

JL
KZM2, N2d
NSI 283
79572

776
52

THE
INDIAN VETERINARY JOURNAL
PUBLISHED BI-MONTHLY

(THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION)

26, WALLAJAH ROAD, MADRAS-2 (S. INDIA)

Vol. XXVIII

NOVEMBER, 1951

No. 3

FOOT-ROT in cattle

For *B. necrophorus* infection in cattle, the intravenous administration of 'M&B 693' Soluble is recognised as a single injection specific.

(Forman, C. R. (1946) J. Amer. Vet. Med. Ass., 109, 126

Davies, D. G. E. and Wynne, M. (1947) Vet. Rec., 59, 687

Where subcutaneous injection is preferred, 'Solupyridine' may also be employed successfully.

'M&B 693' SOLUBLE
trade mark brand

sulphapyridine sodium

Special Pack for Foot-Rot in Cattle
Containers of 10 Gm

'SOLUPYRIDINE'
trade mark brand

neutral soluble sulphapyridine derivative

SOLUTION: Multi-dose containers of 100 c.c.
(each 10 c.c. of 'Solupyridine' contains
the equivalent of 1 Gm. sulphapyridine)



Manufactured by
MAY & BAKER LTD

distributors
MAY & BAKER (INDIA) LTD. BOMBAY • CALCUTTA • MADRAS • NEW DELHI • LUCKNOW • GAUHATI

JL
KZm2, N24
NSI. 28-3
19572

BOOTS PRODUCTS IN VETERINARY PRACTICE



HORMONES

'Antostab' brand Serum Gonadotrophin.
Hexoestrol Implantation Tablets.
Stilboestrol Oral Tablets.
Stilboestrol Dipropionate Injection.
Stilboestrol Implantation Tablets.

PENICILLIN PREPARATIONS

Penicillin Crystalline G.
Penicillin Intramammary Suspension.
Procaine Penicillin G.
Penicillin Ointment and Eye Ointment.

SULPHONAMIDES

Sulphanilamide—Tablets, Ointment and Sterilized Powder.
Sulphaguanidine—Tablets.
Sulphathiazole—Tablets, Ointment and Sterilized Powder.
Sulphacetamide Eye Ointment.

TURK-E-SAN

(Solution Tablets of Acetarsol Sodium)
for the prevention of blackhead in Turkeys.

For further details, please write to
BOOTS PURE DRUG CO. (INDIA) LTD.
P. O. Box 680, BOMBAY 1.

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

Vol. XXVIII

November, 1951

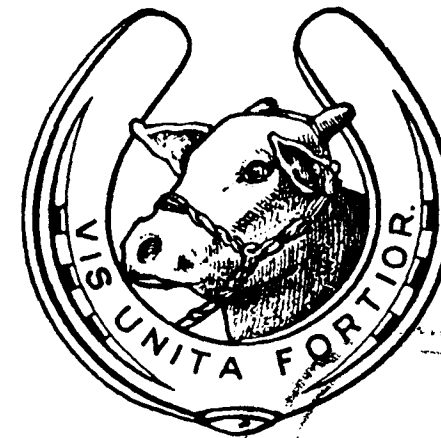
No. 3

THE INDIAN VETERINARY JOURNAL

[THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION]

PUBLISHED ON ALTERNATE MONTHS

A BI-MONTHLY
RECORD OF
VETERINARY
SCIENCE.



DEVOTED TO THE
CAUSE OF THE
VETERINARY
PROFESSION

(ESTD. 1924)

EDITOR

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

Office:—26, Wallajah Road, Madras-2 (S. India)



All communications should be addressed to the Editor.

Advertisements should be in the hands of the Editor not later than the 25th of the preceding month.

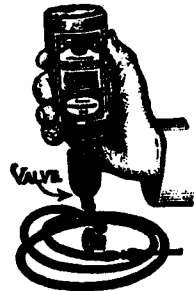
Subscription payable in advance	{	Rs 6 or 10s. per annum to members of profession. Single copy Rs. 1-8-0 or 2s. 4d.
		Rs. 10 or 18s. per annum to Governments and all public institutions. Single copy Rs. 2 or 3s. 4d.

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 receipt of the subsequent issue; otherwise, it will be charged for.

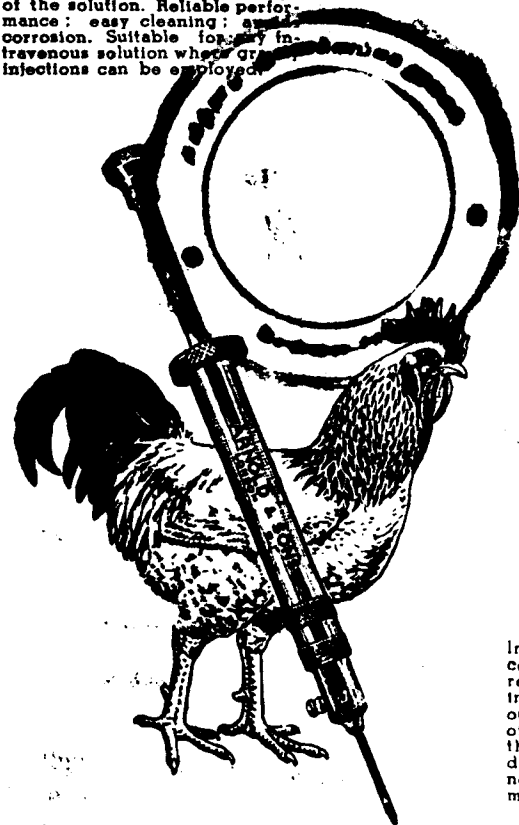
ADVERTISEMENTS

We offer the most Modern Veterinary Equipment

INTRAVENOUS OUTFIT
(Flutter Valve)



The pure India gum head fits any standard neck bottle. The patented feature of the outfit is a flutter valve moulded into the head which admits air into the bottle but prevents leakage of the solution. Reliable performance: easy cleaning: no corrosion. Suitable for any intravenous solution where air injections can be employed.



ARNOLDS INJECTOR FOR USE WITH STILBOESTROL

Better weight; More tender flesh.

In the past the one serious objection to castrating a cockerel, an operation of a highly skilled nature was required. This objection has now been met by the introduction of Stilboestrol for implantation. For a small outlay all the male birds may be treated. With the use of the injector the stilboestrol is inserted high in the neck of the cockerel. When the needle is withdrawn, the incision closes, leaving the pellet in the neck. This is absorbed slowly and the bird loses its masculine appearance in a few weeks.

Sole Agents:

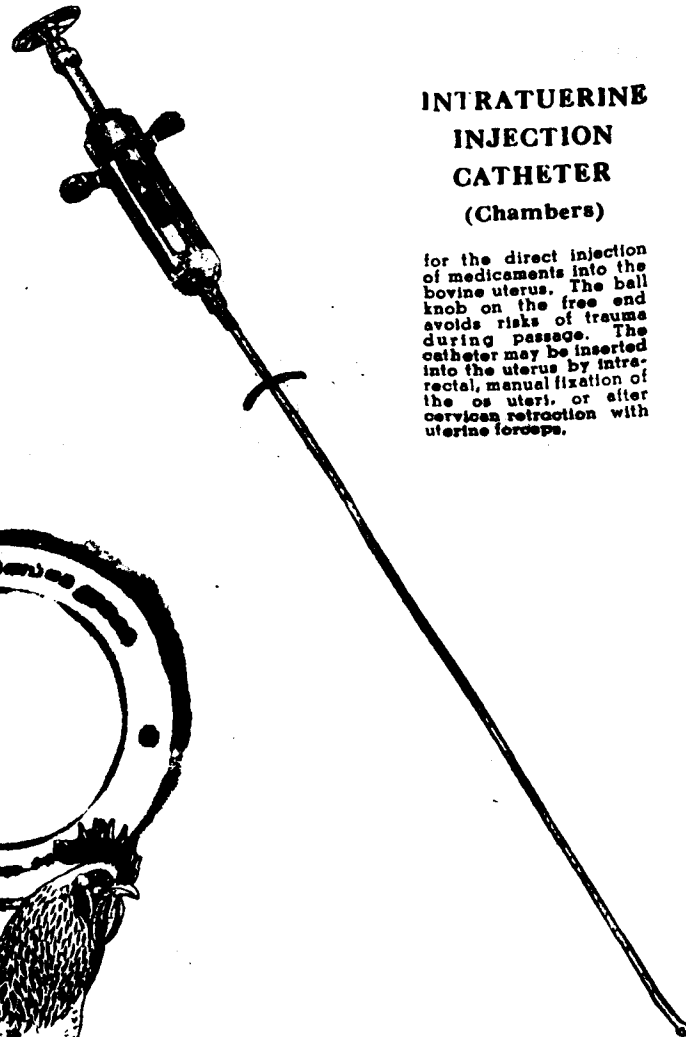
Cirugia De Lux Ltd.

24, CHOWRINGHEE ROAD, CALCUTTA - 13.

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

INTRATUERINE INJECTION CATHETER
(Chambers)

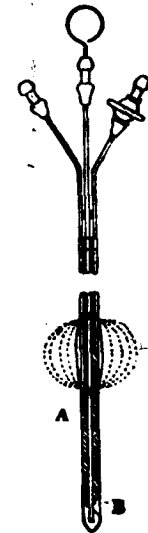
for the direct injection of medicaments into the bovine uterus. The ball knob on the free end avoids risks of trauma during passage. The catheter may be inserted into the uterus by intra-rectal, manual fixation of the os uteri, or after cervical retraction with uterine forceps.



ADVERTISEMENTS

WE OFFER THE MOST MODERN VETERINARY EQUIPMENT

An apparatus for the
EXTRACTION OF FERTILIZED EGGS
from
THE LIVING COW
(Rowson & Dowling's Pattern)
ARNOLDS



NYLON CALVING ROPES
Arnolds



These are 20 times stronger than cotton; are easily washed and sterilized; do not absorb liquid.

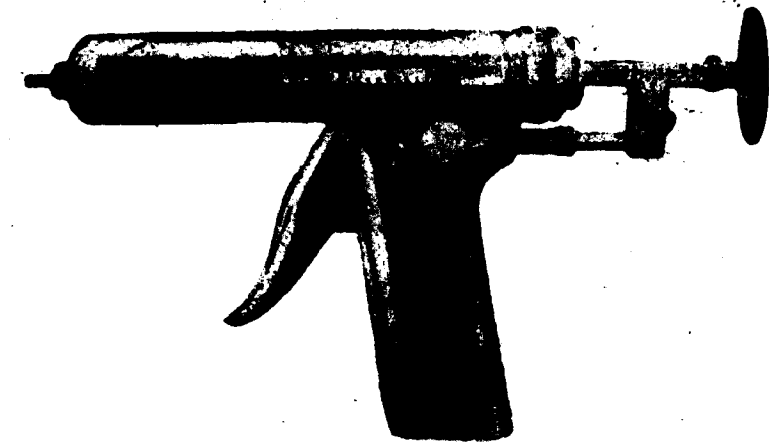
Sole Agents:

Cirugia De Lux Ltd.

24, CHOWRINGHEE ROAD, CALCUTTA - 13.

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

SWANSON VACC-OMATIC TRIGGER-TYPE INJECTION SYRINGE



Relieves you of most of the awkward handling of a syringe you have experienced with the inoculation of livestock. The pistol handle fits into the hand comfortably. It is balanced so that long usage will not overtire the operator. Trigger works easily and vaccine discharged to precise set dosage. Entire operation controlled by one hand. Holds 40cc and may be adjusted for 40 or less vaccination according to individual dosage. Spares available.

STADER VETERINARY SPLINTS
for
BONE SURGERY



Most modern & dependable Veterinary Splints



**T.C.F. VITAMIN
B-COMPLEX
FOR INJECTION**

The early administration of high doses of T.C.F. Vitamin B-Complex in distemper prevents complications particularly the nervous form, and the whole course of the disease is favourably influenced.

**T.C.F. KUBISMIDE
KURCHI BISMUTH IODIDE**

For therapy of intestinal disorders, to be given in half tablets or less according to body weight, in a bolus.

T.C.F. BISMUDERM

A dry dusting powder, for skin affections and wound treatment.

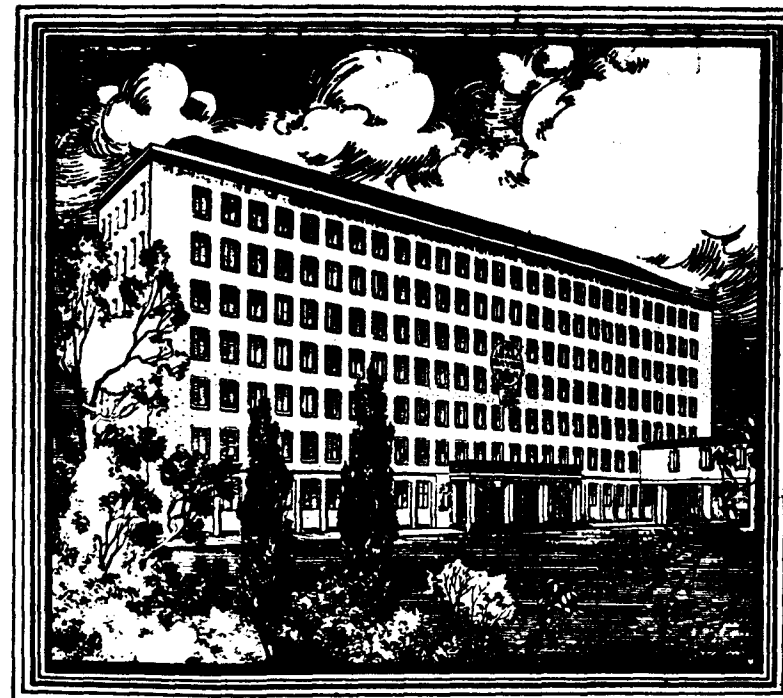
Also suitable for polo ponies.



Products of:
TEDDINGTON CHEMICAL FACTORY LTD., BOMBAY.

Sole Distributors:
W. T. SURÉN & CO., LTD., P. O. BOX 229, BOMBAY, 1.
Branches: CALCUTTA: P. O. Box 672. MADRAS: P. O. Box 1306.

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



BAYER HOUSE

LEVERKUSEN

**»Bayer«
Leverkusen · Germany**

are pioneers in veterinary research

Now Available :—

PRONTALBIN TABLETS — in streptococcal mastitis, pneumonia, wound infections etc.

Containers of 100 tablets of 1 g.

PRONTOSIL SOLUTION — in severe septic conditions and to support oral Conteben therapy.

Bottles of 125 cc. (5% solution).

YATREN SOLUTION — in bronchopneumonia, granuloma, actinomycosis etc.

Bottles of 100 cc. (3% solution).

YATREN-CASEIN "STRONG" — in chronic inflammatory processes, joint affections, sequelae of distemper, rheumatism etc.

Bottles of 100 cc. (solution of 3% Yatren & 5% Casein)

Sole Importers in India

CHOWGULE & CO., (HIND) LTD.

Pharmaceutical Department,

Lentin Chambers, Dalal Street, Post Box No. 1478, Bombay.

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

CONTENTS—(contd.)

Dettol in Bovine Mastitis.—By Ris. Dharampal, Kanpur	214
Penicillin in a case of Tetanus in a bullock.—By B. Mohan Rao, G.M.V.C.	215
Multiple births in cow.—By B. Mohan Rao, G.M.V.C.	217
Contagious otorrhoea in cattle—By Abdul Khader, G.M.V.C.	218
V. Association News.	
The All-India Veterinary Association.—Revised Rules and Regulations	220
VI. Correspondence	
Veterinary Public Health Service and human welfare—By M. V. Pillai G.B.V.C.	226

SHONAN'S

VETERINARY MEDICINES

1. SHONOTONE :—Cattle Tonic. Rich in Cal. Phos.
2. KHAND OINT No. 1. Quick reducer of Tumour.
3. KHAND OINT No. 2. For Yokegalls & other wounds.
4. HOOFOSOL :—Cure for HOOF Disease.
5. RINDERINE :—A sure remedy for RINDERPEST.
6. GLYCOSENE :—For FOOT & MOUTH disease.
7. TICKSOFF :—A wonderful Tick destroyer.
8. HORSE TONIC :—Intestinal and worm troubles.

★

For other 8 Specialities, Price List and Literature please apply to :

SHONAN PRODUCTS

MAKERS OF VETERINARY MEDICINES & SYNTHETIC FRUIT SYRUPS.

F. P. C. O. L. No. By 122.

705, Sadashive Peth, Poona No. 2 (India)

[20% Discount to all Veterinary Surgeons. Wanted District Agents.]

BOOKS.

	Rs.	As.
MODERN FARMING By Graham Brade-Birks in 3 big vols. 1290p. over 500 illns.	75	0
INDEX OF TREATMENT IN SMALL ANIMAL PRACTICE, 2nd edn. '51. 828p. 166 illns.	30	0
MINERAL NUTRITION OF PLANTS & ANIMALS. By Gilbert illd.	10	12
STOCKBREEDING & ARTIFICIAL INSEMINATION OF LIVESTOCK By Milovanov & Sokolovskaya	18	12
ARTIFICIAL INSEMINATION & ANIMAL PRODUCTION By '51. By Sampath Kumeran	15	0
HOARE'S VET. MAT. MEDICA & THERAPEUTICS	21	0
GAIGER & DAVIES VET. PATHOLOGY & BACTERIOLOGY	22	8
BLACK'S VET. DICTIONARY '50.	25	0
PRINCIPLES OF VET. SCE. By Hardley. 532p. 100 illns.	22	8
PRACTICAL FOOD INSPECTION By Martin in 2 vols. Vol. I Meat Inspection :		
Vol. II Fish, Poultry &c. each	17	8
FISH AND FISH INSPECTION. By Syme '49. 90 illns.	16	14

Postage & Packing extra. Ask for complete lists.

SVASTIK SALES COMPANY, (I. V. N.) Parel, Bombay - 12.

