. Within 15 minutes of intramuscular injection it was found quite easy to dislodge the obstruction. In addition to the sedative effect, it appeared that the drug also produced a relaxation of the oesophagus.

Intramuscular injection of 250 mg. of Chlorpromazine hydrochloride has been carried out prior to performing caesarian section in ewes by the authors and they observed that marked sedation was obtained in 10 to 15 minutes and there was no evidence of discomfort on the part of the ewe on drawing the uterus through the flank incision. The authors further observed that the drug had no adverse effect in the calves and lambs delivered from the above cases.

P. K. R. IYER.

The use of Proteolytic Enzymes in Mastitis in Dairy Cattle.—W. J. JORDON, *The Veterinary Record*, Vol. 69, No. 52, P. 1452.

The author records results of his trials with some proteolytic enzymes used in conjunction with appropriate antibiotics in several types of mastitis where the latter alone failed to produce clinical improvement, which the author attributes to non-penetration of the therapeutic agent rather than the insensivity of the causal organism.

Streptokinase—Streptodornase (Dose 20000 units SK, 5000 units SD) and Papain (10 grs) failed to yield satisfactory results.

Freshly prepared solution of crystalline Trypsin in sterile isotonic saline in a dose varying from 25–50 mg, one to three times a day used in 63 cases of different types of mastitis (in which only 3 did not receive the enzyme by intramammary infusion) produced satisfactory results in 43 cases. Consistent results were obtained where 25 mg. of the enzyme was used twice daily after stripping the quarter. Softening of the quarter began at the base of the teat and spread into gland while it was at the top with intramuscular injection. Intravenous route had no effect.

Stabilized Crystalline Trypsin in 50 mg. dose once daily followed by stripping 12 hours later prior to application of antibiotic gave desirable improvement in 4 out of 7 cases of chronic mastitis. Stability of this product helps to curtail the number of visits.

Failure of Trypsin may be due to inexperienced handling of the enzyme or advanced state of lesions where it cannot act.

M. S. J.

News and Views

We told you so:—Here is what Mr. John Foster Dulles, Secretary of State, U.S.A., told the House of Representatives Foreign Affairs Committee on 26th February 1958: "A few years ago communist imperialism had sought to expand by a policy of threats, bluster or armed action. But these methods had ceased to pay dividends. Now the Soviet leaders follow a new technique. They now profess the greatest friendship towards those who seek economic development". We are not concerned which imperialism it is, but that is exactly what we said in our editorial in February 1958 on "Beware of aid-programmes". We called it 'a new non-violent weapon'. Mr. Dulles calls it 'a new technique'. Well, what is there in a name!

* * * * *

Now read this:—The Technical Co-operation Mission of the United States had agreed to meet all the expenditure for the equipment to be imported from abroad for the Agricultural University at Rudrapur in Uttar Pradesh, the Deputy Minister of Food and Agriculture, Mr. M. V. Krishnappa, told Mr. C. D. Pande in the Lok Sabha to-day.

Replying to Mr. Bhakt Darshan, Mr. Krishnappa said that the Government of India had also agreed to provide financial assistance to the Uttar Pradesh Government for the establishment of this University.

Mr. Krishnappa said that the Centre would provide 75 per cent of the approved capital and non-recurring expenditure as grant and the remaining 25 per cent as loan if asked for by the State Government subject to a ceiling to be prescribed by the Central Government. Four Colleges are proposed to be started in the University—one for Agriculture, one for Animal Husbandry, one for Home Science and one for Agricultural Engineering and Technology. Students from all parts of the country would be admitted in the Colleges.

The Deputy Minister added that the Uttar Pradesh Government had started preliminary work such as legislation and preparation of blue-prints for buildings for the starting of the University. The U.P. Government had also deputed two of their officers to the United States for making a detailed survey of the educational pattern and organisation of the land grant colleges in that country. (*Italics ours.*)

The Hindu, March 15, 1958.

Let us hope the experiment will prove a success! The other colleges in India will serve as 'controls'! O tempora! O mores!

His Holiness Sankaracharya of Kamakoti Peetam—the head of a religious order in India, has been saturating the atmosphere of Madras with a series of highly enlightened lectures for well over four months now. It is a treat to hear him speak. Any country could be proud of such religious heads. Recently he brought out well the evil effects of change-over from one *pattern of Agricultural economy to another*. Here is what he said "When agriculturists had to pay *kist* (land-tax) in kind, it was only one sixth of the actual harvest leaving behind plenty in each village. There was contentment. All Kings had capacious granaries attached to their forts, wherein grain collected as *kist* was stored. These in turn were thrown open in days of famine. With the advent of the British rule, the foreigner could not transport grains to his country and so came the system of payment of *kist* in terms of cash. This new innovation of cash payment has worked havoc in our agricultural economy". When prices fell, a cultivator in spite of a good harvest was obliged to borrow to meet *kist* dues even after selling out the entire crop. *This change over from kind to cash has been responsible for many of our ills*" How true! And what a lesson to those who wish to tinker with the existing economy of our land!