THE INDIAN VETERINARY RESEARCH INSTITUTE, MUKTESWAR
POST-GRADUATE REFRESHER COURSE (1951)



1. Seated on Chairs :—S. G. Singh, C. Seetharaman (O. C. Class), M. K. Sreenivasan, Dr. H. N. Rav, Shree Pant (M. P.), Mrs. S. Datta, Hon. Shree K. M. Munshi (Minister), Mrs. K. M. Munshi, Dr. S. Datta (Director), M. R. Dhanda, J. M. Lal, Dr. R. Mukerjee, B. N. Soni, D. K. Mathijani, S. Sen.
2. Standing 2nd from the left :—B. S. Gill, S. P. Ohri (Pepsu), P. R. Dhake (Bombay), J. G. Thaker (Bombay), B. N. Rai (Madras), M. Mahalingam (Hyderabad), A. S. Prakasa Rao (Madras), N. C. Buch (Inst. of Agri. Anand), J. S. Shrivastava (U.P.), S. Damodaran (Madras), K. Ponnudurai (Ceylon), M. L. Mehta (Punjab).
3. 2nd Row Standing. 2nd from Left :—K. M. N. Shrivastava (U. P.), Amarjit Singh (Punjab), G. N. Pillai (Travancore).

ADVERTISEMENTS

ENTER-QUINOL

(IODOCHLOROXYQUINOLINE)



Specific for all forms of Amoebiasis and other intestinal infections.

It is chemically 5 Chloro 7 Iodo 8 Oxyquinoline, practically odourless, tasteless, and insoluble in water.

Tubes contain 20 tablets 0.25 grm. each



EAST INDIA PHARMACEUTICAL WORKS LTD.,

Basusree Buildings,

11/1/4, Russa Road (Third Floor),

CALCUTTA - 26.

SWASTIK SURGICAL CO.

216, CARNACK ROAD, BOMBAY - 2

for

Medicines, Repairs to Surgical Instruments

And all kinds of Surgical and Veterinary Instruments

At Moderate Rates

CANCERINA

(VETERINARY)



Manufacturers

Speedy and sure cure for Cancerous horns, within five bandages. It promotes health. Supplied in 6 lbs. internal and 3 lbs. external powder packing. Cost Rs. 20/8/0.

To save unnecessary postage, please write the nearest Railway Station.

DEEBEE BROTHERS

1706, KHADIA JALOWALI NAKA, AHMEDABAD

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

The Indian Veterinary Journal

(The Journal of The All-India Veterinary Association)

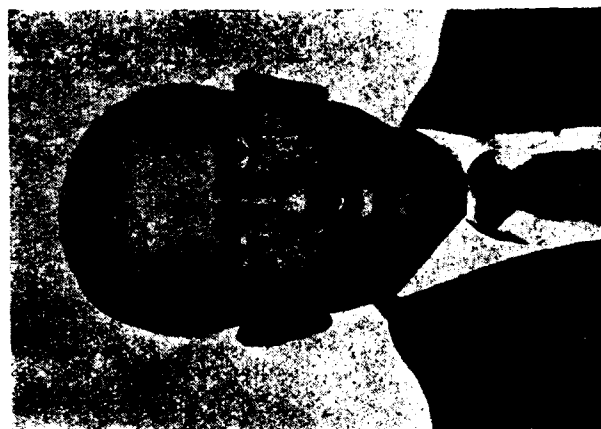
Vol. XXVIII

NOVEMBER 1951

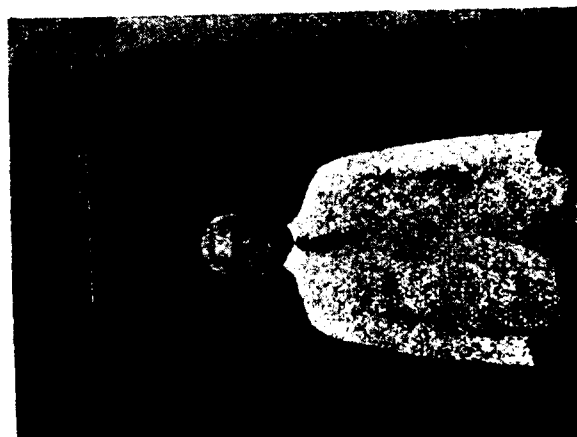
No. 3

CONTENTS

	PAGE
I. General Articles.	
Blood groups in sheep (Part II)—By K. N. Govindan Navar, K. T. K. Nambiar and V. Satchidanandam. ...	143
Detection of Arsenical poisoning in an exhumed carcase—By M. Ramakrishnan, G.M.V.C. ...	146
Some observations on management and diseases of poultry in Bihar Agricultural College farm.—By B. M. Lahiri. ...	150
Hatchability in relation to seasonal variations—By S. G. Iyer. ...	158
Recent advances in Chemotherapy related to general practice.—By D. D. Ogilvie, B.Sc. (Edin.) M.R.C.V.S. ...	160
Stephanofilariasis among buffaloes in Assam.—By V. R. Gopalakrishnan. ...	169
Glycosuria in Rabies due to fixed virus.—By H. M. Bhatia, L.V.P., B.V.Sc., and M. L. Mehta, L.V.P., B.V.Sc. ...	176
Comparative economics of Papain digest broth versus peptone broth in the large scale manufacture of Haemorrhagic Septicaemia Vaccine.—By K. Govind Rao, B.A., G.M.V.C., and N. S. Verma, L.V.P., P.G. ...	180
The morphology and development of the deer sperm.—By C. Krishna Rao, G.M.V.C., B.V.Sc., M.S. ...	183
Search for Tharparkar Breed.—By H. K. Lall, B.Sc., M.R.C.V.S. ...	185
II. Editorial.	
Increasing The Milk Production ...	191
The All-India Veterinary Association—XI All-India Veterinary Conference ...	193
The Bombay Veterinary College—Diamond Jubilee Celebrations. ...	194
The Planning Commission's Report ...	195
An Appeal—Diamond Jubilee Celebrations of the Bombay Veterinary College ...	198
III. Notes and News.	
Aarey Milk Colony ...	200
Indian Mynahs in America ...	200
Bandra Slaughter House, Bombay ...	201
Protein Value of Canned meat ...	202
Returned from abroad—Dr. B. Chandrasekhar ...	202
Retirement.—Prof. R. N. Naik ...	202
Essay contest—Indian Dairy Science Association ...	203
IV. Clinical Articles.	
Further work on the treatment of fractures by means of modified Clouston Walker human mandible splint and Steinemann's pins.—By G. B. Singh B.A., M.R.C.V.S. ...	204
Unusual sickness amongst buffalo calves.—By Lieut. Colonel J. D. Kapur, Simla ...	207
A case of pus in the maxillary sinus in a bullock.—By G. B. Singh, B.A., M.R.C.V.S. ...	209
A case of dystokia due to congenital Polycystic kidney.—By M. R. Marathe, G.B.V.C. ...	210



Dr. B. Chandrasekhar, G.B.V.C., Ph.D. (Mch.)
Animal Husbandry Department, Mysore,
Who has returned after 3 years' study in U.S.A.



Prof. R. N. Naik, G.B.V.C.,
Vice-Principal, Bombay Veterinary College,
Who retired on 5th July 1951.

(To face page 202)

THE Indian Veterinary Journal

(The Journal of The All-India Veterinary Association)

Vol. XXVIII

NOVEMBER, 1951

No. 3

General Articles

BLOOD GROUPS IN SHEEP (Part II)

BY

K. N. GOVINDAN NAYAR, K. T. K. NAMBIAR
and

V. SATCHIDANANDAM

Department of Physiology, Madras Veterinary College

Introduction

The subject of blood groups in sheep is still in the experimental stage and a preliminary study of the blood of sheep obtained from the slaughter house of the Madras City revealed many inconsistent and weak reactions, auto agglutinations and other atypical reactions, making the classification difficult (Nayar *et al* 1949). The technique employed was essentially Landsteiner's and the irregularities were suspected to be due to this technique being not suitable for sheep blood. Various modifications were tried to see if the above irregular reactions could be eliminated and the technique given below was found to be suitable.

Experimental

Samples of blood were collected in the evening from the slaughter house—about 150 c.c. in a 250 c.c. conical flask—the blood being allowed to flow into the flask as it spurted from the cut carotid arteries of the animal. At first the samples were left overnight in the refrigerator at about 4°C and the serum was separated the next morning. But, in the refrigerator, many samples showed a tendency to get haemolysed and therefore the samples were collected in duplicate, one set being left overnight in the refrigerator and the other in the incubator at 38°C. The tendency for haemolysis was found to be much less in the samples kept in the incubator. Both sets of sera were used for grouping and the reactions compared. During the later stages of work, only one set of samples of blood was collected and this was left overnight at the laboratory temperature of 20–25°C. These samples also were comparatively free from haemolysis.

The sera were separated the next morning, centrifuged twice to remove all cells, inactivated by keeping in a thermostat at 56°C for half an hour, and kept in the refrigerator until taken out for grouping—about 2 hours later.

Cell suspensions were prepared from the clot in the following manner. The clot in the flask was cut up into small pieces, mixed with about 20 c.c. of normal saline (0.9% NaCl) and the suspension filtered through cotton wool to remove all particles of clot and fibrin. 10 c.c. of this suspension were centrifuged, the supernatant fluid poured off and the cells washed repeatedly in normal saline until the supernatant fluid was clear and uncoloured. The cells were mixed up with 10 c.c. of normal saline and kept in a thermostat at 40°C for 10 minutes, then rapidly centrifuged, the supernatant fluid was poured off and the cells were washed once more with 10 c.c. of saline at 40°C and made up to 5 c.c. with normal saline.

A 1% cell suspension by volume was aimed at and for making this, the haemoglobin content of the cell suspension was estimated by Sahli's haemoglobinometer. Occasionally the result was checked by the acid haematin method employing a Lumetron photo electric colorimeter and its calibration card. (The results were in fair agreement). The concentrated suspension was suitably diluted to have a haemoglobin content of 0.37 gms %. This was taken to be a 1% cell suspension assuming that sheep blood has a corpuscular volume of 30% and haemoglobin content of 11 gms%.

In agglutination tubes 80 m.m. × 10 m.m. (I.D.), 2 drops of serum, 3 drops of normal saline solution and one drop of 1% cell suspension were mixed together and left aside for an hour at room temperature. The tubes were then centrifuged for two minutes at about 2,000 R.P.M. each tube was then shaken up only just to break up the cells packed at the bottom of the tube, and the contents of the tube were examined immediately macroscopically and microscopically.

By employing the above technique the inconsistent and weak reactions were completely eliminated. There was no difficulty in identifying a positive reaction as such and the negative reactions were very definitely negative. About 150 samples of blood were examined during the final stage of the work and every one of them fell into one or the other of the following three types:

- Blood 1.*—Cells agglutinable, but serum not agglutinative.
- Blood 2.*—Cells not agglutinable, but serum agglutinative.
- Blood 3.*—Cells not agglutinable and serum not agglutinative.

The reactions obtained with the sera separated in the refrigerator were identical to those obtained with the sera separated in the incubator, but the former were in some cases slightly weaker than the latter.

Discussion

The irregular reactions encountered during the preliminary study seem to be atypical reactions. The poor specificity of these suggest the presence of pan-agglutinins or auto-agglutinins—the so called cold agglutinins. The greater tendency for samples of sheep blood to get haemolysed when left overnight in the refrigerator seems to support this conjecture. But such irregular iso-agglutinins in normal sera active at room temperature are very rare, at least in human blood. This problem is worth further study.

It is said that agglutination consists of two processes; one adsorption of agglutinin on the surface of the cell which is considered to be instantaneous, the other clumping together of cells or actual agglutination which depends upon the physical contact of the cells with one another. The second process can be hastened by centrifuging. Theoretically, therefore, centrifuging may be done as soon as serum and cells are mixed, but, in our experience, it has been found that, with sheep cells, at least an hour should elapse after mixing and before centrifuging so that the weaker reactions may not be missed. Mixing up the cells and serum and centrifuging repeatedly has been found to intensify the reaction.

Todd and White (1927-28) and Andersen (1935) have shown that the problem of blood groups in sheep is rather complicated and Wiener (1931) had suggested to the senior author (personal communication) that any further work should be done with iso-immune sera rather than natural sera. By employing the technique described above much of the complications have been eliminated. No doubt, other sub-groups or other entirely different groups cutting across those obtained with normal sera might be brought out with iso-immune sera.

Summary

A technique for classifying sheep blood on the basis of iso-haemagglutination reactions obtained with natural sera is presented.

On the basis of such reactions, bloods of sheep slaughtered in the Madras City have been divided into three primary groups similar to Ro, Oanti R and Oo of Andersen (1935)

- Blood 1.*—Cells agglutinable but serum not agglutinative.
- Blood 2.*—Cells not agglutinable but serum agglutinative.
- Blood 3.*—Cells not agglutinable and serum not agglutinative.

The technique eliminates the inconsistent and atypical reactions encountered by previous workers.

Further work with iso-immune sera might bring out other sub-groups or other entirely different groups cutting across the above three.

Acknowledgments

The authors are much indebted to Dr. I. M. Azizuddin, B.A., G.M.V.C., B.V.Sc., Ph.D. (Edin), Principal, Madras Veterinary College, for the great interest he showed in our work and for all his encouragement and advice.

REFERENCES

1. Andersen (1935) Quoted by Wiener, Blood groups and transfusion III Ed. 350.
2. Nayar K. N. G., et. al. (1949) *Ind. Vet. Jour.* XXV. 408-17.
3. Todd and White (1927-28)—Quoted by Wiener. Loc. cit.

DETECTION OF ARSENICAL POISONING IN AN EXHUMED CARCASE*

BY

M. RAMAKRISHNAN, G.M.V.C.,

Veterinary Investigation Officer, Madras

(Received for publication on 1 March 1948)

Arsenical poisoning in animals as well as in human beings is quite common, but a record of cases in animals where the carcasses have been exhumed are rare or almost absent. The object of this note is to record one such investigation. It was reported in the Indian Express of 23 September 1947, that a thousand head of cattle had died of poisoning in Ottapalem area in Malabar District but, on investigation, however, it was found that only cattle worth 1,000 rupees had died. Arsenical poisoning of malicious nature was suspected because of the value of the skins that would become available on death of animals. It was stated that after some deaths, carcasses were buried, thereby preventing the interested parties for having access to the skins and that this precautionary measure resulted in the stoppage of such deaths. No detailed investigation was intended because it was thought that the carcasses would be several days old and that it would be difficult to make out any organs or structure or to get material for chemical analysis. Mr. Hurley, the Director, however considered that it would be useful to conduct one or two postmortem examinations since arsenic is suspected and that the carcasses might still be in a state of preservation.

*Reprinted from the *Indian Journal of Veterinary Science and Animal Husbandry* Vol. XVIII, Part IV, Dec. 1948.

History

Twenty two animals had died after an illness of one to two days duration in the course of about a month. No occurrence of any contagious disease during that period was reported. The symptoms mentioned by the ryots were highly suggestive of arsenical poisoning. The poison was said to be concealed in jack fruits left in the grazing areas, for the animals to ingest, while grazing.

Postmortem.—The carcase of an animal that had died most recently was selected and examined. The animal was a dark brown bullock—five years old. It was reported that the symptoms that the animal exhibited were uneasiness, colicky pains, profuse diarrhoea which later on became mucus-coated and eventually blood stained. The symptoms lasted for about 28 hours. Just before death, prostration, violent kicking of the legs, striking of the head from side to side as if in acute pain was noticed. Anus became everted and the animal strained violently. The interval between death of the animal and the postmortem was roughly calculated to be about six weeks.

External appearance.—On exhumation, the carcase was seen lying on its left side. The earth covering the carcase was found charred for about half an inch depth all round. The skin with hairs was found intact. No external injury was noticed. Decomposition was only partial and the odour was not offensive. It smelt like fermented aloes. Neither were any blow flies attracted, nor any maggots had formed. The hairs came off the skin only after a light pull. The abdomen was found contracted and there was a perceptible depression at the flanks. On the whole, the general appearance of the carcase was one of mummification. Rigor mortis had passed away. Eyelids were open and eyeballs tumified. There was no discharge at the mouth and nostrils. The tongue still retained its colour and consistency while skeletal muscles had undergone partial decomposition and softening.

Internal appearance.—There was present moderate subcutaneous fat. Peritoneum was dried up and the position of the organs in the abdominal cavity was normal. The heart had contracted to one quarter of its usual size and the auricles and ventricles were empty. Blood vessels were normal. Lungs decomposed and partly liquefied. Nothing unusual was noticed in trachea, larynx and glottis. Liver was contracted and hardened with capsules intact; consistency was a little harder than normal and gall bladder was empty. Spleen was highly decomposed and jelly-like, but retained its form and size with its capsule intact. Kidneys were jelly-like and decomposed. Oesophagus was also decomposed. The four compartments of the stomach were still intact and could be separately made out. Rumen contained the usual amount of ingesta in an almost dried up state.

with the usual colour. The contents of the other three compartments were drier than normal and decidedly darker. The inner lining of the three compartments was black. Small intestines were contracted and tumified, almost empty; and mucus lining was darker than normal. Large intestines were also contracted and tumified and contained hard dry dung. Nothing unusual was noticed in the lymphatic glands, bladder or generative organs. Brain and spinal cord were liquefied and jelly-like.

It was thus obvious that the carcase was contracted and in mummified condition and the skin and the hair were intact. There was absence of postmortem changes in the tongue which was normal in colour and consistency. The liver was contracted and hardened and seemed to be in a fair state of preservation. The condition of the heart and stomach and the intestines also signified that they were contracted and tumified and not decomposed. There was absence of maggot formation.

Diagnosis.—Arsenical poisoning was suspected. The contents of stomach, including that of the rumen and bits of liver and intestines preserved in rectified spirit with a control sample of rectified spirit, were sent to the Chemical Examiner, who detected arsenic in all the samples, except the control one.

Discussion

As stated in the beginning, the cases of malicious arsenical poisoning of cattle have been frequently met with, in the past in this country. The chief motive is the procurement of the skin, though ill feelings, personal jealousies and quarrels among villagers often play a part. The crime is invariably perpetrated by the *Chamars* or chucklers either on their own initiative or at the instigation of others. The other poisons used are mercury and vegetable but arsenic is the most commonly used because of the smallness of its dose and the convenience of administration and easy availability.

According to Hehir and Gribble [1929] there were 283 cases of arsenical poisoning out of the total of 293, during the five years from 1885 to 1889.

Cases of exhumation are comparatively rare or even absent. In cases of human beings there are quite a few records specially where the bodies have been buried either enclosed in a coffin or free. In animals there are rare cases of burial or cremation, because of the usual practice of skinning the carcase and discarding the remains. From a reference to the statistics available with the Chemical Examiner to the Government of Madras from 1942 to 1946, 15 cattle and 23 human beings were diagnosed against arsenical poisoning and, except for one case in human beings, no carcase was exhumed.

In passing, the preservative qualities of arsenic may be mentioned. Macfall [1925] has mentioned in this connection that arsenic is an indestructible poison and may be found in the body after many years; in one case it was found after 14 years. Whitford [1884] records, that the body in one case was found remarkably preserved for a period of 37½ months after internment. Jai Singh and P. Modi [1945] state that the body of Full Ham of Agra was found to be well preserved when it was exhumed 14 months after death, even though the grave was a kutchra one and the lid of the coffin had already given way.

Apparently, in the carcase of the bull exhumed, it was the preservative effect of the arsenic that had resulted in the prevention of putrefaction and preservation of some of the organs.

The appearances met with, in the different organs, are very varied and interesting particularly indicating the relation to their distribution of arsenic in the various tissues and body fluids. While the skin with hairs, tongue, heart, liver and all the four compartments of the stomach and intestines were in a state of fair preservation, the skeletal muscles, lungs, spleen, kidneys and brain had undergone decomposition and complete softening approaching liquefaction. John Glaister [1945] has mentioned in this connection that arsenic quickly absorbed is stored in the liver and from there it passes to general circulation. Although the intestinal tract eliminates some of the arsenic from the body the kidneys are the principal excretory organs. From this it is evident that the liver is the main reservoir of the chemical, from where it passes on to the kidneys and intestines through circulation. The following Table from Glaister [1945] gives the distribution of Arsenic in the various tissues and body fluids.

TABLE I
Distribution of arsenic in the various tissues and body fluids

Tissues	Total weight received	Arsenic in tissues	
		Arsenic in total weight in grains	Arsenic as part per million
	Lbs. Ozs. drs.		
Brain	3 1 0	0.18	.9
Stomach tissue	0 13 0	.143	25.0
Stomach contents	0 14 0	5.18	861.0
Intestinal tissue	3 6 0	1.29	54.0
Intestinal contents	1 12 0	5.88	486.0
Liver	4 3 0	2.33	80.0
Spleen	0 4 0	0.009	5.8
Kidney	0 9 0	0.103	27.0
Pancreas	0 4 0	0.002	1.2
Heart	0 12 0	0.011	2.0
Adrenals	0 0 6	0.004	9.6
Lungs	1 3 0	0.026	3.2
Urine	0 0 6	0.004	15.0
Bile	0 1 0	0.003	5.7

From the above Table I it is seen that the highest concentration is in the stomach contents; next in order the intestinal contents, liver, intestinal tissue, kidneys and stomach tissue. In all the above organs and their contents the concentration ranges from about 25 to 860 parts per million. In other tissues and fluids the concentration is below 15 parts per million.

It will thus be observed that the degree of preservation in the different organs in this case is in direct proportion to the amount of arsenic present except in the case of kidney, which was perhaps putrified due to the acute nature of the poisoning, as evidenced by the sudden death, which might have prevented the usual amount of the chemical going to the kidneys.

Summary

A case of poisoning of cattle with arsenic, where the carcase was exhumed after a period of six weeks is recorded. The organs, like the liver, stomach, intestines, which are likely to contain a considerable proportion of arsenic were found in a state of preservation.

Acknowledgments

I am grateful to Mr. Hurley for his valuable suggestion, to Mr. C. Madhavan Nambiar and his staff for their co-operation and help and to Dr. K. C. Jacob, Professor of Medical Jurisprudence and Dr. P. Venkat Rao, Chemical Examiner for having placed the necessary literature at my disposal.

REFERENCES

- Heiber & Gribble (1929). Medical Jurisprudence for India, 872.
 Jai Singh & P. Modi (1945). Medical Jurisprudence and Toxicology 484.
 John Glaister (1945). Medical Jurisprudence and Toxicology 503.
 Macfall (1925). Revised edition of Buchanan's Text Book of Forensic Medicine and Toxicology 298.
 Whitford (1884). British Medical Journal 1, 504.

SOME OBSERVATIONS ON MANAGEMENT AND DISEASES OF POULTRY IN BIHAR AGRICULTURAL COLLEGE FARM

BY

B. M. LAHIRI,

*Lecturer in Veterinary Science,
Bihar Agricultural College Farm, Sabour, Bhagalpur.*

Unlike western countries, poultry keeping has not yet been taken up as one of the essential agricultural pursuits in this country. Perhaps, the tradition stands in its way. Nevertheless, its importance in combating the present day food shortage and in improving the biological value of Indian food, which is already deficient in many respects, cannot be overestimated. Proper management and prevention of diseases are the two important steps in making poultry keeping successful.

A poultry unit is maintained at this institute to teach the Agricultural students practical management in poultry keeping. The boys also get opportunity of observing the poultry diseases that prevail amongst them from time to time and they learn the measures to prevent them. The following observations derived from practical experience are recorded here, so that they may be useful to an interested poultry keeper, or to those veterinarians who have to deal with poultry diseases.

Management

Originally, the start was made with W. L. H. variety. Subsequently Rhode Island Reds and Black Minorcas have been introduced and their comparative values regarding egg-laying capacity and acclimatisation are being ascertained. Breeding on pure lines as well as crossing with the country flock is also practised.

The area consists of 3 acres of land fenced all around to a height of 6 feet with closely woven wire netting. Dwarf trees like Malta orange and mulberry are planted inside to provide shelter to the birds during hot days. Inside the yard, there are 6 pens, one central house, one chicken house and a food preparation room. All are brick-built structures. The pens are of 10' x 6' sizes, divided in the middle by wire-netting partition providing accommodation for 2 sets of flocks. There are wire netting enclosures around them for exercise as well as for preventing inter-breeding. Each enclosure has enough space @ 4' x 5' per bird. The Central house is of 30' x 12' size and has 3 rooms inside. Both the pen and Central house are provided with trap-nests, dropping boards and perch of portable design so that these can be dismantled and cleaned whenever needed. Each flock consist of 12 to 15 birds. The chicken house is of 50' x 14' size. The space inside is arranged in cubicals, which are provided with enclosures outside, so as to allow the chickens fresh air and sunshine during the day. In the evening the outlets are kept closed. There is an incubator room and a store chamber fitted with shelves for storing food material attached with the chicken house. Floors are spread with sand which is changed as often as possible. Dust baths have been provided in each pen in the yard.

Each adult bird gets a scratch feed in the morning, a mash in the day, and another mash in the evening. The scratch and the mash are the mixture of wheat, barley, gram or pea and paddy. Linseed cake is added to the mash during its preparation. The quantity of each feed is about a handful (3-4 ozs.) for each bird. Most of the grains are farm-grown. Green feed is supplied in the mash. Cabbage, berseem, cauliflower leaves, turnip, carrot leaves are freely supplied, but difficulty is encountered during summer when the greens become very scarce and the feed has to be supplemented with cod liver oil or shark liver oil. Small wooden boxes

containing grits, charcoal and lime are kept inside the pens. Fresh drinking water is placed within easy reach in improvised earthen water pot with addition of a few crystals of potassium permanganate.

Chicken after being hatched are kept inside the incubator for about 24 hours for drying and after 48 hours they are taught to take fine sand. They are then put on finely ground atta or suji, for a few days, then on mash and finally on adult feed. They are kept during the day under the care of a foster mother in the form of *deshi* hen and at night put inside a brooder which is fitted with lamps to provide warmth.

Both artificial and natural incubation are practised. There are 2 oil incubators, one for 50 and the other for 150 eggs which are used for the purpose from the month of September to March. Their use in summer is discontinued and the eggs which are considerably decreased in summer are hatched by broody *deshi* hen. The percentage of hatchability differs greatly on the breed and individual birds ranging from 55-80%. The maximum number of eggs laid by a W. L. H. hen in a year was 190. The weight of the eggs is usually from 2-2½ ozs.

Absolute cleanliness is maintained by daily sweeping the floor, removing the faecal matters and washing the feeding utensils. Pens and houses are occasionally white-washed and the wooden fixtures are thoroughly scrubbed and washed with phenyle lotion. Sulphur powder is dusted on the floor and in the dustbath. Gammexene dusting is also practised to keep away the pests.

The expenditure towards the cost of feeding and attendance excluding the supervision has been estimated as Rs. 1-8-0 per month per bird.

Diseases and their control

In the early part of previous years, when the preventive vaccines were not available, the appearance of contagious diseases amongst flock was a regular feature, causing heavy losses as no measures of control were successfully effective. Diagnosis of these diseases was not an easy one, since the symptoms in the affected birds were almost alike, and differential diagnosis had to be based on postmortem findings. Microscopical examinations of pathological materials and biological tests were also resorted to. The poultry section, I.V.R.I. Izatnagar, was of great help in this respect and the Assistant Disease Investigation Officer, Poultry, Bihar, attended the outbreaks on many an occasion.

Contagious diseases

Ranikhet disease.—It suddenly made its appearance in 1945. The source of infection could not be definitely traced, but the existence of the disease in neighbouring villages was detected. On detection of the disease,

the birds were divided in several small lots and removed to different localities with separate attendants, leaving away the affected ones in the pen. This was of no avail, as the disease spread in all the lots in acute form with catarrhal and nervous manifestations. The affected birds showed signs of distressed breathing with beaks wide open, profuse diarrhoea of green colour and salivation of slimy character. The combs were dark in colour. Some of the birds developed twisted neck, paralysis of the wings, with legs outstretched behind the body. The duration of illness was from 2-3 days with nearly cent per cent mortality. On post-mortem examination, pin-point haemorrhages of the proventriculus and greenish necrotic raised patches on the mucous lining on the intestine were noticed.

As suggested by the Assistant Disease Investigation Officer, Poultry, Bihar, treatment with different drugs, of which some were of indigenous nature, being practised in villages, was given a trial. As will appear from the table attached, none of the drugs had any appreciable effect on the course of the disease. Since the availability of preventive vaccine, the flock now undergoes regular vaccination every year and the disease has been kept at bay. In the first year of vaccination there had been 1% loss with severe reaction like paralysis of the wings and legs and inco-ordination of movements.

Infectious laryngo tracheitis.—It resembled Ranikhet disease closely. The beak was open, there was gasping for air, the neck was extended and the head was occasionally flung as if something was obstructing the throat. There was moist cough and a peculiar crow-like sound emitted. On close examination blood-tinged mucus was found besmeared on the neck and its sides. The birds were dull and off-feed. There were necrotic yellow patches at the entrance of the larynx. Death took place in 24-36 hours. Thick mucous accumulation of the nasal sinuses, slimy discharges, pin-point haemorrhagic spots on mucous lining of the mouth, haemorrhagic linear patches of the trachea and throat were the noticeable post-mortem features. Examination of pathological materials and biological tests at I. V. R. I. and by the Asst. D.I.O. Poultry proved negative for Ranikhet disease or fowl pox. Treatment with sulphonamides was of no avail and before further investigation was carried out the outbreak subsided spontaneously causing only 6 deaths.

Fowl Cholera.—The flock was vaccinated against fowl cholera. After a week of vaccination one cock developed greenish diarrhoea. The combs were dark, the bird became very weak and died after 24 hours. Microscopical examination of the heart blood at the Bihar Veterinary College laboratory revealed typical fowl cholera organisms.

Avian leucosis complex.—It was found to be present in all the breeds in cocks. Only 3 of the affected birds manifested leg weakness, but the

TABLE I
Showing the result of treatment of fowls affected with Ranikhet disease with different drugs as advocated by the Asstt. Disease Investigation Officer, Poultry, Bihar.

Name of medicine.	Date of commencing treatment.	No. of times given.	No treated.	Result.										Re-covers	Remarks.
				10 ⁹ / ₄₅	11 ⁹ / ₄₅	12 ⁹ / ₄₅	13 ⁹ / ₄₅	14 ⁹ / ₄₅	15 ⁹ / ₄₅	16 ⁹ / ₄₅	17 ⁹ / ₄₅	18 ⁹ / ₄₅	19 ⁹ / ₄₅		
Indigo 1% sol. with Tamarind 10% sol.	9-9-45.	Twice daily.	13	2	5	2	—	—	—	—	—	—	2	2	84% Mortality.
Lemon Juice 20-30 drops.	9-9-45.	"	13	—	1	1	2	6	2	1	—	—	—	—	100% "
Pot. Permang. 1 gr.	9-9-45.	"	13	1	3	2	1	—	—	2	—	—	—	4	75% "
M & B 693 2 to 3 grains.	"	1st & 11th day 4 times daily, then twice daily.	19	5	6	2	2	2	—	1	—	—	—	1	95% "

rest showed no symptoms during life and died suddenly with symptoms of restlessness, convulsions, subnormal temperature just before death. Others were found dead in their pens. P. M. examination showed excessive enlargement of the spleen like that of a golf ball and the liver occupied the whole of the abdominal cavity. It was dark-red in colour, fragile and had nodules on its surface. In some cases it was found ruptured with blood clots in the abdominal cavity. Examination of the materials at I. V. R. I. Izatnagar confirmed the diagnosis. 5% of the flock was found to be carriers when the blood of the whole flock was examined at the Bihar Veterinary College, Patna. Experimental treatment with 10% Pot. Iodide solution, 5 c.c. intravenously, of birds showing paralysis was tried with temporary improvements only.

Pest infestation.—The birds were found infested heavily with lice causing itchiness and reddish denuded patches on the skin with debility and decreased egg yield. All the birds were dusted every week with powder containing sulphur and tobacco-leaf powder, mixed with five parts of finely powdered ash. The dust baths were similarly treated. Since the introduction of D.D.T. and gammexene, control of pest has been quite easy. Gammexene D 205 mixed with dry road-dust in 5% ratio was dusted on the birds by means of an empty perforated cigarette tin.

Scaly legs.—Cocks were found affected with constant itching and thickening of the shank and toes. They responded quickly to the application of sulphur and tar oil mixed with some bland oil.

Helminthic infestation.—Infestation with small and large round worms was very common causing unthriftiness, diarrhoea, leg weakness and decrease in egg production. P. M. examination showed large number of these parasites in the intestines causing enteritis. For treatment of round worms the birds were fed with mashed grain soaked with tobacco infusion in an empty stomach early morning. For 100 birds, $\frac{1}{2}$ seer tobacco stem cut into pieces and steeped in water for $\frac{1}{2}$ hour. Next feed they obtained was also a mash soaked in Mag. Sulphate. (1 lb. per 100 birds) Evacuation followed in which large numbers of worms were expelled. The treatment was repeated after a fortnight. Subsequently monthly dosing with phenothiazine mixed in mash (1%) was resorted to, from July to October. For tape worms, the birds were individually treated with gelatine capsules containing 1 c.c. of turpentine in olive oil per bird. The capsules were pushed down the gullet. Arecanut powder in 5 gr. dose per each adult bird was more effective than oil turpentine. It was given in pill form mixed with wheat atta. Cestarsol (M & B) $\frac{1}{2}$ tab each bird was also tried. The poultry yard was thoroughly ploughed up and treated with weak solution of copper sulphate.

Coccidiosis.—There had been immense loss of young chicken being affected with either acute and chronic form of the disease. A number of young chickens were found dead with blood stained diarrhoea. Ceca were found inflamed with contents tarry coloured. Large birds had rather a chronic course showing dullness, miserable look, drooping of the wings and sluggish movements. Most of them died of lung complication. The lining of the intestines showed pin-point haemorrhages and the intestinal contents were creamy. In more advanced cases, the ceca were found greatly enlarged and mis-shaped containing large pieces of greyish cheesy masses streaked with tarry marks. Examination of intestinal contents revealed large number of coccidia. The outbreaks were controlled by the measures adopted below :

1. Collecting all the faeces and burning them every day.
2. Providing raised wire netted floor in the chicken cubicals so that they might not pick up infection from the droppings on the floor.
3. Feeding with whey or butter-milk and also wheat bran mash and green feed to increase nutritional resistance.
4. Administering mag. sulph (1 lb for every 100 birds) followed next day with sulphaguanidine at the rate of 1% in the total amount of the mash repeated every fifth day for about a month. Sulphaguanidine was subsequently replaced by soluthiozole (M & B). 50 c.c. of Soluthiozole was given in one gallon of water and no other drinking water was made available.

Fowl pox.—It was found to affect the chicken all the year round usually in roup form with swelling of the eye, nasal discharge and pneumonia. Only once, wart-like growths were noticed in the face, eyes and over the body, thigh and corners of the mouth. It is now kept in abeyance by regular vaccination of the chicken a few days after their hatching.

Non-contagious diseases

Nutritional roup.—It affected the chickens of one and one and half months old in large numbers at a time, resembling outbreak of fowl pox, when the green feed was totally stopped in their ration. The symptoms were falling off in condition, dullness, retarded growth, reddening and swelling of the eyes with discharge and cheesy deposits in between the eyelids. The birds moved about with staggering gait and drooping wings and they died in 3-5 days. Mortality was almost cent per cent and no symptomatic treatment was effective. Post mortem examinations showed pin-point white deposits on the pharynx, gullet and crop and white crystalline spots were found on the kidneys and cloaca as well. Biological tests yielded negative results. Further study of the diseases led to the diagnosis that it was a condition of avitaminosis. Treatment was

accordingly taken up and the chickens were fed with shark liver oil 4% of the total mash for the first three days and then 2% thereafter. The green feed in the ration was also restored. More seriously affected birds were individually treated with 15 minims of the oil. The response was marvellous, as the disease subsided as abruptly as it appeared.

Cold and pneumonia.—Cases occur now and then. The birds are usually found sleepy with increased and laboured breathing and discharge from the nostrils. Birds are found dead in the pen. On postmortem, lungs are found congested and in some cases caseation of the lung tissues is noticed. Inhalation with antiseptics and use of stimulants in individual birds are of not much value. Mass treatment with sulphamezathine or sulphadiazine at the rate of $\frac{1}{2}$ gr. per bird has been found to be effective.

Malignant tumour.—Cases of malignant tumour are not infrequent affecting the region of the wings and back originating from previous injury, developing into dark brown gangrenous mass. Histologically they are found to be of sarcomatous type. Surgical removal was quite ineffective and all the affected birds died.

Bone fracture.—Cases of simple fracture of bones of the shank are common and they responded to the ordinary treatment of reduction and fixation with Plaster of Paris bandage.

Bumble foot.—It has been a very common ailment in fowls. The probable cause may be due to injuries to the ball of the feet on account of jumping from the perch. This causes lameness. Such cases are treated with antiphlogistine poultice and when matured are incised open and treated as open wounds, but it takes a long time to heal up.