Maulana Abdul Kalam Azad has passed away. He was a Minister of 'sound counsel' at all times of crisis, the like of whom, it is difficult to find. A person of what may be termed as 'cosmopolitan culture', he was a tower of strength at the centre. The country is prostrate with grief at the passing away of this great man. May his soul rest in peace!

Nothing to crow about.—A cock in the Community Development Block farm at Songadh (Surat Dt.) crows no more at dawn—it has changed its sex.

Mr. A. G. Sheikh, Poultry Inspector of the Farm, told pressmen that the cock had been laying eggs during the last fortnight.

The cock, a Rhode Island variety, was brought to the Farm about seven months ago. It showed signs of changing its sex two months ago, its feathers changed, and its crest began softening.

The bird was then fed "Exostrol" a food containing female hormones and 15 days ago, it laid its first egg. The bird has now forgotten its habit of crowing early in the morning.

The Indian Express, 21-2-58.

Cattle Show Souvenirs.—Salem in Madras State has shown the way how best to educate the rural folk at the time of Cattle Shows. The Cattle Show Committee took pains to produce a Souvenir on the occasion. It is indeed a happy idea. Souvenirs till now were the

prerogatives of cities and urban areas. Salem has tried to extend this idea to the rural folks who gather at Cattle Shows in the districts. Such souvenirs should be profusely illustrated, giving an idea of the livestock wealth of the entire district in which the show is held, as well as the several aspects of the livestock industry in and around the district. It should be in colloquial language and more in the nature of talks to rural folk. Suitable subjects both on husbandry side and disease side should be included. Such illustrated booklets would prove more interesting to the ryots than the usual dry-as-dust pamphlets. We congratulate the Salem Cattle Show Committee on its venture!

Fools to confer.—Jaipur, Mar. 1: Well-known "fools" of the country have been invited to attend the third "All Fools' Conference" to be held at Asalpura from March 6.

The Conference will, it is stated, take steps to form a permanent "All Fools Body" in India to look after the interests of its members.

For this purpose, a committee has been formed with the local Sarpanch as its Chairman.

In an appeal, the committee has exhorted the "fools of the country" to make the conference a success.

The Madras Mail dated 1-3-'58.

In the self-opinionated World of to-day, we wonder if there is need for a *separate* Conference of this nature! However it would be interesting to watch their proceedings and note who is going to be the President and the General Secretary of this highly promising Association. Whoever they are, their task is bound to be very exacting. We are afraid they will have to decentralise the Association on a regional basis or even on language basis, as otherwise it might prove too big a single unit to easily manage. What disturbs us most is the fact that India has come forward to give the necessary lead in the matter! We have heard it said that she easily takes a rank in the world with regard to her mental hospitals, maternity hospitals etc. Here is a new field now for her to crow about! We wish her the best of luck in her attempts! We expect this Conference to be a normal feature on the 1st of April every Year! It is fitting also that this news appears in our April Issue!

Indiscriminate use of Penicillin.—Bad reactions from penicillin ranged from "mild skin rashes" to "acute shock and death," the current issue of the Journal of the American Medical Association said in a warning against the drug's overdose. "Indiscriminate use of penicillin is no longer just a waste of good drug—it is also a threat to patients who might be allergic to it," the journal said.

Advising doctors not to prescribe penicillin unless there was clear indication it was needed, the journal said a three-year sampling in hospitals showed that 2,517 people suffered such bad reaction to the drug they had to be given antidotes.

'The Hindu' Feb. 24th.

* * * *

Army Horse Show Concludes.—The sixth army horse show which concluded this afternoon was attended by a gathering which included the President, Dr. Rajendra Prasad, the Prime Minister, Mr. Jawaharlal Nehru, Gen. Sir Francis Festing, C-in-C of Britain's Far East Land Forces and Gen. K. S. Thimayya, Chief of the Army Staff.

"Shantikala owned by Ch. Jaggu Singh won a double honour in the show, winning both the Rashtrapati Challenge Cup for the best breeding mares as well as His Holiness Sri Satguru Maharaj Pratap Singhji Challenge Cup for country-bred brood mares.

Remount Depot, Saharanpur, received three trophies, namely coaching marathon (first prize), four in hand (first prize) and double harness.

The 26-year-old Austrian bay-gelding "Prithviraj", a veteran of many a horse show, created yet another record in its momentous life yesterday. Ridden by Maj. H. N. Naniraj Urs, he came first in the open jumping competition.

The President gave away the prizes. *'The Hindu' Feb. 18th.*

* * * *

A new body in British racing formed for the improvement of breeding and racing, held a meeting in London recently. This body is the Racing and Breeding Liaison Committee and is composed of members from the Racecourse Association, the Racehorse Owners' Association and the Thoroughbred Breeders' Association. The Committee launched a memorandum giving its views on the problems of the racing industry. Its object, the memorandum says, is to maintain and improve the standards of the British turf in all its aspects.

'The Hindu'—Feb. 18th.

* * * *

Dogs to be members of a Himalayan Expedition.—Formal permission from the Government of Nepal to carry three Californian Beagle hounds along with the expedition in search of the Yeti had been obtained, said Mr. Gerald Russel, who is leading the second American expedition to solve the mystery of the Snowman.

Block Development Corner

[Articles under this section, should be more in the nature of simple 'talks' to rural folks and village level workers, on Animal Husbandry matters, and not loaded with scientific terms and theories.]

FLUKE DISEASES AND THEIR CONTROL

BY

M. ANANTARAMAN,

Madras Veterinary College, Madras.

Our livestock, chiefly cattle, sheep and goats, are liable to ills caused by parasites, both internal and external. Among the former may be included the worms consisting of the flukes, tapeworms and roundworms. The most important of the flukes are the Liver-flukes, the Stomach-flukes, and the Blood-flukes.

The Liver-fluke is flat and leaf-like in shape, and large in size, i.e. over an inch long. It lives in the bile-ducts of the animals. The bile-ducts become hardened like clay-pipes, and therefore lose their function. In course of time, the liver itself is damaged and becomes fibrosed. Consequently, the assimilation of food is interfered with. Diseased animals may, in the early stages of the infection, show an improvement in general condition, but it passes off quickly. Symptoms of digestive disorder follow soon after, namely, diarrhoea and constipation, anaemia and emaciation, culminating in death. Cattle are, however, less susceptible to the effects of the parasite than sheep and goats. While in a sheep, 50 liver-flukes (*Fasciola*) may be enough to cause marked changes, as many as 250 may be necessary in cattle for similar symptoms to appear. Livestock owners sustain heavy losses due to this parasite.

Stomach-flukes, otherwise known as Conical flukes (*Amphistomes*) are found in the first stomach (rumen) of cattle, sheep and goats. Even normally, we find large numbers of them in these animals, attached to the stomach-wall. They are about half an inch long, thick and fleshy, and reddish in colour. The adult worms living in the stomach deprive the animals of their food to some extent, but are not harmful otherwise. On the other hand, the young ones are highly dangerous. The young ones are attached to the inner wall of the fore part of the small intestine (the duodenum), and cause grave digestive disturbances, as well as injure the intestinal wall. In the northern States of India, the disease is known as 'Pitto' or 'Gillar'. Severe diarrhoea, anaemia, and emaciation lead to death. In a locality, several hundred animals may show

wasting away and die suddenly. Those which survive the attacks of the young flukes continue to carry the adult worms without showing untoward symptoms.

Blood-flukes (schistosomes) live in the veins and capillaries of the nose or mesenteries of cattle, sheep and goats. They are small and slender, barely visible to the naked eye. The male and female worms are permanently joined together. Those flukes (*S. nasale*) which occur in the nasal veins cause small growths on the inner surface of the nasal cavity, all of them together giving the appearance of a cauliflower. These growths are small and separate to begin with, but later enlarge and fuse together into a large mass. This growth obstructs normal breathing and leads to a characteristic type of snoring. The disease is frequently recognized by the symptom, and by the name 'Korattai' in Tamil. The snoring becomes severe with work, and animals get fatigued sooner. Our ryots suffer a great loss thereby. The blood-flukes found in the mesenteric veins (*S. spindale*) are comparatively less harmful, only occasionally causing colic, diarrhoea or dysentery.

It is now necessary to know how these worms succeed in reaching the animal's body. They lay eggs in the organs in which they are situated, and they come out with the faeces or the nasal discharge. Eggs dropped near the water-edge hatch, and the larvae swim about in search of a freshwater snail and enter its body. After a few weeks, they come out as different larvae and settle themselves on grass and other vegetation, each with a protective covering around. Such larvae of the blood-flukes do not however rest on grass, but directly penetrate the skin of the large animal when it comes in contact with it. Those of the liver-fluke and the stomach-fluke resting on grass bide their time patiently till they are swallowed by the grazing animals. In either case, they reach their normal place within the animal's body and grow into adult worms. This is the way in which a fluke happens to infect such a large animal as the cow, sheep or goat.

You will, by now, have understood that the freshwater snail acts as an agent for the flukes in their attempt to attack new animals. This is very much like the mosquito in the transmission of malaria. These snails are commonly found in ponds, channels and ditches, and could be recognized by their spiral or coiled shells. In order to check fluke infections, we should turn our attention to the destruction of snails in these places, so that animals going there will not be attacked by the larvae of flukes.