Crop bound.—Birds were found dull and taking no food. On examination, the crops were found tense and swollen due to engorgement with grains. Surgical operations of the crop was not successful, neither washing of the crop by introducing tubes into the crop. Some responded to administration of castor oil about 2 drams in quantity into the crop which was then massaged gently.

Prolapse of the cloaca and intestines.—This was detected in birds due to picking at and pulling up cloaca by other birds. The parts were cleaned with normal saline and then pushed into the abdomen as far as possible by the little finger.

Egg abnormalities and Egg bound.—Birds were found inside the trap-nest straining hard. On examination through the cloaca by the little finger it showed the presence of the eggs inside the oviduct. Good result was obtained by giving an enema of warm olive oil (4 drams) and holding the birds over steaming water. Some hens died suddenly with symptoms

of restlessness and gasping. On P.M., the deformed eggs, either intact or with broken shells, were found impacted inside the oviduct.

In some birds the oviducts were found ruptured with their contents passing into the abdominal cavity.

Soft-shelled eggs.—Some fowls were found to pass eggs without the outer hard shell. This was perhaps due to the eggs passing out too quickly or due to deficiency of calcium in the system. These birds were treated effectively by giving them light food at night and also calcium gluconate 5 grs. daily per each bird.

HATCHABILITY IN RELATION TO SEASONAL VARIATIONS

By

S. G. IYER,

Indian Veterinary Research Institute, Izatnagar, U.P.

Introduction

The estimated total poultry population in India amounts to about 70 millions but a three years' disease survey carried out by the writer has revealed that over half the number of fowls in the country are lost annually due to various contagious diseases as well as attacks by predatory animals. Production of replacement stocks to the extent of 35 million birds annually is therefore the responsibility of the poultry keepers. On specialised farms, on the other hand, nearly two-thirds of the laying stock are usually replaced from year to year. These two factors together prove the vital importance of artificial incubation for purposes of mass scale production of eggs and poultry.

The success of artificial incubation depends mainly on (1) proper incubator management, (2) the breeding stock and the environment, (3) care and handling of hatching eggs and (4) economy in production of quality chicks. The extent to which climatic conditions influence hatching results and, thus in turn the economy of production, has not been thoroughly studied, particularly under Indian conditions. Experiments have therefore been made at the Poultry Research Section, Izatnagar, and the results obtained therefrom are embodied in this note.

Experimental

Eggs from Rhode Island Red, White Leghorn and indigenous (*Desi*) breeds were set in mammoth incubators at weekly intervals for a period of one year October 1946 to September 1947. During the hot summer months—May to August—only small number of eggs could be set on

account of the relatively low egg production on the farm. Care was taken at each time to set eggs not more than five days' old stored at proper temperature and humidity.

Observations

The hatchability results when represented graphically resembled the letter V the apex denoting the poorest results obtained in mid-summer months. There was also a close similarity between fertility and hatchability. During the period October to March, hatching results were satisfactory, thereafter there was fairly rapid fall till June, when poorest results were recorded. With the onset of rains in July, the hatchability also improved, probably due to favourable climatic changes and the availability of fresh greens to the birds. On the whole, the data show that best results are obtained in the months of December, January and February when the atmospheric temperature and humidity are most conducive to incubation. Maximum hatchability is often associated with peak production in the farm.

In Northern India early hatching i.e. in September and October may be practised to maintain an even level of production during the summer months when the older birds go usually into moult. It has been found uneconomical to set eggs from April to July on account of the vast wastage in the shape of dead germs and dead-in-shells, not to mention the poor fertility, poor quality of the shell, relatively small size of the eggs laid and the slow rate of growth of the late hatched chickens rendering them susceptible to a host of disease conditions.

Summary

In the plains of Northern India, satisfactory hatchability results are obtained during the months of December, January and February and there is a positive correlation between fertility and hatchability. The high summer temperatures together with dry atmospheres are detrimental to hatchability and, as such, late-hatching should be decried.

THE INDIAN VETERINARY JOURNAL

★

VERY FEW COPIES OF BACK VOLUMES AVAILABLE

Apply Immediately to Avoid Disappointment

Rs. 6 Per Volume.

Rs. 1-8-0 Per Issue.

SILVER JUBILEE NUMBER Rs. 4/-

RECENT ADVANCES IN CHEMOTHERAPY RELATED TO GENERAL PRACTICE*

By

D. D. OGILVIE, B.Sc. (EDIN.), M.C.R.V.S.,
Wilmslow, Cheshire.

It has been customary in dealing with recent advances in chemotherapy to go back to Ehrlich, the father and founder of this relatively new branch of science, and to dilate especially on the historical features of the mercurial, the antimonial and the arsenical compounds. This has been necessary because in the early days nearly all the major discoveries were related to these heavy metals or to their derivatives. The advent of modern organic chemistry, however, opened up many new fields and, perhaps happily, it now becomes impossible in the compass of a short paper to cover more than a selection of newly discovered or recently developed products. It is indicative of the present rate of progress that none of the products which will be discussed here was developed and some not even discovered only three and a half years ago when a review of this subject was given to a joint meeting of the Mid-West and Western Counties Divisions, N.V.M.A.

In many lands great numbers of chemists and biologists are now engaged in the search for new chemotherapeutic agents and for substances which will aid both mankind and livestock. During the last few years the momentum of discovery has increased at a remarkable rate so that better and better weapons are continually being placed in the hands of the practitioner in his fight against disease. So great is the effort and so well defined the pattern of discovery that it is now possible without great danger of error to anticipate a continuing flow of completely novel substances with remarkable and far-reaching properties which no doubt will revolutionise the therapeutic aspects of our science, and if in another year or two a further review is made it is virtually certain that it will be able to feature exclusively substances now undiscovered or not yet existing. Such progress is intriguing and exciting but it makes exacting demands on the practitioner if he is to remain abreast of developments.

Anaesthetics

The new veterinary anaesthetic "Anavenol"-K, which is based on β -naphthoxyethanol and thialbarbitone and about which a film has just been made, has some remarkable pharmaceutical and pharmacological characteristics. Particular interest has been aroused on all sides and in both medical and veterinary fields by the fact that this is the first substance which has been used intravenously in the form of a particulate suspension. β -naphthoxyethanol is insoluble in water and in blood and yet, injected as an aqueous suspension,

exerts anaesthetic effects almost within seconds. Its elimination is correspondingly rapid. Because of these observations many substances hitherto disregarded for intravenous use on grounds of low aqueous solubility will have to be re-examined, opening up a whole new field of exploration. Such is the integration of modern chemotherapy that any radically new discovery cannot fail to influence the work and thought of all engaged throughout the field. (A film on "Anavenol"-K was then shown.)

The Newer Antibiotics

Everyone, of course, is aware of the circumstances of the discovery of penicillin by Fleming in 1929 and of its subsequent development in 1940 and later by Florey and co-workers. Fleming himself from the earliest days always held that penicillin could be only one of many antibiotics with similar or even more remarkable properties, but for some years it seemed that this might not be so and that penicillin was unique among antibiotics in having therapeutic properties uncomplicated by high toxicity. Penicillin was taken to America for large-scale production in the early years of the war because at that time it was difficult to make new plant available for it here. Undoubtedly, this accelerated progress in the whole antibiotic field because not only did the Americans make great efforts to improve penicillin production by deep culture methods and by developing X-ray and other mutants of the mould, but they also began, on a very wide scale, the search for new antibiotics by the examination of soil samples and by other means. That search is still proceeding, but because no better ones exist the methods being employed are still relatively primitive. The chemical composition of the antibiotics is complex and has been difficult to determine, but recently one antibiotic, chloromycetin (chloramphenicol), has been made synthetically and this may herald the day when new antibiotics can be developed in the laboratory by logical synthesis.

Streptomycin.—The first great discovery after penicillin in the antibiotic field was, of course, streptomycin, which is already being recognised as a milestone in chemotherapy. Streptomycin is not only the first chemotherapeutic agent proved to be active against tuberculosis and the earliest effective antibiotic against Gram-negative organisms, but, by directing attention to the actinomycetes as a fruitful field for examination for new antibiotics, it has shed the first light on the way to discoveries which already are proving of outstanding merit. Streptomycin itself has had a chequered history since its discovery by Waksman in 1944. Severe side effects following its administration have threatened to cause its discontinuance and the ease with which susceptible organisms acquire resistance to it has made it difficult to employ. But so far it has survived and by various stratagems such as the concurrent use of the other anti-tubercular agents such as para-amino salicylic acid and the thiosemicarbazones, it continues to be first choice against human tuberculosis. Whether it is assured of a lasting place in therapeutics is, of course, questionable. *Nature*, commenting on the

*Address delivered at a meeting of the Lancashire Veterinary Association, Liverpool University, May 11th, 1951. *Vety. Record*, Vol. 63, No. 33; 1951.

subject recently, has summed up the position by saying "Streptomycin has very definite shortcomings and these prompt one to reflect that in the face of competition from better drugs it may yet share the fate of sulphapyridine, not so long ago the outstanding drug of the times, and already the outcast of the pharmacopoeia."

What of streptomycin in veterinary practice? Much work remains to be done and, so far, except in bovine mastitis where it has a good degree of activity against staphylococci and Gram-negative organisms, it has not been very widely employed. In general against Gram-positive organisms, it is less active than penicillin. Clinical reports and experience testify, however, to a wide range of possible uses for it such as in infectious sinusitis in turkeys (injected directly into the sinus), in *Erysipelothrix rhusiopathiae* infection of these birds, in tularæmia of hares and rabbits, in bacillary infections complicating distemper in dogs, in joint-ill in foals caused by *Shigella equuli*, in urogenital infections in dogs, and in various pneumonic conditions.

Most interest, however, arises from its possible use against brucellosis, paratuberculosis (Jöhne's disease), and actinomycosis and actinobacillosis.

Against brucellosis it gave early promise in the laboratory, but this has not been fully upheld clinically and, unfortunately, it cannot be relied upon for cure in man, cattle, or pig.

Against paratuberculosis, streptomycin is effective *in vitro* in high dilution. In the cow, preliminary trials have shown that sufficiently high concentrations can be obtained clinically to inhibit growth of the organisms. Marked clinical improvement has resulted from therapy continued over three days. As with 4:4 diaminodiphenyl sulphone, a marked tendency to relapse has been encountered when administration of the drug has been discontinued. It is known, however, that in the therapy of acid-fast organisms administration must be long continued and it would be interesting to see the result of prophylactic feeding over a lengthy period of, say, streptomycin residues containing streptomycin. Similarly, trials in animals before they reach the critical breakdown stage might give interesting results. The outstanding effects now being obtained with 4:4 diaminodiphenyl sulphone in human leprosy indicate its possibilities in Jöhne's disease but here again, on analogy, small doses continued over a long period would doubtless have to be employed for success to be achieved.

Actinomyces bovis is inhibited by streptomycin *in vitro* and spectacular results against actinomycosis in man have been obtained with it. *Actinobacillus lignieresii*, also a Gram-negative organism, should respond equally well and it would appear worthwhile to test the drug in this direction.

Finally, a most interesting possibility has been opened by a recent finding that *Vibrio foetus* is susceptible to streptomycin. The part which this organism

plays in bovine infertility is still a matter of debate. Undoubtedly little attempt has been made to diagnose it in the past and it may well be much more important than has been thought. *Vibrio foetus* infections in cattle appear to respond readily to 1 gramme of streptomycin injected directly into the uterus and these appear to be a case for investigating whether this would not be a profitable line of attack on some of the cases of sterility which now occur.

Three newer antibiotics call for consideration. These are aureomycin, chloromycetin and terramycin.

Aureomycin.—Aureomycin, which is claimed to have the widest spectrum of antibacterial activity of all the antibiotic substances, is produced by another species of *Streptomyces*, *S. aureofaciens*, and was discovered in 1947-48 by Duggar. It is active against both Gram-negative and Gram-positive organisms and has the advantage that, so far as is known, bacteria are unable to elaborate a protective antagonist against it such as penicillinase against penicillin. Aureomycin is now quite widely used in human medicine and in the United States fairly extensive field trials have been made with it in the veterinary sphere. Unlike penicillin it can be given easily by mouth except in ruminants where it interferes with the activity of the ruminal flora. It has been given by mouth to calves, however, before full function of the rumen has been established. Aureomycin can be used by the intravenous route for all animals and clinical records now exist of its effectiveness in a wide variety of conditions in horses, cattle, dogs, cats and foxes. Of particular interest is a recent report that aureomycin is highly active against *Trichomonas foetus*, certainly much more active on preliminary test than the other antibiotics, and field trials in this connection would appear to be well worth consideration. When supplies of aureomycin are freely available in the veterinary field, a considerable number of new indications for it may well emerge.

Chloromycetin.—As has been said, chloromycetin or chloramphenicol is notable as the first synthetic antibiotic. Its field of activity covers in large part that of aureomycin but it perhaps has a wider range of action against rickettsia and the larger viruses, e.g., against herpes in man. Its value in the veterinary field has yet to be established.

Terramycin.—The newest antibiotic to come into general use is terramycin, an American discovery, which is already being widely exploited. This substance, which is of low toxicity and has a wide range of action, has been taken up by American veterinarians especially for small-animal use.

Considerable claims are being made for it in the common infectious conditions of dogs, cats and other small animals, in pneumonia, distemper complications, upper respiratory tract infections, tonsillitis, ear infections, cystitis and nephritis, infectious feline rhinitis, and the bacterial infections of feline panleukopenia. In early clinical trials favourable responses have been

obtained in many conditions insensitive to penicillin therapy. The use of terramycin in larger animals awaits development.

Albanitsan.—As in all hyperactive fields of research, newly discovered substances continue to be notified at frequent intervals. Such is the range of interest in antibiotics that novel products are now given publicity in great numbers, but few of these survive even preliminary biological trials, most being too toxic or unsatisfactory for other reasons. Early claims are often unfulfilled by subsequent experiences. The Russians, for example, have just announced the discovery of a new antibiotic named "Albanitsan" which they claim is generally superior to most if not all other antibiotics, but, somewhat characteristically, they give no details and any judgment upon it is therefore not possible at this stage. What is very clear, however, is that the possibilities of antibiotics are as yet barely explored and much fruitful work remains to be done in this field.

Antibiotics and Antibiotic Residues in Animal Nutrition

An interesting and important recent development of antibiotics is their use in animal nutrition. This development, which has been pioneered in America by the Wisconsin School and followed up in Britain by Blount and others, is somewhat complex and some aspects of it are still not fully agreed. Manufacturers of antibiotics, as is to be expected, have done much to assist the work since the essence of efficiency in the chemical industry is, of course, to develop by-product uses. Because of this, penicillin felt, the residue of penicillin manufacture, was tested several years ago as a feed supplement. It was found to be rich in carbohydrates and high quality protein, and proved very suitable for pigs, but it is bulky, difficult to handle, requires drying for transportation and, therefore, is generally utilised only in close proximity to penicillin manufacturing plants.

The almost simultaneous discovery in Britain and America that streptomycin residue is rich in vitamin B₁₂, caused wide-spread interest. Vitamin B₁₂ is a cobalt complex naturally synthesised by bacterial action in the rumen in cattle. Non-ruminant animals, however, especially pigs and poultry, have to obtain their requirements from their food. This they do, normally, from the animal protein side of their diet, for example, from fish meal, meat meal, etc. If fed exclusively on a vegetable protein diet they soon show deficiency symptoms which are especially serious in young subjects and in breeding adults. Supplementation of a wholly vegetable protein diet with vitamin B₁₂, however, prevents the onset of these disorders. Investigations have shown that almost any bacterial fermentation, under certain conditions, produces vitamin B₁₂. Poultry faeces when fresh, of course, contain none, but if left for 24 to 48 hours to ferment become rich in it. Cow faeces, on the other hand, contain large quantities of it even when fresh. Vitamin B₁₂ has been isolated in crystalline form and is being used in man with great success in certain types

of anaemia much in the same way as folic acid, but in the animal nutrition field streptomycin residue is being employed for reasons of economy. Thus, in general, vegetable protein plus streptomycin residue gives normal growth in pigs and poultry.

But even more recently, residues of aureomycin, chloromycetin and terramycin have been shown to be rich, not only in vitamin B₁₂, but in a further vitamin, B₁₂b, and in other, so far, undetermined substances. When fed as supplements to pigs and poultry these have brought about accelerated growth rates with increases of 10 to 20 per cent. The efficiency of feed utilisation has been increased 5 to 10 per cent. and pigs and table poultry have reached market weeks before the usual time.

A complicating factor, however, is that these residues have considerable amounts of active antibiotic in them when fed. Reports show that in many cases feeding of them is simply dealing therapeutically with subclinical disease conditions—for example, necrotic enteritis in pigs—and much of the excellent progress subsequently recorded is really due to disease control.

Whatever the position, such feeding is now well established in the United States and pig and poultry farmers have no doubt as to its efficiency. Obviously conditions in Britain differ greatly from those in America and it will only be by field trial that the value of similar usage here can be determined.

Cortisone

We must now pass to a great discovery which bids well to change many lines of therapy and to alter many age-old pathological conceptions. This is compound E or cortisone, first described by Kendal and co-workers in 1936 but only recently found to be spectacularly successful in arthritis in man. Cortisone is, of course, one of the hormone substances of the suprarenal cortex, of which about 30 have been described. Its chemistry is very complex. In structure it is 17-hydroxy-11-dehydrocorticosterone and it can be made by a synthesis involving about 30 different stages, but so far this has proved extremely expensive and very active work is proceeding to try to simplify the synthesis, improve the yields from it, and hence produce the drug at an economic figure. Unfortunately, yields from natural adrenals are very small. An alternative line of approach has been through the adrenocorticotrophic hormone (A.C.T.H.), a hormone of the anterior pituitary gland which, through action on the adrenals, produces the same clinical effects as cortisone. A.C.T.H. acts directly on the adrenal cortex whose steroids control salt and water metabolism.

So far, of course, both cortisone and A.C.T.H. have been restricted in practical use to human medicine, but no doubt the day will arrive when they will be freely available at a cost which will allow them to be employed in the veterinary field. Already some tests have been made in that connection. In

America, Doyle, Andres and Hutchings have treated so-called rheumatoid disease in pigs with excellent clinical results, although as in man, relapses occurred when administration was discontinued. Meites of the Michigan State College has conducted the first official tests in dogs with success and recently in the U. S. notice has been given of the first large-scale trials to be undertaken in horses.