While diseased animals could be treated with suitable drugs, is it not much more profitable to prevent these animals from getting infected? Ryots could help their community and their livestock by

taking simple and easy precautions in this regard. Snails could be removed by hand, for which youngsters in the village should be employed; snail-eating fishes, and ducks which also feed on the snails, could be allowed in ponds with snails. In certain areas, plants like the Shiyakkai, Soap-berry (*Sapindus*) namely Ponnankottai, Divi-divi or Inki-kai, and *Balanites* or Nanjundank, could be grown in the vicinity of ponds, because their fruits are poisonous to the snails. But the most popular method is to spread Copper Sulphate or Blue-stone on the surface of these ponds and channels. Or, Ammonium Sulphate or Quick-lime may also be used. Any of these, if properly applied will kill the snails.

Other methods include filling up of small pools and pits with sand, and filtering of water in irrigation channels by means of reed mats, palm leaves, etc., to strain snails and their eggs.

It is however important that ryots should be keen to keep the animals clean, remove their dung and droppings promptly, and where possible, provide drinking troughs in which clean water could be stored. The preparation of silage is also highly desirable because the resting larvae of flukes settled on grass would be killed in it.

The treatment of diseased animals has to be undertaken as soon as the disease is diagnosed. Drugs that are useful in fluke infestations are Carbon tetrachloride and Hexachloroethane against liver-flukes and stomach-flukes, and Tartar emetic against Blood-flukes. But these drugs are poisonous and have to be administered carefully. Only the Veterinary Surgeon of your place could do it. So, seek the help of this doctor as quickly as possible and obtain his advice and services, when your animals become ill in any manner.

Farm News Releases

Better Milking Some Tips.—Milking to be efficient should be carried out quickly, quietly, completely and carefully, dairy experts point out.

Before milking, it is better that the animal is helped to let down her milk. Normally, this is done by gently massaging the udder or by suckling the calf. But, if grain is fed to the animal immediately before milking, she comes to associate this act with milking, and immediately lets down her milk.

Once stimulated, the animal should be quickly milked. Slow milking or prolonged stripping make the animal develop the habit of slow let down.

Milking should be complete. If incomplete milking is practised the animal will get dry sooner. The last portions of the milk drawn contain a higher percentage of fat. If the animal is not completely milked, the milk drawn will naturally have less of fat.

The animal should be milked gently, without causing any injury to the teat or udder. Milking with the closed thumb is a bad practice, and should be discouraged. I.C.A.R. 6/58.

Compost from Paddy Husk as good as Cattle Manure.—Experiments show that paddy husk, which is a waste product, can be put to a good use.

Compost prepared from the husk was found to be as good as farmyard manure, if not better.

To prepare compost from paddy husk, it is spread a foot thick in the cattle shed and covered with a soft material like straw or litter, so that it may not prick the cattle. Cattle are allowed to rest on this husk bed. After every ten days to a fortnight, the bed is turned. The process is repeated for about two months, when the husk gets soaked with cattle urine and becomes softer.

The mass is then removed and put into a pit and composted in the usual manner. I.C.A.R. 8/58.

Feeding Poultry Common Errors.—Lack of a proper feeding routine for poultry birds results in a fall in egg production in laying birds and slower growth in young chicks, poultry-keepers are warned.

Birds should be fed according to the feeding scales and the time-table recommended for the area concerned.

Egg-yield will go down seriously and the growth of young birds will slow down if there is not enough animal protein, such as fishmeal or meat offal in the daily mash. There should be animal protein as well as available protein in the diet given to the birds.

If whole grains are not included in the daily ration, the digestive power of the birds is badly affected.

If green food, such as lucerne or lawn clippings, is not included in their diet, poor growth and low resistance to diseases will result.

Common salt is necessary for birds. Lack of it in the diet will lead to poor digestion and ultimately poor development.

If shell grit is not made available in hoppers or boxes, either the laying will stop or the eggs produced will be soft-shelled. Shell grit is no substitute for stone grit. The latter is also required by young as well as grown up birds to help them digest the food.

Lack of sufficient clean water interferes with the digestion and egg laying of birds. The water should be kept in the shade.

It is not good to encourage feeding outside the fowl-house especially when the runs are not well-protected from crows and sparrows. Feeding birds by scattering grain on the ground is a poor way of feeding them as they tend to pick up infection from the ground. I.C.A.R. 10/58.

Eye troubles in sheep, protection from injury or irritation.—Sheep should be protected from eye affections. Their eyes get affected due to direct or mechanical injuries, or due to irritation caused by certain irritants. If neglected, the sheep may go completely blind, after which they cannot be maintained economically.

The first symptom of any eye affection is the flowing of tears from the affected eye. When such a condition is noticed, the owner should detect and remove the cause of the trouble. If some foreign body, such as a thorn, is seen in the eye, it should be gently removed and the eye washed with boric lotion. A few drops of shark-liver oil put into the affected eye thereafter will be sufficient to cure the eye completely. If necessary, the eye should also be fomented with warm boric lotion.

The building in which sheep are housed should be well-ventilated, and all the doors and windows should be kept open throughout the day. The droppings should be removed every day. The shepherd should handle his sheep gently and be careful while using a stick to drive them.

If these precautions are observed, eye troubles among sheep can be kept down to the minimum. I.C.A.R. 11/58.

Association News

THE BOMBAY VETERINARY MEDICAL ASSOCIATION THE 33rd CONFERENCE

The Thirty-third annual Conference of the above Association was held in the main hall of Mor Bhawan at Nagpur on the 29th and 30th December 1957.

Sri V. N. Sharma, Deputy Director of Veterinary Services, Nagpur and Chairman of the Reception Committee received the chief guest, Hon'ble Shri Vasantrao Phulsing Naik, the Minister for Agriculture and introduced the various office-bearers and officers of the Department. In his welcome speech, Shri V. N. Sharma described the Hon'ble Minister as "an ardent and decided servant in the cause of the

general welfare of the community who would guide us on proper lines and inspire us in our duty".

The proceedings were overshadowed by the sad and sudden demise of Dr. D. S. Laud, the President of the Association virtually on the eve of the Conference. His posthumous speech was read out by Major Soman and there was a ring of sadness all round when point after point was driven home in that speech with a clarity of vision and boldness of expression rarely met with in these days. It was as though the spirit of Dr. Laud was hovering over the Conference, guarding the interests of the profession which he loved so much and served so well. Here are a few of the points touched upon by him:—

1. The 1st July 1957 is a red letter day in the annals of the Bombay Veterinary profession and all the credit for it goes to Shri Naik, our Minister for Agriculture. This day saw the transfer of the Animal Husbandry work once again back to the Veterinary Department after years of vehement agitation.

2. The Bombay Slaughter House is now definitely to be shifted to Deonar, where it would be fitted with all modern equipment and facilities for the manufacture of hormones and other gland products, etc. All these would be a waste unless suitable men are trained for a thorough and strict inspection of meat.

3. The 'sad news' of disaffiliation of the Bombay Veterinary College by the University of Bombay, is not allowed to be an accomplished fact, as the Government themselves have taken a serious view of the affair and are pursuing the matter.

4. The necessity for a policy of planned selection and specialised training of suitable Veterinary men to man the Colleges and other Scientific and Technical institutions.

5. Revival of the Stud Farms at Hingoli and Junagadh and the establishment of a Camel Breeding Farm in Kutch in addition to the usual cattle, sheep and poultry breeding farms.

6. The delay in implementation of the Veterinary Practitioners' Act is much to be regretted. He pleaded for immediate attention and necessary action in the matter.

7. A note of warning was sounded with regard to the training of emergency Veterinary personnel and expansion of Artificial Insemination work. Until an adequate number of trained personnel and proved sires are available, as well as the necessary demand from the public is created, it is better to adopt a policy of 'go-slow and steady' in the matter of Artificial Insemination.

8. The un-conditional and total prohibition of cow-slaughter is not a virtue and should not be encouraged.

The Hon'ble Shri Vasant Rao Phulsing Naik, the Minister for Agriculture next delivered his inaugural address which was full of understanding, highly sympathetic and of good cheer. It was an illuminating address in the course of which he said:—"I am sure you all feel happy and satisfied over the decision taken by the State Government to amalgamate the Veterinary and Animal Husbandry activities of the State and to place them under a unified control and re-designate the head of the Department as the Director of Animal Husbandry. Your aim should now be to devise ways and means to make cattle more productive and more efficient in their performance. You must try and develop village industries like Poultry raising sheep rearing etc."

"The Government have increased the number of admissions into the Bombay Veterinary College from 60 to 75 and have also made arrangements for provision of seats for 40 students and 12 students respectively at Jabalpur and Hyderabad Veterinary Colleges. The number of stipends have also been increased from 40 to 60 and there is a proposal to raise this to 100 from next year. The Government have also taken a decision to set up a new Veterinary College, probably at Nagpur".

"I am glad to inform you that after careful consideration the Government have taken a decision to continue the affiliation of the Bombay Veterinary College to the University of Bombay for a further period of three years from June 1957. For raising the standard of teaching, lectures are being sent abroad for advanced training and foreign experts are being brought to man the staff of the College and to tone up the institution".

"To meet the increased demand for Vaccines and Sera, a Serum Institute has been established and it will be shifted from Bombay to Poona as soon as the buildings are ready".

"I may tell you that the upward revision of the pay scales is under the consideration of the Government and I hope, something tangible will emerge soon."

"The Bombay Veterinary Council and the Bombay Veterinary Medical Association have quite different functions to perform. The first one is a statutory body to look after the duties and functions entrusted to it under the Bombay Veterinary Practitioners' Act of 1953. But the Bombay Veterinary Medical Association is purely a private Association of Veterinarians always thinking of and making efforts for the welfare of the profession as a whole. I would therefore advise all those who are not members of the Association to enrol themselves soon, so

as to increase its strength numerically and financially and enable it to serve the cause of the Veterinary profession more vigorously".