Meanwhile, the question of the safety of cortisone is causing much discussion. Cushing and others have pointed out that the hyperadrenalism caused by administration of cortisone or A.C.T.H. generally leads to increased susceptibility to infection. The question arises, therefore, whether treatment with these substances will merely produce a fit-looking animal with no defences which will make its way more quickly to a symptomless death from septicaemia. Much investigation on this point is being made on the medical side and examinations in relation to it have ranged over bacterial pneumonia, tuberculosis, haemolytic streptococcal infections, malaria, and various virus diseases. Investigations have also covered the effects of administration of the drugs on wound healing. There is still much dubiety, but on the whole it would seem that uncontrolled infection is a complication with overdosage of cortisone. Nevertheless, it is felt that with good diagnosis, proper dosage and supporting chemotherapy the risks which have to be run in this respect may well be worth while. One interesting point is that in the supporting chemotherapy, larger doses of antibiotics and other chemotherapeutic agents than usual have to be used. In normal uncomplicated chemotherapy success depends on reducing the reproduction rate of the invading organisms to below that at which the natural defences of the body can deal with them. Cortisone, however, impairs these defences and hence tips the balance back in favour of the organisms. These clinical use of cortisone in the veterinary field, when it does become available, will require, therefore, more than usual care and attention.

A most interesting recent development has been the observation by the Dutch workers Borst and colleagues that liquorice extract when given by mouth has quantitatively similar effects to injections of cortisone and A.C.T.H. Borst has shown that liquorice is effective in some cases of Addison's disease and Groen and co-workers have demonstrated that a crude preparation of one of the main ingredients of liquorice containing ammonium glycyrrhizinate gives equally good results. In this connection it is noteworthy that liquorice contains glycyrrhetic acid which has a formula closely resembling the group of steroid hormones to which cortisone belongs. The famous herbalist, Culpepper, believing that all plants had therapeutic uses if these could be determined and hearing that no cures had been attributed to honeysuckle, is reported to have said, "It is good for something, for God and nature made nothing in vain." Liquorice then may be "good for something" other than its more orthodox and well-established uses. Certainly from the economic view-point it has much to commend it over cortisone at the moment.

Plasma Substitutes

The growth of transfusion work, especially whole blood cow-to-cow techniques, has focused attention in the last few years on blood substitutes. Much work has been done, of course, in the human field and plasma substitutes are now widely employed. The properties of a transfusion fluid have been closely defined. The more important are these:—

The material must be stable at normal temperatures, and be able to withstand the shaking and jolting of transportation: it must be sterilisable, non-toxic, and non-antigenic: it must be isotonic with erythrocytes: its osmotic pressure and viscosity must be as near whole blood as possible: the molecule size must be sufficient to prevent fluid leaving the vessels too readily: and, finally, it must be only slowly destroyed in the body, but eventually completely eliminated.

To obtain all of these properties in one substance is obviously difficult and hence the search for ideal plasma substitutes has proceeded for many years and is still in progress.

Sodium chloride and dextrose.—Sodium chloride and dextrose solution were first used, either alone or in mixtures. They are effective in dehydration states but almost useless when blood or plasma have been lost, since when used in normal amounts they are unable to raise the blood pressure to pre-haemorrhage level. This, of course, is because their viscosity is no greater than water. Moreover, they diffuse rapidly and therefore have a very short action period.

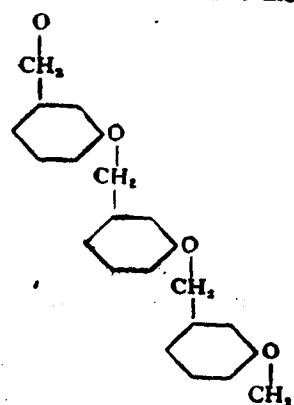
Gum saline.—In World War I Baylis showed that colloids with the osmotic pressure of plasma proteins could be used as blood substitutes, and he developed acacia, utilising a 6 per cent. solution in 0.9 per cent. sodium chloride. This gum saline solution was widely used with good effect, but later was abandoned because of reports of liver damage in some cases. Acacia is a foreign body which is not completely metabolised but further attention has been given to it recently in the human field and it is possible that it will return to use.

Gelatine.—A logical development from the use of acacia was gelatine, since this substance obviously has many of the requirements for a blood substitute and, being derived from animal bones, can readily be dealt with by the body. Tests soon showed that a 7 per cent. solution in 0.9 per cent. saline gave excellent results but wider developments were held up because of reports of tetanus following its use and suggestions that it might transmit anthrax. However, precautions can be taken in this regard and gelatine as a blood substitute is now being widely developed in America.

Isinglass.—Because of these dangers of mammalian infections, isinglass or fish gelatine has been used as a plasma substitute with excellent clinical results, but supplies are too limited for this to become generally employed.

Polyvinyl pyrrolidone.—During World War II, polyvinyl pyrrolidone, a new synthetic colloid, was used extensively by the Germans as a blood substitute. The results generally were good. A considerable advantage was the long duration of action following a single dose—about ten days. The Germans claimed that the material was wholly excreted within three to four weeks but there are still doubts on this point. The molecules are too large to pass the kidneys and probably do not dissociate in the body. Doubts as to the safety of polyvinyl pyrrolidone therefore still inhibit its general use.

Dextran.—The most recent development in this field and possibly the best substance to date is dextran, which was discovered in Sweden and developed in that country and in Britain. It is claimed to be nearly ideal. Produced from carbohydrate starting material it has a molecule tailored to a definite size and is therefore free from many of the dangers of toxic effects associated with its predecessors. It is formed of long linked chains (as is shown in its formula) which ensures material of high viscosity. Action with it is prolonged but its metabolism is claimed to be complete and it is now rapidly gaining general acceptance. Its main indications are in haemorrhage, traumatic shock, burns, etc., and doubtless it will find many uses in the veterinary field.



The Spreading Factor

A recent development which is of potential veterinary importance, relates to hyaluronidase, the so-called spreading factor. Hyaluronidase is an enzyme which occurs naturally in a wide variety of sources including testicular extract, spermatozoa, snake and bee venom, and some strains of haemolytic streptococci. When injected it allows fluids to diffuse into the tissues at an accelerated rate. This it does by its action in lowering the viscosity of hyaluric acid which is the simple tissue cement in nearly all animal tissues. By its use it is possible to inject hypodermically large volumes of fluid which generally have to be given intravenously at present. Absorption is very rapid and little or no swelling or discomfort arises. The toxicity appears to be extremely low and the activities of the substance are confined to the immediate area of injection. The use of hyaluronidase is now being advocated with local infiltration anaesthetics and it would appear that it could be utilised with advantage for some of the bulkier injections such as those administered for milk fever.

Nylon Surgical Dressings

Finally, although it does not fall strictly in the chemotherapeutic field, mention should perhaps be made of recent British work with nylon surgical dressings. A considerable drawback to ordinary occlusive dressings is, of

course, the sealing in of water vapour which, unless frequent changes are made, leads to maceration of the tissues, unhealthy granulation, and low resistance to re-infection. By a special process, strong nylon film has now been made which is only some three-thousandths of an inch thick and which is provided with numerous microscopic pores. These pores are of such a size that the film is completely waterproof and will not allow entry of bacteria but freely permits the transference of water vapour. If a wound is cleaned, therefore, only one dressing is required. An additional safeguard is provided by the transparency of the nylon film which permits the progress of the wound to be watched without interfering with the dressing. Such a development has, of course, considerable veterinary implications since, quite apart from the undesirability of frequent redressing, this is often impracticable on economic grounds.

Conclusion

The pace of discovery and development in the chemotherapeutic field shows no signs of slackening. On the contrary, the impetus given by World War II has resulted in the entry of many new research teams, particularly in America, and a continual flow of new and far-reaching discoveries is to be expected. As in the past, British discovery and inventiveness, as befits long experience and tradition, are still in the forefront. The veterinary profession, part of a great biological and chemical association, has an important and increasing part to play in these advances. In this paper it has been possible only to deal briefly with a few of the more recent of them but what is abundantly evident is that an advance in any one of the branches of these sciences is almost always of immeasurable aid to all the others. Sulphone, developed for veterinary uses, now gives results in leprosy which afford new hope to sufferers and physicians alike. The products elaborated to deal with the ills of man prove of no less value for the diseases and disorders of animals. It is in this spirit of unity that future progress will be made.

STEPHANOFILARIASIS AMONG BUFFALOES IN ASSAM*

By

V. R. GOPALAKRISHNAN,

Veterinary Investigation Officer, Assam, Gauhati

This article is based on an investigation into an outbreak of Stephanofilariasis among buffaloes in Nowgong district, Assam, and it also records the observations on its occurrence in other parts of the province. Fairly large number of buffaloes are maintained in certain localities in Assam and the climatic and geographical conditions seem to suit them well. Stephanofilariasis or ear-sore, as it is popularly called, was

*Paper read at the Indian Science Congress (Section of Medical and Veterinary Sciences), held at Patna in January 1948. *Indian J. Vet. Sc. A. H.* Vol. 18, Part 4, Dec. '48.

investigated in buffalo herds of several localities in five districts. The incidence of the disease has also been reported from other parts of India, particularly from Bihar, Orissa and Madras. The clinical lesion observed in the ear of buffaloes is known by various names such as, Ear-sore, Enzootic Otorrhoea, Otitis, Otacariasis, Contagious otorrhoea, etc. It seems probable that the condition is likely to be caused by other factors or agents than *Stephanofilaria* Sp., depending upon the locality, climate and environment. However, in this paper, the specific nature of the parasite occurring in the ear-sore of buffaloes in Assam is recorded and so it is considered appropriate to designate the condition as Stephanofilariasis.

Microfilariae or the larval forms of certain adult nematode worms, are found free in circulating blood as well as in skin lesions of domestic animals in India. It is not uncommon to demonstrate the presence of microfilaria in the peripheral circulation, causing no apparent inconvenience to the animal. However, the occurrence of microfilaria as a morbid entity of importance affecting the health of some species of domestic animals in this country, has been recorded by some workers during the past few years.

In a resume on the subject Sen [1931] stated that only two species of microfilaria were definitely recorded in equines and pointed out that the occurrence of microfilariasis in the horse as a condition concomitant with other forms of blood infection had been the general observation of workers. In dogs microfilariasis is commonly noticed with variable symptoms—from being devoid of noteworthy symptoms to being fatal. Datta [1935] indicated that his studies on the histopathology of humpsore in cattle, had led him to conclude that this disease of Indian cattle was similar to 'Cascado' of cattle in Dutch East Indies, caused by *Stephanofilaria dedoesi*. Pande [1935, 1936] detected the occurrence of and recovered microfilaria and live adult worms from the lesions of hump-sore among cattle in Assam. After pointing out certain anatomical differences between *S. dedoesi* and the new parasite, he designated it as *Stephanofilaria assamensis*, a new species, and attributed its constant presence in or association with the morbid skin lesions, to be the cause of hump-sore in cattle. While elucidating the cause of subcutaneous haemorrhagic nodules in cattle, a disease of economic importance in this country, Bhalerao [1939] pointed out that the worm affecting cattle was *Parafilaria bovicola*. Srivastava [1939] reported the occurrence of cutaneous microfilariasis in a bullock with a description of the clinical features of the disease as it occurred among cattle in Bombay province. Nathani and Sankaranarayanan [1940] have demonstrated the presence of microfilaria in a chronic indolent sore in the sheath of a breeding bull that ultimately responded to treatment with antimosan. Recently, in an interesting survey on applied helminthology

in India, Bhalerao [1947] has dealt with the occurrence and also new findings of some important parasites including filarid worms of man and animals. He also refers to the attempts made to discover the insect vector of *S. assamensis* causing hump-sore of cattle. It is evident that much attention is being paid, in recent years, to disease conditions among livestock caused by helminths. In this paper the occurrence of Stephanofilariasis as a specific disease entity in buffaloes causing ear-sore, is described.

Nature of occurrence

The disease occurs generally in a sporadic form. A few buffaloes in a herd are affected and there is hardly any indication either for a slow or for a rapid spread to other animals. Stray cases in a village are also observed. However, it occasionally assumes the form of an outbreak affecting a large number of buffaloes in a village and even spreading to a few villages in an area having large buffalo population. In such cases, the prevalence of the disease is seasonal; the outbreaks being noticed in the rainy season, especially soon after the first showers in February and March. But stray cases, not of acute or severe type, have been observed in almost all the months of the year. It seems that the lesions are quiescent in winter season and become active during rains and in this respect the behaviour is similar to that of hump sore of cattle.

The occurrence of the disease is observed in all the districts in the plains of Assam, particularly in low-lying localities on either bank of the Brahmaputra and the Surma rivers and their major tributaries. In fact, the first investigation of affected cases was carried out in Silchar on the bank of the Barak river, a tributary to the Surma, in Cachar district in November, 1939. Subsequently the disease was investigated in several localities of other districts, all of them situated on the banks of rivers. Cases are often seen in herds that are usually maintained in marshy low-lying areas or in riverain tracts that abound in grazing pastures. The occurrence of the disease is more common in the Surma Valley and the Lower Assam Valley than in the Upper Assam Valley. It is noteworthy that the disease has not been observed in buffaloes in the hill districts of the province.

Buffaloes of both sexes and of all ages seem equally susceptible. But more cases are often seen among the adult and old animals. The disease is very rarely fatal even though the incidence of affected animals in an outbreak may vary from 20 to 50 per cent depending upon the severity of the outbreak.

Outbreak in Nowgong district.—Investigation into this condition was carried out in March 1942 and in subsequent years in Kampur, Nowgong district. In the first instance, it prevailed in the form of an

epidemic affecting about 30 buffaloes in Kampur and two adjoining villages. The outbreak was noticed about ten days after the rains. The first case was observed at Kampur in the middle of March and subsequently more cases were reported in the three villages.

The villages are situated on either bank of a river that winds its way near Kampur. The whole area is low lying and is usually flooded during rains. Fairly extensive grazing area is available in the marshy banks of the river and around low-lying pools where buffaloes graze and lie down for rest in the stagnant water for some part of the day.

Symptoms.—Frequent shaking of the ear and sometimes slightly offensive odour near the animal are first observed. Examination reveals the inflammatory condition at the base of the ear near about the meatus while the external ear becomes more or less thickened presenting cracked surface of the skin. Appetite is diminished and there is definite decrease in milk yield. The inflamed area shows numerous minute pin-point congested spots. Frequent rubbing or scratching of the ear to poles or trees is often seen. One or both the ears are affected. If one ear is affected the animal holds its head side ways with the diseased ear down.

Slight watery discharge is observed at the early stage which later becomes purulent, light or dirty yellow in colour with offensive odour. Sometimes ulceration of lining of the ear is seen. The exudate is occasionally streaked with blood. There is usually extraneous infection. The animal shows much pain when handled. Occasionally pharyngitis and congestion of the nasal mucous membrane with profuse discharge, are noticed. Submaxillary lymph glands become swollen. Neglected cases become fly-blown and even maggots are formed. In severe cases, when both ears are affected there is constitutional disturbance which interferes with the working capacity of the animal. A large number of cases are usually seen in working animals, i.e., male buffaloes. They are mainly used for field work such as ploughing and for carts. During the rest period of the day they often remain in miry and marshy places near water-ways. This habit, to a certain extent, seems to retard the improvement in treated cases. The condition usually becomes chronic and often remains quiescent in the cold season. Generally active lesions reappear during rains, the monsoon weather being most favourable.

Several cases were examined in various localities during the rainy and winter seasons, to study the differential characters of the lesions in the active and quiescent stages. The symptoms described above refer to the active stage in the rainy season. In winter, the lesions become inactive and appear more or less dry. The surface presents a healthier appearance and there is less local irritation. In fact, the animal does not manifest any inconvenience or pain. Parasites have been recovered from

all the cases though their number from these cases may be less. When the lesions are active, more parasites are obtained from the scrapings.

The disease usually runs a slow course of two to three weeks or more. Generally one ear is affected and sometimes both are involved. Recovery ordinarily takes place and there is rarely any mortality.

Collection of scrapings.—Scrapings are collected from the affected part after cleaning the surface with normal saline solution. A blunt scalpel or a curette will serve the purpose. Certain observations regarding the collection of adult worms from fresh scrapings are worthy of note. While scraping affected areas or lesions, it is not uncommon that a portion of the parasite protrudes from the scraped surface. Dropping a small quantity of saline over the area, removes the oozing blood, thus exposing more distinctly the adherent parasite which can be gently removed with a pair of forceps or camel-hair brush. Besides, when scrapings are collected in normal saline in a Petri-dish, the worm could be found embedded in a piece of scraped tissue, sometimes with a portion of it protruding. A careful teasing of the clumps of the scrapings dislodges the worm. While examining the worm under microscope, it is not infrequent that the anterior extremity is covered with fragments of tissue.

Laboratory findings.—Scrapings and smear preparations were examined in all the cases that were investigated. From the scrapings adult nematode worms, both male and female, have invariably been recovered for examination. As usual in Filariidae, female parasites were found longer than the male ones. Smear preparations have revealed numerous microfilariae. These preparations have been examined fresh as well as stained with Leishman stain. In wet smears, the microfilaria is coiled up inside an egg-like membrane. In stained smears, free forms are detected. The morphological characters of the parasite have been found apparently identical with those of *Stephanofilaria assamensis* causing hump-sore of cattle as recorded by Pande [1936].

Further, with the object of getting the finding confirmed, collection of worms from the ear scrapings was sent to the Officer-in-charge, Veterinary Zoology Section, Imperial Veterinary Research Institute, Mukteswar, and it has been identified as belonging to *Stephanofilaria* (sp). Besides, specimens of worms from further cases were sent to the Officer-in-charge, Helminthiasis Scheme, Imperial Council of Agricultural Research, Lucknow University, Lucknow, and these too were identified as *Stephanofilaria* (sp).

In the smear preparations, in addition to microfilaria, various organisms have been seen, such as cocci, fungi, acari parasites, etc. These are considered saprophytic or secondary invaders in view of the anatomical position of the parts affected; nor is their presence constant in all cases.

Transmission of the disease.—Experimental transmission or reproduction has not been successful so far. In view of the seasonal occurrence of the disease, insects must be considered to be the probable vectors of the causative parasite. During the rainy season when the lesions become active, the sores are swarmed with flies—*Stomoxys calcitrans* and *Musca* (*sp.*). But nothing definite regarding transmission could be ascertained. It may, however, be mentioned that the probable vector or intermediate host of *Stephanofilaria* (*sp.*) causing skin affections of cattle in this country and elsewhere, is yet undetermined.