Finally the Hon'ble Minister finished by saying "I feel that a person who looks after the livestock of a nation plays a major role in its economy". The address was heard in pin-drop silence and was much appreciated.

The Secretary read the Annual Report and it was duly adopted. Messages received were read.

The Conference met again on 30-12-57 when as many as 18 professional papers were presented for discussion. Next the following resolutions were passed:

1. This Conference places on record its profound sorrow at the sad demise of (1) Dr. D. S. Laud, (2) Dr. R. M. Kalapesi, (3) Dr. D. B. Khole, (4) Dr. J. B. Desai and (5) Dr. V. S. Rao, and conveys its heartfelt condolences to the members of the bereaved families.

2. This Conference empowers the Managing Committee to award prizes and medals to the students of the Bombay Veterinary College from the interest accruing from the funds of Rs. 14,00,000 collected by the Diamond Jubilee Commemoration Committee. A sub-committee consisting of the following was appointed for the purpose:—1. Dr. V. S. Sakhadeo (Convenor) 2. Dr. Balakrishna 3. Dr. V. G. Khare. They should submit their report to the Managing Committee.

Moved by Shri K. V. Divekar. Seconded by Shri M. Y. Bhatwadekar.

3. The Conference resolves that the annual conference should be held at different district head-quarters as far as possible by rotation.

Moved by Shri Deodhar. Seconded by Shri Paundrik.

4. The Conference resolves that the Government of Bombay be requested to raise the pay scales of Class 11 Officers of the Animal Husbandry Department. The pay scales should be Rs. 250 to 650 with an annual increment of Rs 25.00 p.m. Moreover the pay of the people from subordinate cadres should be fixed suitably in the scale with the minimum of Rs. 300.00 only.

Moved by Shri Chatti. Seconded by Shri Gupte.

5. The Conference resolves that with the change in designation of the Department and in view of the new responsibilities entrusted to the staff, the Government be requested to depute more number of young officers for training in Animal Husbandry and allied subjects at different institutions in India and abroad.

6. The Conference resolves that the present Editor (Shri M. Y. Bhatwadekar) of B. V. M. A. Bulletin be requested to continue as an Editor for the year 1958. He is free to co-opt any members as his assistants.

Moved by Dr. K. V. Divekar. Seconded by Dr. V. G. Khare.
Next the following Office-bearers were duly elected for 1958:—

President	...	Dr. V. N. Sarma.
Secretaries	...	Dr. K. V. Divekar, Dr. H. S. Joshirao.
Hon. Treasurer	...	Shri M. B. Gupte.
Members	...	Dr. D. T. Parnaik, Dr. D. R. Nawathe, Dr. N. D. Bhawe, Dr. N. B. Deodhar and Dr. Paundrik.

After the usual vote of thanks, the Conference came to a close with the singing of the National Anthem.

THE MYSORE VETERINARY MEDICAL ASSOCIATION

Proceedings of a meeting of the Executive Committee held on 5-2-1958.

Resolutions passed

1. Resolved that the Silver Jubilee of the Mysore Serum Institute be celebrated in conjunction with the All-India Veterinary Conference either in the 2nd or 3rd week of May 1958.

2. Resolved that His Excellency the Governor of Mysore be approached to inaugurate the Silver Jubilee celebrations of the Mysore Serum Institute on any convenient day during 2nd or 3rd week of May 1958.

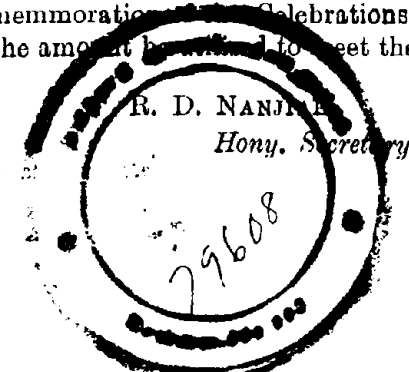
3. Resolved that the Chief Minister of Mysore State be approached to inaugurate the All-India Veterinary Conference to be held in the Second or Third week of May 1958.

4. Resolved that the All-India Veterinary Conference be given two days for its sessions.

5. Resolved that the General Secretary, All-India Veterinary Association be requested to make necessary arrangements for the election of the President to preside over the All-India Veterinary Conference and also to arrange for the reading of professional papers.

6. Resolved that the Editor, *The Indian Veterinary Journal* be requested to give wide publicity to these resolutions.

7. Resolved that Rs. 50,000/- be earmarked for the construction of the Silver Jubilee Buildings in commemoration of the Silver Jubilee, in the City area and the balance of the amount be utilized to meet the expenditure of the celebrations.