Treatment and control.—During the period of investigation of this disease, experimental treatment of hump-sore in cattle was started in October, 1940, using tartar emetic, due to its recognized parasitocidal properties. Local application of tartar emetic ointment, 1 in 25, gave indications of improvement in the skin lesions and its wider application in all types of cases of hump-sore gave promising results. Since the casual agents of hump-sore and ear-sore appeared identical, excepting for the difference of host and seat of predilection, the same method of treatment was adopted for the lesions in the ear. The results were very encouraging and in fact, it was found that the response was more satisfactory in ear-sore than in hump-sore.

Application of tartar emetic ointment is adopted as a routine treatment now-a-days in Assam, for ear-sore in buffaloes. After dry cleaning and removal of superficial debris, tartar emetic ointment 1 in 25 (one dram of tartar emetic powder thoroughly mixed with three ounces of vaseline), is rubbed well over the affected part. Daily dressing is continued for three days followed by a rest period for three days. The treatment is repeated for three days more with an alternative equal period of rest. In two to three courses of treatment satisfactory clinical recovery is observed. The alternate rest period was found necessary due to the irritant property of the drug. No other medicine was tried as tartar emetic appeared safe, effective, cheap and simple to use.

With proper application of this treatment, improvement in the condition of the sore is noticed in the course of one to two weeks. It is necessary to avoid damage by external agencies, like pecking by crows and excessive fly infestation. The habit of remaining in water or marshy poud should be avoided to keep the sore dry and clean.

Discussion

It is well-known that nematodes of *Stephanofilaria* (*sp.*) have been associated with skin affections of cattle, most probably as etiological factors, in 'Cascado' of cattle in Dutch East Indies [1933], in sore-like skin lesions of North American cattle (1934), and in hump-sore of cattle in India (1935).

The occurrence of *Stephanofilaria* (*sp.*) causing ear-sore in the buffalo is interesting.

A question may be asked whether the parasite is a direct etiological agent causing ear lesions. Although transmission experiments, here as well as elsewhere, have not been successful so far in all the skin affections caused by parasites of the *Stephanofilaria* species, other evidences substantially establish the disease to be of nematode origin. The constant presence of the parasite in the lesions, the distribution of the worms in the affected parts and the type of cellular reaction set up in the skin lesion, clearly suggest the cause of the disease.

Ear-sore in buffaloes is reported to occur in Bihar for some years past and at times in an epidemic form. While investigating the condition, Kapur [1940] has stated that in one case three microfilaria-like objects were seen in the pus obtained from an infected ear. The report on the material sent to the Indian Veterinary Research Institute, Mukteswar, for examination states that a considerable number of microfilaria were seen in section burrowing through and below the epithelial papillae of the skin. Presumably no adult parasite was obtained from the lesions. It seems evident from the report that the condition, as reported in Bihar, is similar to some extent to the disease described in this paper.

Clinical observation indicates that some parallelism exists between ear-sore of buffaloes and hump-sore of cattle in certain respects. The nature of skin lesions in quiescent and active stages, the seasonal incidence, the tendency to become chronic, the presence of apparently identical parasites, their absence in general circulation and finally, the response to tartar emetic treatment, point to similar pathological process though in different species of animal and places of predilection.

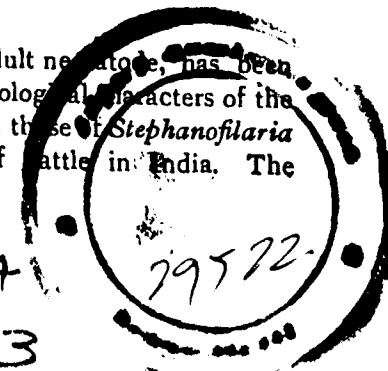
Summary

Details are given of investigation of Stephanofilariasis among buffaloes in Assam and of its occurrence as a specific cutaneous microfilariasis of the ear. The disease usually occurs sporadically but at times, it prevails in the form of an epidemic. Full particulars of its seasonal occurrence and localities affected are given.

Symptoms, course, means of control and treatment are described. The disease is generally confined to buffaloes. It is very rarely fatal though the incidence of affected animals in an outbreak varies from 20 to 50 per cent.

The causal parasite, both microfilaria and adult nematode, has been recovered from the lesion of ear-sore. The morphological characters of the parasite have been found apparently identical with those of *Stephanofilaria assemensis* [Pande 1936], causing hump-sore of cattle in India. The

JL
KZ m 2, N24
NSI-28-3



findings have been confirmed by the Mukteswar Institute and by the Officer-in charge, Helminthiasis Scheme, Lucknow University.

Skin affections of cattle in India and elsewhere, caused by *Stephanofilaria sp.*, are cited. The occurrence of *Stephanofilaria sp.* in buffalo—a different species of animal—causing ear-sore is recorded.

Observations on certain identical features of hump-sore of cattle and ear-sore of buffaloes are discussed.

The work has been carried out under a scheme of research financed by the Indian Council of Agricultural Research, India.

Acknowledgments

I wish to express my sincere thanks to Dr. G. S. Thakar, Officer-in-charge, Helminthiasis Scheme, Indian Council of Agricultural Research, Lucknow University, Lucknow, and to Dr. S. C. A. Datta, Officer-in-charge, Veterinary Zoology Section, Indian Veterinary Research Izatnagar, for examination of specimens. I wish to place on record acknowledgment of help and facility received from Rai Bahadur S. C. Ghose and from Mr. A. K. Mitra, Director of Veterinary Department, Assam. To Mr. Nag Chowdhury, Veterinary Assistant Surgeon, Patharkandi, my thanks are due for his assistance in the field work.

REFERENCES

- Bhalerao, G. D. (1939). *Indian J. vet. Sci.* 9, 371.
 ——— (1947). *Proc. Indian Sci. Cong.* 34, 15.
 Datta, S. C. A. (1935). *Proc. Indian. Sci. Cong. Calcutta.*
 Kapur, H. R. (1940). *Ann. Rep. V. 10. V. Bihar (1939-40)*, 2.
 Nathani, R. C. and Sankaranarayanan N. S. (1940). *Ind. Coun. Agric. Res. Misc. Bul.* 33, 7.
 Pande, P. G. (1935). *Indian J. vet. Sci.* 5, 332.
 ——— (1936). *Ibid.* 6, 346.
 Sen, S. K. (1931). *Ibid.* 1, 143.
 Srivastava, H. D. (1939). *Ibid.* 9, 389.

GLYCOSURIA IN RABIES DUE TO FIXED VIRUS

By

H. M. BHATIA L.V.P., B.V.Sc., and M. L. MEHTA L.V.P., B.V.Sc.,
Punjab Veterinary College, Hissar.

Hutyra *et al* (1) have stated that, during the course of rabies, especially in the canine species, the urine contains glucose up to 3 percent. This is based on the works of Nocard, Nilcos and Rabiaaux and Pfiel who detected glucose in the urine of 33 out of 44 and 7 out of 15 rabid dogs examined by them respectively. Nocard, Rabieaux and Rodecha also detected 9 per cent glucose in the urine of a rabid cow shortly before death.

According to the same book Porcher reported this symptom in goats suffering from rabies. Malkmus (2) while dealing with glycosuria also says that it is observed in rabies.

On the other hand, Krishnamurty (3) examined the urine of 21 rabid animals (16 canines and 5 bovines), but could not demonstrate the presence of sugar in any of these cases. His findings were not in agreement with the findings reported in the literature referred to above.

Again, according to Hutyra *et al* (1), albuminuria is rarely present or only in slight degree in cases of rabies, while Krishnamurty (3) detected albumin in 19 per cent of such cases (4 out of 21).

Taking into consideration the above divergent findings, it was considered desirable to find out the presence or otherwise of sugar and albumin in cases suffering from rabies.

Methods and Material

Anti-rabic Vaccine is being prepared from sheep's brain at the Biological Products Section of the Punjab Veterinary College, Hissar, after Semple's method (4). The sheep used for the purpose are inoculated intrathacally with rabies 'fixed' virus. These sheep when fully paralysed from the reaction to the virus are destroyed by air inflation into the heart. At the time of destruction, there is involuntary passage of urine in some cases; this was collected for examination. In other cases, the pelvis was opened immediately after destruction and the urine collected directly from the bladder.

The usual Benedict's and Fehling's tests were employed for the presence of sugar and Heat Test and Heller's Ring Test for the detection of albumin (5). Each sample of urine was subjected to these tests in duplicate to check up the results.

Results

In all, 74 sheep were examined, out of which urine from only 45 could be collected. In the remaining 29 sheep, the bladder was found to be empty on autopsy and no urine was passed at the time of destruction.

Out of the 45 samples of urine thus collected, 3 were found positive for the presence of sugar and one for the presence of albumin (Vide Table I). The percentage of sugar and albumin in the positive cases could not be worked out as the quantity of urine collected in each case was very small (not more than 10 c.c.). According to the colour changes in the Benedict's test, however, it could be safely judged that the quantity of sugar in the positive cases was not more than 2 per cent,

TABLE I

Showing the results of urine examination of sheep affected with rabies 'fixed' virus.

Sheep No.	Date inoculated	Date destroyed	Mode of Urine collection.	Results of tests for Sugar.	Results of tests for albumin.
1	2	3	4	5	6
3	3-7-50	12-7-50	B	—	—
4	5-7-50	13-7-50	V	—	—
5	4-7-50	13-7-50	V	—	—
6	4-7-50	14-7-50	B	—	—
8	5-7-50	13-7-50	B	—	—
11	12-7-50	18-7-50	B	—	—
12	"	"	B	—	—
13	17-7-50	25-7-50	V	—	—
14	"	26-7-50	B	—	—
23	25-7-50				
	reinoculated				
	7-8-50	14-8-50	B	—	—
24	7-8-50	"	B	—	—
27	31-7-50	7-8-50	V	—	+
28	"	"	B	+	—
32	8-8-50				
	reinoculated				
	23-8-50	31-8-50	B	—	—
34	14-8-50	21-8-50	V	—	—
38	21-8-50	28-8-50	B	—	—
39	"	30-8-50	B	—	—
41	22-8-50	29-8-50	V	—	—
42	"	"	B	—	—
43	"	30-8-50	B	—	—
44	26-10-50	3-11-50	B	—	—
45	14-11-50				
	reinoculated				
	28-11-50	6-12-50	B	—	—
46	14-11-50	22-11-50	B	—	—
48	9-1-51	17-1-51	B	—	—
49	"	18-1-51	V	+	—
50	19-1-51	27-1-51	B	—	—
51	"	"	B	—	—
53	24-1-51	31-1-51	B	—	—
54	"	"	B	—	—
55	5-3-51	14-3-51	B	—	—
56	"	"	V	—	—
57	"	"	B	—	—
58	7-3-51	13-3-51	B	—	—
59	13-3-51	20-3-51	B	—	—
60	19-3-51	26-3-51	B	+	—
61	20-3-51	26-3-51	B	—	—
62	19-3-51	27-3-51	B	—	—
63	"	"	V	—	—
64	"	"	V	—	—
66	20-3-51	"	B	—	—
67	21-3-51	29-3-51	V	—	—
68	"	"	B	—	—
69	"	"	B	—	—
72	2-4-51	9-4-51	B	—	—
73	"	"	V	—	—
74	"	"	B	—	—

N.B.—1. Missing numbers represent those sheep from which urine could not be collected.
2. V stands for involuntary micturition at the time of destruction and B for direct removal of urine from the bladder.

Discussion

In the present investigation out of the 45 samples of urine from sheep infected with fixed virus rabies, only 3 were positive for the presence of sugar. The percentage of positive cases thus works out to only 6.5. Foreign workers have, however, recorded a far higher percentage, from 50 to 73%, in cases of rabies in canines. So far as cattle are concerned only one case was available, which cannot form the basis of any generalisation. Krishnamurty, on the other hand, could not detect this symptom in any of the 21 cases (16 canines and 5 bovines) recorded by him. Similarly, the percentage of positive cases in the present work is so low that it cannot be attributed to rabies. It may be argued that this symptom may not occur in artificially infected cases with 'fixed' virus. Clinical symptoms observed in cases of rabies from 'fixed' virus are nearly the same as observed in 'street' virus rabies. The findings of Krishnamurthy, therefore, appear to be more reliable and are corroborated as far as rabies due to 'fixed' virus in sheep is concerned.

Similarly the presence of albumin in only one case cannot be considered significant.

Summary

1. 74 sheep inoculated with rabies 'fixed' virus were examined, out of which urine from 45 was collected at the time of destruction either on voluntary micturition or from the bladder directly.
2. The above samples of urine were tested for the presence of sugar and albumin.
3. Glycosuria could be detected in only 3 cases and albuminuria in one out of 45 cases examined.
4. Glycosuria and albuminuria do not seem to be common symptoms of rabies due to 'fixed' virus.

Acknowledgment

Our thanks are due to Dr. Tulsa Ram, L.V.P., M.Sc., Ph.D., P.V.S., Veterinary Investigation Officer, Punjab, for his valuable suggestions and scrutiny of the paper.

REFERENCES

1. Gradwohl, R. B. H. (1948) "Clinical laboratory methods and diagnosis" Vol. I pp. 54-55 & 66-67. The C. V. Mosby Co., St. Louis.
2. Huttyra, Marek & Manniger (1949) "Special Pathology & Therapeutics of Domestic animals" Vol. I pp. 537, 540 & 541. Bailliere, Tindal & Cox, London.
3. Krishnamurty, D. (1946) "A note on Glycosuria in Rabies" *Indian Veterinary Journal*, Vol. 23 pp. 219-21
4. Malkmus, B. "Clinical Diagnostics of the internal diseases of domestic animals" 11th. Ed. (1944) pp. 216. Bailliere, Tindal & Cox, London.
5. Webster, W. J. (1946) "Practical notes on large scale vaccine production in India," Govt. of India Publication.

COMPARATIVE ECONOMICS OF PAPAIN DIGEST BROTH
VERSUS PEPTONE BROTH IN THE LARGE SCALE
MANUFACTURE OF HAEMORRHAGIC SEPTICAEMIA VACCINE

BY

K. GOVINDA RAU, B.A., G.M.V.C., U.P.V.S.I.,
and

N. S. VERMA, L.V.P., P.G., (Muk.)

Biological Products Section,
Animal Husbandry Department, U.P., Lucknow.

History

Martin (1927) introduced Papain Digest Broth for the first time for isolation of cholera and dysentery bacteriophage. Marrison and Vardon (1929) slightly modified the process and dispensed with the use of meat extract for dilution of the concentrated Papain Digest Broth as they thought that such a dilution with meat extract was apt to alter the pH of the medium and affect the action of the bacteriophage. Later Asheshov *et al* (1933) made a comprehensive study of the various methods and introduced a simpler method of preparing Papain Digest media. They also described several methods of standardization of the concentrated broth in order to obtain an uniform composition of the media. Roberts (1948) maintained his *Pasteurella septica* strain on horse-muscle digest. White (1950) used the Papain Digest Broth for the cultivation of bovine contagious pleuro-pneumonia virus.

Introduction

In order to explore the possibility of the use of Papain Digest Broth media for the preparation of Haemorrhagic Septicaemia Composite Vaccine on a mass scale cheaply for field use, completely eliminating the use of Bacto-Peptone, which was in short supply and, when available, was prohibitively costly, some experiments were conducted at the Biological Products Section here which are now recorded. Upto the time of sending the paper to the press, i.e., during a period of 8 months, over 125 lakhs c.c. of the Papain Digest Broth Vaccine has been issued to the field and used without any untoward result.

Material and Methods

Papain of Ceylon quality was used for the digestion of beef throughout the experiments. Method of preparing Papain Digest Broth and of its standardisation by estimation of oxidizable matter as advocated by Asheshov *et al* (loc. cit.) was followed in broad outlines. Viable bacterial counts to compare the growth were carried out by pour-plate method. Total Nitrogen was estimated by the method of Campbell and Hanna (1937).

(a) *Preparation of concentrated Papain Digest Broth*:—One thousand grammes of well-chopped fat-free beef was thoroughly mixed with two litres of tap water. Fifteen grammes of powdered papain was well emulsified in a little warm water and added to the meat. Reaction was adjusted to pH 7.0 and was maintained throughout the digestion. The container with the mixture was then placed in a water bath and temperature raised to 70°C and maintained for three hours with constant stirring. The digest was strained through a thick cloth. Reaction was then adjusted to pH 8.4, as high alkalinity favoured the complete precipitation of all earthy phosphates leading to a sparklingly clear medium on filtration. The product was then either steamed for 30 minutes or autoclaved to inactivate the ferment and to deposit the phosphates and other coagulable matter.

On cooling, when the supernatant was quite clear, the contents were filtered through filter paper without disturbing the deposit, which otherwise tends to choke the pores of the filter paper and make the filtration slow; later the deposit was placed on the paper and drained completely.

(b) *Dilution of the Stock Broth*:—Oxidizable matter in the above concentrated digest broth was estimated by the method described by Asheshov *et al* (1933) and the concentrated broth was diluted with water so as to contain 0.5% oxidizable matter. 0.5% Sodium Chloride was added to the dilute broth and the reaction adjusted to the required pH (7.6) with N/1 Hydrochloric Acid. After filtering through metafilter it was sterilized in autoclave at 15 lbs. pressure. This constitutes the Papain Digest Broth for actual use.

Experimental

1. *Analysis of 1% Peptone Broth and Papain Digest Broth*:—The percentage of oxidizable matter and total nitrogen found in Nutrient Broth as well as concentrated Papain Digest Broth is tabulated below.

Trials	Total Nitrogen in Gms. c.c.		Oxidizable Matter	
	Nutrient Broth	Papain Digest Broth	Nutrient Broth	Papain Digest Broth
1.	0.3	1.25	0.60%	3.0%
2.	0.29	1.28	0.69%	3.2%
3.	0.31	1.26	0.70%	3.2%
4.	—	—	0.62%	3.8%
5.	—	—	0.56%	3.6%
6.	0.30	1.26	0.66%	4.0%
7.	—	—	0.69%	4.0%
8.	—	—	0.64%	3.9%
Average	0.3	1.26	0.63%	3.6%

2. *Comparison of growth*:—A virulent strain of *Pasteurella bovisseptica* was grown in tubes of Papain Digest Broth containing various concentrations of oxidizable matter and nutrient broth. To obtain comparable results, the quantity of broth and size of inoculum was kept equal in each tube. Viable bacterial counts were made by pour-plate method after 18 hours' incubation at 37°C. The results are tabulated below.

Number of viable bacteria in millions per c.c.

Trials	Nutrient Broth	Papain Digest Broth with Oxidizable matter.			
		0.4%	0.5%	0.6%	0.7%
1.	540	120	540	—	—
2.	740	—	733	698	712
3.	621	—	642	572	649
4.	625	—	625	625	640
Average	631	120	635	635	667

It will be noted from the above table that the growth of *Pasteurella bovisseptica* in Papain Digest Broth is comparable to that in Nutrient Broth. Further it may be noted that the concentration of oxidizable matter above 0.5% did not improve the growth while concentrations below this adversely affected the growth. This observation supports the view of Asheshov *et al* (loc. cit.) held in case of *Vibrio Cholera*.

3. *Safety test* —100 calves including 31 buffalo calves, 100 rabbits and 13 guinea-pigs were vaccinated with Haemorrhagic Septicaemia Composite Vaccine prepared from Papain Digest Broth. No untoward reaction was observed in these animals.

Medium	Quantity of raw material	Cost per brew of 100 litres finished broth.
1% Peptone Broth.	Beef 100 lbs.	= Rs. 50/-
	Bacto-peptone 2 lbs.	= Rs. 100/-
Papain Broth	Beef 14 lbs.	Rs. = 7/-
	Papain 4 oz.	Rs. = 7/-
		Rs. 14/-

4. *Comparative costs of media*:—The above table shows the comparative cheapness of the media prepared by digestion of beef with papain. This is of great significance in large scale manufacture for mass prophylactic vaccination, especially when they are issued free by the State for field use.

Summary

1. Some experiments were conducted to explore the possibility of the use of Papain Digest Broth for the preparation of Haemorrhagic Septicaemia Composite Vaccine.

2. Papain Digest Broth with 0.5% oxidizable matter supports the growth of *Pasteurella bovisseptica* equal to 1% Pepton Broth and the cost of the former is very much less.

3. Haemorrhagic Septicaemia Composite Vaccine prepared from Papain Digest Broth was safe when used on 100 calves including 31 buffalo calves, 100 rabbits and 13 guinea pigs.

Acknowledgments

The authors are indebted to Dr. R. L. Kaura, Director of Animal Husbandry Department, Uttar Pradesh, for his helpful suggestions from time to time and also for kindly editing the paper.

REFERENCES

1. Asheshov, I. N., Asheshov, I., Sranjam Khan, and Lahiri, M. N. (1933), *Ind. Jour. Med. Res.* 20, 1101.
2. Campbell, W. R. and Hanna, M. L., 1937, *J. Biol. Chem.* 119, 15.
3. Martin C. de, C (1927) *Trans. F.E.A.T.M. 7th Congress*, 2, 484.
4. Morrison, J and Vardon, A. C. (1929) *Ind. Jour. Med. Research* 17, 48.
5. Roberts, R. S. (1948) *J. Comp. Path & Therap.* 57, 261.
6. White R. W. (1950) *British Vety. Journal* 106, 201.
7. Webster W. J. (1946) Notes on large scale vaccine manufacture in India.

THE MORPHOLOGY AND DEVELOPMENT OF THE DEER SPERM**

BY

C. KRISHNA RAO, G.M.V.C., B.V.SC., M.S. (Calif.)

Madras Veterinary College.

Recent work has elucidated the fact that the cytoplasmic cap and the cytoplasmic drop are structures closely associated with the development of the spermatozoa of a number of farm animals. Since the first record for the boar sperm (1) the cytoplasmic cap has been observed under the electron microscope (2) in the case of bull sperm and Rao and Hart (3) demonstrated that this structure is a normal feature of all bovine sperm from all levels of the male reproductive tract, being most prominent on those from the deeper regions. In view of this and other recent work (4, 5, 6) on sperm development, it was proposed to extend this study to other species of animals and the preliminary work done on the deer sperm is reported in this note.

The testes of two sexually mature deers were obtained after shooting them, the period elapsing between the death of the animals and the labora-

**This work was carried out at the Texas A. & M. College, College Station, Texas U. S. A. The help and encouragement given by Dr. R. O. Berry, Associate Professor of Animal Husbandry, are very deeply appreciated.

tory examination being approximately twelve hours. The staining techniques employed were the same as reported earlier (6).

Morphologically the deer sperm bore a strong resemblance to the goat sperm. The cytoplasmic cap could be noticed clearly on the testicular sperm as well as on those from the different regions of the epididymis of the deer. Using Weigert's iron hæmatoxylin and safranin, the cap could be seen as a brownish structure at the anterior end of the sperm head and extending laterally to about the middle of the head and appears to stop at the junction of the acrosome and the post-nuclear cap. It could be noticed on practically every one of the sperm in varying degrees of development. It was more clearly visible and was better developed on the sperm from the epididymis than on the sperm from the vas deferens and thus appears to undergo regression as the sperm move away from the testes. The cap was present both on morphologically normal as well as abnormal sperm.

The cytoplasmic drop could be seen in different locations on the sperm depending on the region from which the sperm were collected. On the testicular sperm the drop may be seen on any of the following locations—round the posterior half of the sperm head towards the base, surrounding the neck, or at the anterior end of the connecting piece. In the former two locations, the drop is in the form of an irregular, loose cytoplasmic mass but when it is at the anterior end of the connecting piece, it is in the form of a compact, well-defined, globular structure. The majority of the sperm from the head of the epididymis showed the drop at the anterior end of the connecting piece, while most of the sperm from the tail of the epididymis and the vas deferens did not have the drop at all. A large number of drops were, however, found loose in the microscopic field in preparations from the tail of the epididymis and the vas deferens indicating that these must have come off from the sperm possibly having been released owing to the motility of the sperm in these two regions. The position of the drop on the sperm collected from the body of the epididymis was extremely variable, there being a general tendency for increase in the number of sperm with posterior drops towards the lower end of the body. When stained with Weigert's iron hæmatoxylin and safranin, the head of the sperm was found to take the blackish colour while the cytoplasmic drop and the tail took a brownish colour. The cytoplasmic drops whether loose in the microscopic field or on the sperm could be easily identified by their characteristic shape. Observations on the motility of sperm could not be made owing to the long interval between the time of the animals' death and the examination of the material.

In preparations from the testes a large number of sperm with a filiform or filamentous connecting piece were noticed and these had the cytoplasmic drop either surrounding the base of the sperm head or round the neck. This type of sperm were conspicuously absent from preparations

from other regions of the male reproductive tract. It is, therefore, presumed that these sperm represent immature forms and not abnormal sperm since they appear to get over their abnormalities in the course of further development. Some of the testicular sperm and an occasional sperm from the head of the epididymis were found to have a tortuous connecting piece of normal thickness but such types were not come across in preparations from the tail of the epididymis and the vas deferens.

BIBLIOGRAPHY

1. Baylor, M. R. B., Nelbandov, A. and Clark, G. A.: *Proc. Exptl. Biol. and Med.*, 1943, **54**, 229.
2. McKenzie, F. F., Miller, J. C. and Banguess, A. C.: *Missouri Agric. Exper. Sta. Res. Bull.*, 279, 1938.
3. Rao, C. K. and Hart, G. H.: *Am. J. Vet. Res.*, 1948, **9**, 286.
4. Rao, C. K. and Berry, R. O.: *Am. J. Vet. Res.*, 1949, **19**, 357.
5. Rao, C. K. and Berry, R. O.: *Ind. J. Vet. Sci.*, 1950, **20**, 47.
6. Rao, C. K. and Berry, R. O.: *Ind. Vet. J.*, 1950, **26**, 288.

SEARCH FOR THARPARKAR BREED*

BY

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

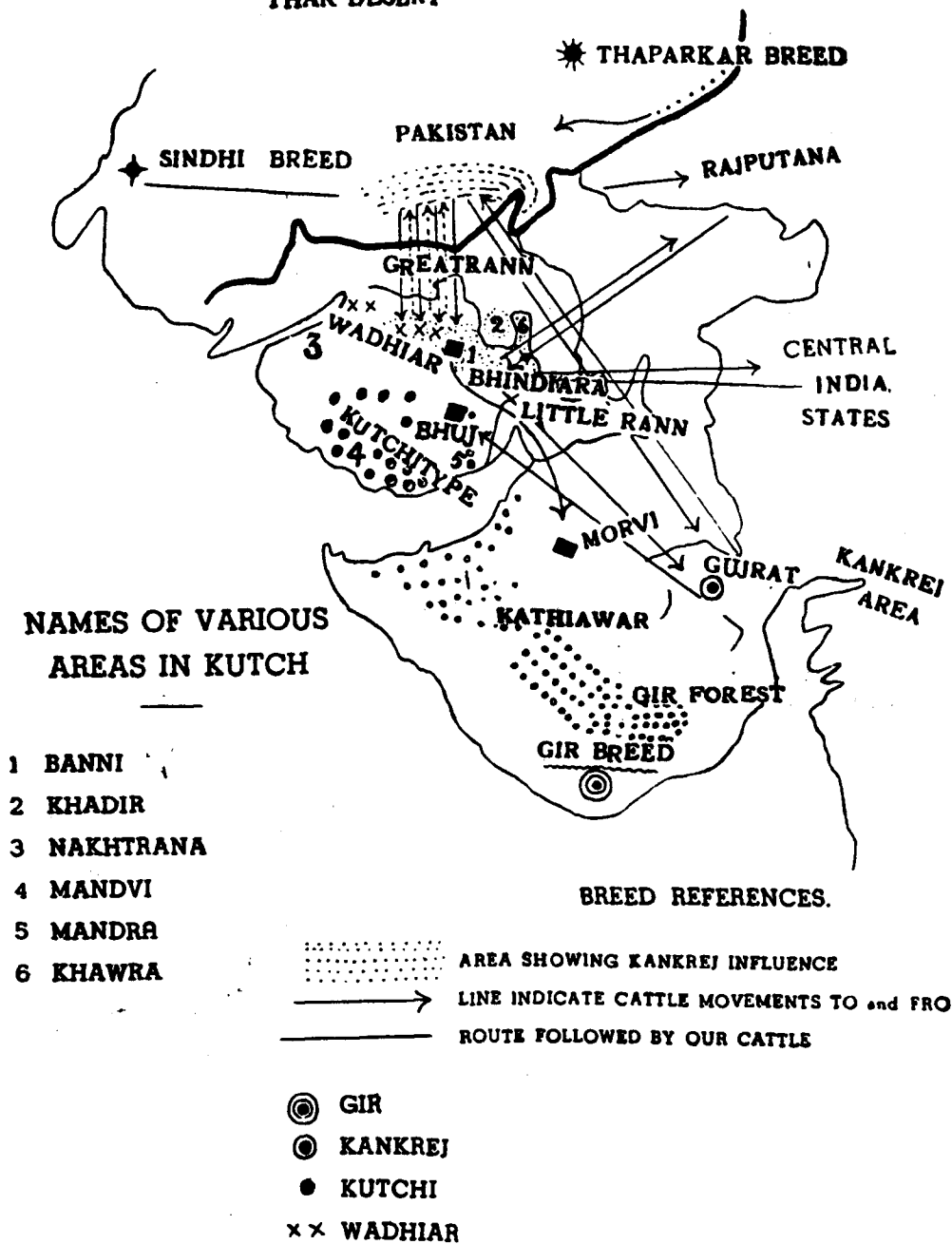
Deputy Director, Animal Husbandry, Meerut.

On the basis of information that nearly 2,000 heads of Tharparkar cattle had migrated into Cutch, we proceeded to acquire some of these for setting up in U. P., a nucleus of this breed, well-known for its good draught and milk qualities. The preservation of this breed assumed greater importance, because the home of this breed has gone away into Pakistan. According to Oliver¹ the home of this breed is a semi-desert tract of the south-west Sindh in which they are largely bred but they are also produced over large sections of the Indian states of Cutch, Jodhpur and Jeselmer. Williamson², who paid a special visit to the home of this breed to decide the controversy about the Thari and Tharparkar breed, recorded that the breed is found in a state of purity in the Nagarparkar area of Thar desert and as one moves towards west of this tract, Sindhi influence is noticeable, while towards south and east, Kankrej and Gir influences are visible. There is no special mention as to the degree of purity or the abundance in which this breed is found in Cutch.

Survey.—On arrival in Cutch, a thorough survey was made of Banni, Khawra and Khadia areas (for location see Fig. 1). These areas were likely to contain the migrated animals, because of their nearness to Pakistan border which is only separated from this area by the Rann³. Keeping Williamson's

*This article is the result of survey carried out for purchasing Tharparkar animals from Cutch.

THAR DESERT



Map illustrating Mr. H. K. Lall's article on Search for Tharparkar Breed.

FIG. 1

Photos illustrating Sri H. K. Lall's article



Fig. 2
A herd of Wadhiar cattle.



Fig. 3
Tharparkar Cow.



Fig. 4
Tharparkar and Cutchi Cow side by side.



Fig. 5
A Group of Malgujars with their huts in the back ground.



Fig. 6
Inside the drawing room of a Malgujar of Banni (Kutch).



Fig. 7
Flag stones commemorating the memory of two feudal Rajputs in Kutch.



Fig. 1
COW WITH
TRIPLETS



Fig. 2
THE TRIPLETS
AS THEY ARE
NOW



Fig. 3
COW WITH THE
DEAD TRIPLETS

(To face page 217)

observations in view, the area in Pakistan, lying parallel to the area we were surveying in Cutch, would show Kankrej influence, and not have Tharparkar breed in a pure state, because of being some distance away from the home tract of the breed and therefore the migrated animals from this area would be a mixed lot and not all be pure Tharparkar animals. This observation was confirmed, when we completed the survey of this area. Tharparkar animals were found, but few in number. Most of the breeders in this area were going in for Wadhia breed, a breed similar to Kankrej. (Fig. 2) All the cattle, excluding Wadhias, that came from Sindh, whether they were of white or red colour, were called Sindhis by the local breeders. Not only the number of Tharparkars was small, but there were no animals in milk on account of the famine in the year 1948-49 and thus our plan to buy the cows in milk had to be given up. The bull calves of the breed were conspicuous by their absence, not only in this area, but also in other areas that were surveyed.

Kachhi type.—The other taluqas of Cutch — Mandvi, Mandra, Nakhrana—were also surveyed in search of Tharparkar breed (Fig. 3) but in none of these areas, Tharparkar breed was found in any state of purity. Most of Cutch including the above mentioned areas has a local type of cattle called 'Kachhi'. (Fig. 4). It may, however, be said without reservation that the 'Kachhi' is not at all a defined breed, or even a type, because the term is used by the local people for all indigenous cattle not belonging to any breed irrespective of size and colour. But one also gathers the impression by seeing large number of 'Kachhi' animals, that perhaps it was a distinct type once upon a time and that it has now lost its identity, because of mixing with other breeds.

Other Breed Influences.—Apart from Tharparkar, the influence of Sindhi and Gir on local animals is also seen in different parts of Cutch, obviously as the result of using bulls of these breeds either intentionally or accidentally. The Gir influence is more conspicuous than those of others and is observed in the bulging forehead, Gir colourings and in flatness of horns. Perhaps it would have been more so, if Cutch was not isolated by the sea and the Rann from Kathiawar—the home of the Gir. The trends of cattle movement in Cutch show a constant traffic of cattle to and from Cutch, Kathiawar, Gujrat, Central India, Rajputana and Sindh (before partition) which is probably one of the main reasons for the influence of other breeds coming into Cutch. Cutch in fact has been the mixing bowl of breeds; some remained distinct, as it were, in pockets; some became blended with others either during their sojourn to pastures when there was famine in Cutch or during the reverse movement when there was famine outside Cutch.

Against this variegated background of breeds and their mixtures in Cutch, it was not an easy task to find out sufficiently large numbers of

animals conforming to Tharparkar characteristics without lowering down the standard of selection. Therefore only a small number, 48 cows in late pregnancy, were purchased. For all practical purposes, we might say that the Tharparkar breed is more or less about to disappear in Cutch and only few individual animals may be found here and there. The men who are the real breeders in Cutch, are going in for Kankrej or Wadhia because of the great demand of bullocks of these breeds in Kathiawar and Gujrat.

The breeders in Cutch:—Cattle breeding in Cutch is practised by different classes of people; to some it is a subsidiary occupation while others solely depend upon this. The *rabbaris* in east of Cutch i.e., the Waghar area, also called the granary of Cutch, are well-known for their cattle herds, but in addition they also do some farming. The 'Malgujars' of Banni (Fig. 5.) who are Muslims and are very much similar to the Muslim Jats of Sindh solely depend on large herds of their cattle. The strength of their herds varies from 40 to 300 per man, though the number of breeders possessing over 50 cattle is small. They are very judicious in the practice of breeding their herds. They castrate their male calves when 3 months old and it is observed that this early castration does not hinder their development as bullocks. This practice is well worth following in other parts of the country where castrations are performed as late as 2 or 3 years in the belief that early castration will interfere with the development. Most of the Malgujars change their herd bulls with their neighbours every 3 years, to avoid in-breeding. They also keep goats. They do not practice any cultivation but live on the proceeds of sale of cattle or cattle products. Outwardly coarse but otherwise very hospitable, they have an inherent artistic taste which is observed in the decoration of their huts. (Fig. 6.). The love of the inhabitants of Cutch for animals seems to be universal as one would observe from the numerous carved flag stones spread all over Cutch showing the warriors, on horse or camel installed in the memory of those who lost their lives in battles or feuds in the days gone by. (Fig. 7).

Effect of the Journey.—The cows that we purchased were to be brought to Jhansi, a distance of over 1,000 miles, but the main difficulty was of bringing them over to the main land, because of the intervening sea and the *Rann*. To save the expenses of bringing them over by the sea, it was decided to march the animals by land route, from Bhindiara to Morvi, in all 120 miles including 20 miles stretch of the salt desert. This gave an opportunity to observe their reaction to a long land journey. Among the forty-eight cattle purchased, there were three cows which calved just when the journey was to commence. It was decided to finish the journey in 10 to 12 days at the rate of 10 or 12 miles a day, to avoid exhaustion and to give them complete rest on the way, but the distance was covered in 8 days, on an average of 15 miles a day, on account of shortage of grazing on the way and anxiety to reach the destination. The

sign of fatigue became apparent on the 5th day. In some cows the soles of their feet were badly worn out during the march, causing lameness and swelling of the whole limb, which, however, disappeared on rest. The crossing of the *Rann* was also made more difficult as it was not completely dry, and sometimes the feet of the cows got stuck in the mud below the salt layer. All animals showed sign of thirst during the journey through the *Rann*.