The All-India Veterinary Association

THE I. V. J. RESERVE FUND

LIST OF SUBSCRIBERS

	Rs.	nP.
1. Dr. M. S. Sastry, President, A.I.V.A. ...	100	00
2. Rao Sahib T. Vinayaka Mudaliar ...	100	00
3. Dr. Pangal Srinivasa Rao ...	116	00
4. Dr. C. Krishna Rao, Hyderabad, A.P. ...	50	00
Total ...	366	00

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

LATEST BOOKS RECEIVED ON VETERINARY SCIENCE AND ANIMAL HUSBANDRY

	Rs.	nP.
LANDERS: Veterinary Toxicology ...	26	25
KAURA: Indian Breeds of Livestock ...	7	00
WINTERS: Animal Breeding ...	30	00
BLACK'S: Veterinary Dictionary 4th Edition Revised ...	26	25
MONNING: Veterinary Helminthology ...	30	00
ROBERTS: Veterinary Obstetrics & Genital Diseases ...	85	00
RICE & ANDREWS: Breeding & Improvement of Farm Animals ...	42	50
Handbook of Tropical Diseases in South Africa ...	125	00
Poultry Handbook (5 books in one) ...	24	30

Please send your orders without delay as the financial year is progressing fast



Ask for Complete List from Veterinary Book Department

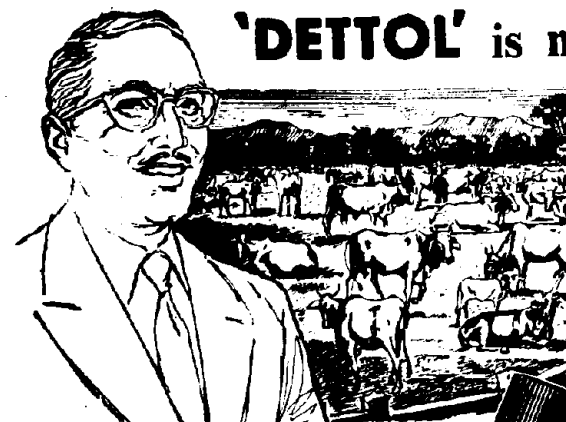
BRITISH BOOK DEPOT

HAZRATGANJ, LUCKNOW (U.P.)

When writing to advertisers, please mention *The Indian Veterinary Journal*.

ADVERTISEMENTS

'DETTOL' is my best assistant



Thousands of tons of milk and thousands of head of cattle are lost in India through infection—Mastitis, contagious abortion—and primitive post partum protection. To combat this, veterinarians are holding 'classes' to teach farmers the methods of prevention.

In all phases of prevention 'Dettol' Antiseptic is extensively used in India. No wonder the veterinarian says, "My best assistant is Dettol".

'DETTOL'

The antiseptic
doctors use



Asiatic (East) Limited
(Incorporated in England)

AEL 997

'Dettol' helps the veterinarian to fight sepsis. As an antiseptic 'Dettol' leads the field. Safe, non-poisonous, pleasant to use and long-lasting in effect, it prevents all kinds of external infection. Whether he is treating a cow for a small wound or during parturition the veterinarian knows that 'Dettol' is the best protection against germs.

DVI-1

Books on Poultry Science

	Rs.	nP.
BRADLEY: Structure of the Fowl 1950, 23 plates &c. ...	11	25
DE SAULLES: Pictorial Poultry Keeping 1955, 212p. 500 illustrations &c. ...	12	00
BRITISH Poultry Standards, 1952, 360p. 87 pages plates ...	18	75
FERMOR: Good Poultry Keeping 1955 illd. ...	4	80
OLSEN: Incubation & Brooding of Chickens 1953 illd. ...	1	87
HALL: Diseases and Parasites of Poultry 1953 illd. ...	2	87
BIRD: Nutritive Requirements & Feed Formulas for Chickens ...	2	50

Available from

SVASTIK SALES COMPANY,

VETERINARY BOOKSELLERS,
PAREL - BOMBAY - 12.

MASTISIN: Economical and specific cure for all forms of Mastitis, Pasteurellosis, Trypanosomiasis, Nasal Schistosomiasis, etc.

Mastisin is our best assistant where the antibiotics and sulphas have failed, is the opinion of Veterinarians.

Available in 2-lbs packing with ointment Price Rs. 6.25 for one full course.

CANCERINA: The only cure for cancerous horn. Without internal treatment cure is not possible, is the outcome of survey.

PRANAVA: External treatment for cancerous horn. Highly appreciated as dressing in many diseases. Still economical.

Full course for one animal is 6-lbs of Cancerina and 3 lbs of Pranava. Lessens trouble. Price Rs. 15.50.

Mastisin up to two courses is not possible to be booked by rail. Postal orders must accompany 50% advance to cover postage. Give the nearest railway station to get them cheaper.

Literature on demand.

DEEBEE BROTHERS

1706, KHADIA JALOWALI NAKA, AHMEDABAD

When writing to advertisers, please mention *The Indian Veterinary Journal*.

ADVERTISEMENTS

LOCULA

10%, 20%, 30%, Solutions
and
10% Ophthalmic Ointment

for

CONJUNCTIVITIS AND OTHER
FORMS OF INFLAMMATORY
DISEASES OF THE EYE.



EAST INDIA PHARMACEUTICAL WORKS LTD.

CALCUTTA - 26.

VETERINARY BOOKS

	Rs.	dp.
HAGAN: Infectious Diseases of Domestic Animals 1957 fully illd. Sh. 84/-	52	50
DUKE: Physiology of Domestic Animals 1955. Sh. 80/-	50	00
UDALL: Practice of Veterinary Medicine 1954. Sh. 72/-	44	89
BVA: Handling of Animals & 1st Aid 1951 illd.	4	50
WIRTH: Veterinary Clinical Diagnosis 1956. Sh. 25/-	15	82
WRIGHT: Veterinary Anaesthesia 1957	20	00

Order your requirements from

SARCOR BOOK COMPANY

PALLIARAKAV ROAD, MATTANCHERI, COCHIN 2. (KERALA STATE).

TO OUR SUBSCRIBERS

1. Please note that the *I.V.J.* will in future be released punctually on the 5th and 6th of every month so as to enable you to watch the date and receive it safely, as otherwise losses are reported often which we are not able to account for.
2. Please report non-receipt of a particular issue *before that month closes*.
3. Please do not fail to intimate immediately any change in your address. Do not expect your Journal to be re-directed from your old address. It is rarely done. Please write legibly or in block letters.
4. Please note subscriptions are payable in advance. The official year of the Journal is the Calendar year.
5. Please note down our correct address, as many communications are still sent to our old address.

When writing to advertisers, please mention *The Indian Veterinary Journal*.

ADVERTISEMENTS

Telegram—CRESCENT

Telephone—34-3104

RINDERPEST ERADICATION SCHEME BRAND VACCINATED ANIMALS WITH "P.E.W. BRANDING INK"

A scientific chemical combination.

Produces a lasting and distinctly visible brand, usable on Cattle and Buffaloes. Application very easy, quick and absolutely economical. No wastage. Already tried on one lakh of animals with great success.

It permeates into the layers of the skin evenly over the branded area and forms an antiseptic dry scab that peels off in a few weeks, leaving a well defined easily visible brand mark. It does not produce any open wound and thus serve as a source of infection.

ALREADY SUPPLIED TO THE DIRECTOR OF VETERINARY
SERVICES AND ANIMAL HUSBANDRY,
WEST BENGAL.

TRY ON YOUR ANIMALS ALSO.

This can be supplied in any quantity along with Branding Iron (as per specification), G.T.V. set and G.T.V. Stainless Steel needle.



For further particulars, please apply to:

PAUL'S ELECTRO WORKS

39, JORAPUKER SQUARE

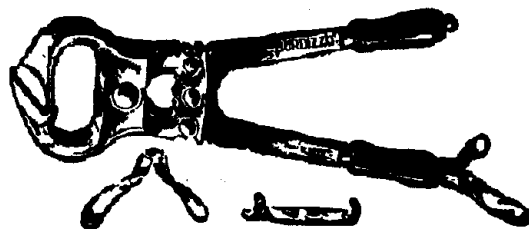
Post Box No. 11406

CALCUTTA-6

When writing to advertisers, please mention *The Indian Veterinary Journal*.

22
2

Burdizzo Castrators with Patent Cord-Stop at Jaws.



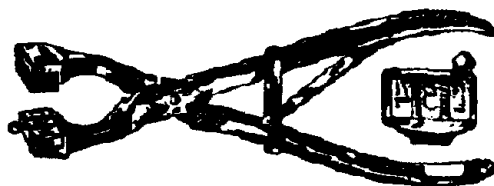
Beware of Imitation.

Do not be misled by spurious makes.

Dr. Burdizzo's Bloodless Castrator for the Castration of Bulls, Horses, Sheep, Dogs, Pigs etc., is the only Castrator guaranteed to be of perfect manufacture, built up to a standard not known to price.

Burdizzo Tattooing Forceps

Official Marker of many Cattle-Breeding, Sheep Breeding and Horse Breeding Farms and Cow Testing Associations, with Interchangeable Letters and Numbers for marking Cattle, Sheep, etc.



Nickel-plated, three space; in tin box. The usual set consists of a 3 Space-Forceps, 2 Sets of Figures, Complete Alphabets, and Tattooing ink.

*Further particulars on request from the
Representatives and Distributors:—*

DR. PANGAL'S VETERINARY INSTITUTE,

26, Wallajah Road, MADRAS 2, (S. India).

Printed by T. Kannabiran, at The Paramount Press, (Proprietors: Jaya & Co.,) High Road, Triplicane and published by Rao Sahib T. Vinayaka Mudaliar, G.M.V.C., Editor, The Indian Veterinary Journal, 28, First Street, Vidyodaya East, T'Nagar, Madras-17.