The day-old calves, however, stood the journey amazingly well but their dams showed more signs of fatigue than the pregnant animals. The effect of journey on older animals was also more visible. At the close of journey, the animals took a hearty drink in the river, but felt shy of taking water from the cemented watering troughs to which they were not accustomed.

Most of the cattle-dealers transport their cattle along this route, and much of the ease with which the journey is performed depends on the grazing conditions available. Provision of fodder other than grazing on the way is difficult on account of prohibitive cost of road transport in this area.

REFERENCES

1. Olver, A. (1938).
2. Salt desert.
3. Williamson, G., (1947) *Indian Farming*:—Vol VIII, No. 2.

Reliable Veterinary Products

For Passive Immunisation

TETANUS ANTITOXIC SERUM
2000 and 6000 I. U.

For Active Immunisation

TETANUS ANATOXIN
in 25 c.c. and 50 c.c. phials

For Active Leucocytosis

NUCLEIN

10% Solution of Nucleinic Acid in 5 c.c. Ampoules

BENGAL CHEMICAL

CALCUTTA

::

::

BOMBAY

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



**Lambs can hold their own
against each other**

But against Intestinal Nematodes
they need the protection of early
and regular treatment with

'PHENOVIS'

brand of

PHENOTHIAZINE



IMPERIAL CHEMICAL INDUSTRIES (INDIA) LTD.
Calcutta Bombay Madras Cochin New Delhi Kanpur

IX-V 200

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

THE Indian Veterinary Journal

(The Journal of The All-India Veterinary Association)

Vol. XXVIII

NOVEMBER, 1951

No. 3

Editorial

INCREASING THE MILK PRODUCTION

"MILK—the most perfect single food known to mankind. It is a food ideal alike for the expectant mother, the infant, the growing child, the adult and the aged. A seer of milk is equivalent in food value to nearly $\frac{1}{2}$ seer of raw milk, 9 eggs, 10 chhataks of chicken or a seer of sole fish. Rich in first class proteins, milk is of special value to vegetarians. It contains vitamins as well". This is the description of the 'product for which millions of milch cattle are maintained,' as given in a report of the Government of India published over a decade ago. The importance of this article of food has been stressed quite frequently in these pages and we have often drawn attention to the observations of the Nutrition Advisory Committee that, in sample surveys of typical urban and rural groups, the caloric intake of some 30 percent of families is below requirements and that, even when the diet is quantitatively adequate, it is almost invariably ill-balanced containing a preponderance of cereals and insufficient 'protective' foods of higher nutritive value. The effect of this malnutrition for want of sufficient *protective* food is manifested in the poor physique of the generality of our people. 'Malnutrition produces states of ill-health and lowered physical efficiency short of actual disease which are perhaps more important, because more widespread, than disease itself'. And, therefore, one of the pressing problems of our Nutrition Experts is to provide the people of the country with more and more of *protective* foods, among which milk ranks foremost owing to its qualities mentioned above. It is the best supplement to the otherwise ill-balanced cereal diet of the people. As such, it should be the prime concern of the authorities to increase the availability of this article of diet. It is well known that, though

our country possesses nearly a third of the world's total cattle population, the production of milk and its consumption by the people is the lowest in the world. The reasons for this are many and varied, but, ultimately, they all come under the three headings of Feeding, Breeding and General Management. Of these, the first and the last, viz feeding and management, if attended to and improved upon, are capable of yielding results almost immediately. It has been repeatedly demonstrated that when village cattle are taken to Government Farms and fed well and looked after properly, they react very well to the improved feeding and environment and their milk-yield gets even doubled. It is, therefore, heartening that, in the report of the Planning Commission, these find prominent mention in the scheme for development of livestock. We are also glad that the All-India Veterinary Association in its memorandum to the Planning Commission which is published elsewhere in this issue has, among its many suggestions, drawn pointed attention to the importance of feeding in the livestock development and has outlined the ways in which this can be done. We do hope that these suggestions would be given their due weight and given effect to. On the subject of Breeding, the shortage of breeding bulls is a very great handicap for intensifying the development work. Fortunately, this is being solved by the extensive introduction of the practice of Artificial Insemination. It is here that a very great and lasting improvement can be made if correct procedures are adopted right from the earliest stages. 'The bull is half the herd' is an oft-quoted maxim in Animal Husbandry work. This should be put into practice. It is no use taking the semen of any and every bull and using it for impregnating the cows. This will only lead to the production of more non-descript animals of doubtful utility and productivity. It is essential that the 'donor' bull is really a *proven* bull which can 'transmit its high milk-producing capacity with a high degree of certainty'. Only then, will there be a lasting improvement in our dairy cattle. It has been found practicable to grade up, in the course of two generations, a herd of non-descript cows of low milk-yield into a herd of good cows with a reasonably high yielding quality by the use of *proven* bulls; and, therefore, great care must be adopted in the selection

of the donors for the Artificial Insemination centres. In this process, the Government Farms should enable the selection of suitable sires and we do hope that this is borne in mind when Artificial Insemination Centres are opened countrywide.

Lastly, as regards General Management, here also, the Government Livestock Farms must function as Demonstration centres for all aspects of Animal Husbandry, particularly, the maintenance of cattle and the correct method of looking after them. Combined with Propaganda work in rural tracts, the ryots would soon learn and appreciate the importance of this factor for the increased productivity of their livestock.

THE ALL-INDIA VETERINARY ASSOCIATION

XI All-India Veterinary Conference

[We publish below the appeal issued by the General Secretary of the All-India Veterinary Association about the forthcoming XI All-India Veterinary Conference requesting the members of the profession to attend the function in strong numbers. We need hardly add anything to this appeal as we are sure that our brothers in the profession will gladly avail of this opportunity to meet old friends, renew acquaintances and chalk out plans of action for the future development of the profession. Ed. I. V. J.]

For the second year in succession, through the earnestness of the Bombay Veterinary Medical Association and on its kind invitation, the All-India Veterinary Association is holding its Eleventh All-India Veterinary Conference at Bombay on the 27th December 1951 as a Joint Session along with the Bombay Veterinary Medical Association and in conjunction with the Diamond Jubilee Celebrations of the Bombay Veterinary College. A hearty and cordial invitation is extended to all members of the profession and they are earnestly requested to attend the Celebrations and the Conference in strong numbers.

The occasion is an unique one and it should be the endeavour of every one to be in Bombay then and participate in the deliberations. Momentous matters of great import affecting the profession and its organisation are coming up for consideration and the most important of them is the formation of the Indian Veterinary Council and the National Veterinary Committee. It is essential that these subjects are considered in a representative

gathering of Veterinarians and, therefore, I appeal to the members of the profession to gather in numbers on this great occasion and make the Conference an unqualified success.

THE BOMBAY VETERINARY COLLEGE

Diamond Jubilee Celebrations

We are glad to announce that the Diamond Jubilee Celebrations of the Bombay Veterinary College, which had to be postponed sometime back, are now scheduled to take place from the 25th December 1951 and will go on for the next three days during which there will also be a Joint Session of the All-India Veterinary Association and the Bombay Veterinary Medical Association. The inaugural ceremony will be performed by the Hon'ble Shri K. M. Munshi, Minister for Agriculture and Food in the Central Government and the subsequent programme of events is being published separately in this issue along with the appeal of the Diamond Jubilee Celebration Committee extending a cordial invitation to one and all of the Veterinarians in the country to be present on the occasion. We cordially endorse the appeal and we do hope that the members of the profession will muster strong on the occasion and make the celebrations a grand success, as they richly deserve to be.

Started in the year 1886 by that outstanding Veterinarian Professor J. H. Steel, the Bombay Veterinary College is the pioneer Veterinary institution in this country. From out of its portals have emerged a galaxy of Veterinarians who have held aloft the torch of the profession and built up Veterinary organisations in the different parts of the Indian Union at a time when scientific treatment of animals, as known to modern India, was non-existing. These *alumni* of that College, some of whom have gone even to far off places like Zanzibar, Brazil and West Indies, have shed lustre wherever they have been and have built up a name and a fame for their *Alma mater*. During the sixty years of its existence, it is now even more, the College has been expanding enormously to suit the requirements of the rapidly developing Veterinary Science and has latterly become

one of the affiliated institutions of the University of Bombay. It has also one of the finest Veterinary clinics in this country. The institution is thus one of our proudest assets and it should be the duty of every one of us to revere and foster it and pray for its continued undying fame for years to come.

THE PLANNING COMMISSION'S REPORT

[The following memorandum has been forwarded by the All-India Veterinary Association to the Planning Commission for its consideration and incorporation in its Final Report. Ed. I.V.J.]

1. The Council of the All-India Veterinary Association having read the Draft Report of the Planning Commission is gratified at the emphasis laid on the development of Agriculture and welcomes the reiteration of the fact that, throughout the country, Agriculture and Animal Husbandry are complementary to each other.

2. The Council also welcomes the suggestions that have been made for cattle development under the four headings of Feeding, Breeding, Removal of Useless cattle and Protection against diseases and hopes that, with the proposed grant of the Central Government, the State Governments would be in a position to implement these suggestions with greater vigour and enthusiasm.

3. The Council, however, regrets very much that the Commission, while stressing the 10% deficit of cereals in the country, has practically ignored the alarming deficiency of 'protective' foods which are as much as 300 to 400% and which, in the words of Mr. Afzal Hussain of the Famine Commission, has been responsible for the physical decline and inefficiency of both men and cattle.

4. The Council also regrets very much that the Commission has not suggested any plan for the all-round development of Animal Husbandry and Veterinary Science, which is a *sine qua non* for the development of Sheep, Goats, Poultry, Pigs and Horses, all of which are highly valuable farm stock contributing a good deal for our requirements of food and for improving our transport.

5. The Council further regrets that in spite of the fact that, in the past, and even now, many a livestock development scheme has been held up for want of adequate Veterinary personnel and many an animal disease has remained imperfectly tackled for want of Veterinary Research, the Report of the Commission does not contain any provision for increasing the availability of Veterinary personnel and for improving the facilities for Veterinary Research.

6. And, therefore, realising well that livestock improvement work is fundamental to the improvement of Agriculture in any country both to ensure

proper balance in the diets of the people and to ensure adequate humus for the soil (to quote the observations of FAO), the Council of the All India Veterinary Association recommends to the Planning Commission that it may be pleased to incorporate the following points in its Final Report so that the livestock wealth of our motherland may be adequately and suitably developed.

7. Realising the fact that the one single factor that has been responsible more than anything else to keep down the development of livestock in this country and keep them in a perpetual state of mal-nutrition and under-development is an over-all deficiency of feed and fodder, this Association wishes to pay special stress on the urgent need of tackling this problem from a district level onwards by making all such feed and fodder as are available even now to be conserved for the exclusive use of the livestock and to be used judiciously and economically.

In pursuance thereof, the Association suggests the following:—

- (a) Hay-making units in and around forest areas may be opened so that the large volume of grass that is available during monsoonic seasons may be properly preserved for use during periods of scarcity.
- (b) A total ban may be imposed on the export of the available protein concentrates, like oil-cakes, which are a highly valuable cattle feed and also on their use as manure directly on the land.

(It is often forgotten that when cattle are fed on concentrates like oil-cakes, a major portion of the nitrogenous and mineral constituents of these cakes are excreted through the dung and urine of such animals and, therefore, feeding the livestock with these cakes and utilising their excreta as manure on the land serves the double purpose of nourishing the starving cattle and enriching the soil simultaneously.)

- (c) Cheap transport facilities may be provided for the movement of feed and fodder from areas of plenty to areas of scarcity and make them available in Fair Price Shops.
- (d) District Salvage Depots may be opened in convenient centres to look after the valuable milch cows of urban areas during their dry periods.
- (e) The 'Milk Pockets' in the interior tracts may be developed by the provision of adequate and cheap feed and fodder and by the supply of easy and quick transport for milk and milk products and by developing the milk strain of cattle in the area.

8. Immediate steps to increase the availability of qualified Veterinary personnel may be taken so that there is at least one Veterinary Officer for

every 25,000 head of cattle, as recommended by the Linlithgow Commission on Agriculture, besides the number required for Veterinary Education and Research.

At present the Veterinary Service in the different constituent States of the Indian Union is very meagre and grossly inadequate and consequently preventable contagious diseases continue to levy a heavy toll. This necessitates the ryot to keep a 'surplus' number of animals as an insurance against the ravages of epidemics. These 'surplus' cattle swallow up the already low stock of cattle fodder and create a fodder problem. For want of adequate fodder, livestock development work becomes impossible and our cattle continue to remain in a low state of efficiency and production. Their lowered vitality and capacity affects adversely the agricultural operations and food problem. Thus the inadequacy of Veterinary aid to the ryot has created a number of complicated problems leading to dearth of food for men and animals. It is therefore absolutely essential that the Veterinary staff in all the States is augmented immediately in the near future.

9. As a first preliminary step towards this object of ensuring adequate Veterinary personnel for the needs of the ryots, the Veterinary profession must be assigned its rightful and proper place in the arrangement of things and the members of the profession accorded the status that is rightly due to them as members of a Scientific profession. Their role as the Doctors of the Farm and the Guarantor of the Nation's food supply must be appreciated and they should be put on the same footing as members of the sister Medical profession.

10. Secondly, equip the existing Veterinary Colleges adequately and bring them all to an uniform University standard and open new Colleges wherever feasible so as to ensure a steady passing out of Veterinary Graduates every year.

11. Thirdly, provide adequate facilities for Post-Graduate training within the country by developing the existing Veterinary Research Institutes and opening more such Institutes on a Regional basis for conducting Research on varied aspects of Veterinary Science like Genetics, Nutrition, etc.

12. Establishing Breeding Stations for improving sheep, goats, and poultry on a Regional basis and also encourage breeding of these farm stock by a system of subsidy to farmers in villages and rural tracts.

13. Encourage Horse Breeding Industry in the general interest of the defence of the country and as an additional means of transport: For this purpose remove the ban on Racing.

14. Encourage Research in Wool and Tanning Industry and also into the judicious and economic use of bones, offals, etc.

The above suggestions are calculated to relieve the Fodder problem of our livestock and also improve the feeding of animals both of which will show an *immediate* beneficial effect on increasing the available 'protective' foods in the country. The suggestions are also intended to bring out the potentialities of the Veterinary profession for the development of the livestock resources of the country and its capacity to improve not only the quantity but also the quality of the food supply for the people of the land. It is therefore earnestly hoped that the Planning Commission will bestow its earnest attention to these suggestions and incorporate them in their Final Report.

DIAMOND JUBILEE CELEBRATIONS OF THE BOMBAY VETERINARY COLLEGE

AN APPEAL

Friends,

The Bombay Veterinary College, the pioneer Veterinary Institute in the country, has completed Sixty Five years of its useful existence and the Diamond Jubilee of this Institute is to be Celebrated during X'mas week this year. The Diamond Jubilee Celebrations Committee has now finally decided to celebrate the function in a fitting manner. You are requested to make it convenient to attend the function and make it a success.

The functions are to start on Tuesday the 25th December 1951 with the inauguration at the hands of the Hon'ble Shri K. M. Munshi, Central Minister for Food and Agriculture. Amongst the other items of the celebration will be a Joint Session of the All-India Veterinary Association and the Bombay Veterinary Medical Association, when a large number of delegates from all over the country are expected to take part in presenting their professional papers and discussions. Members wishing to take part in the papers and discussions are requested to intimate their subjects by the 15th December 1951 at the latest, and send a copy of their article, if possible.

PROGRAMME

Tuesday the 25th December 1951	Morning—Subjects Committee Meetings. 4-30 p.m. Inauguration of the Celebrations.
Wednesday 26th	„ Morning—Visit to the Aarey Milk Colony. Afternoon—Sight seeing.
Thursday 27th	„ Joint Session of the All-India Veterinary Association and the Bombay Veterinary Medical Association, papers, etc.
Friday 28th	„ Business meeting and papers, etc.

The inauguration day and time is finally fixed. Other items may be modified, here and there, if necessary.

A Reception Committee is to be formed. It has been decided that Members and Delegates attending the Jubilee and the Joint Sessions and who pay a fee of Rs. 10/- in addition to their usual subscription to the Jubilee, are entitled to become Members of the Reception Committee. Members intending to be Members of the Reception Committee are requested to inform the Secretaries and send their fees in time.

Gentlemen, this is the Diamond Jubilee of your *Alma mater*, and you, as its illustrious *alumni*, are requested to help towards enriching your institution. One of the ways of expressing your gratitude towards your own institute is to celebrate its Diamond Jubilee in a very fitting manner. Your help towards swelling the Jubilee fund will be much appreciated.

A local Committee has been formed who will look after your needs during your stay in Bombay. Boarding and lodging arrangements are made in the College Compound. Though other arrangements are all free, boarding charges will be required to be paid by the Delegates. Please, therefore, inform us in good time, so that we can make all possible efforts to make your stay as comfortable as is humanly possible. Delegates wishing to take advantage of the boarding arrangements are requested to inform us in good time, since arrangements for rations, etc., are to be made.

Members attending the Jubilee will make it convenient to alight at Dadar Station, which is the nearest station to the College, where practically all through-trains stop, and, if they inform the date and time of their arrival, arrangements will be made to meet them at the station and other conveniences arranged.

During the celebrations, important items concerning the Veterinary Profession and allied subjects, formation of an Indian Veterinary Council and such other items of vital importance are to be discussed and given final shape to. Reconstitution of the B.V.M.A., and the A.I.V.A. are expected to be finalised during the sessions. This will be a very fitting opportunity to express your views in the matter.

Please therefore muster strong and make the function a memorable one.

Yours faithfully,

P. G. DATE,
C. S. BALAKRISHNAN,
S. R. NADGIR,

Secretaries,

Bombay Veterinary College Diamond Jubilee
Celebration Committee.

Poona 4. }
26th Nov. 1951 }

Notes and News

"AAREY MILK COLONY"

The dairy in the Aarey Milk Colony is one of the best dairies in the world, while the colony itself is run on the most modern lines, according to Mr. D. N. Khurody, the Milk Commissioner, Bombay.

Speaking on 'What's behind a bottle of Milk,' he told the Rotary Club of Bombay, according to a report in the Times of India, that the milk scheme underlined the Government's determination to provide good milk at a reasonably moderate rate and progressively to expand its supply to the people. He then proceeded to say that the supply of milk from Government sources had been growing as was evident from the fact that, while in 1947, there were 233 centres, there were 557 at present. While 70,000 persons were served in 1947, the number of persons who benefited now was 5,10,000. The Milk Commissioner observed that with the opening of more centres and the acquisition of more trucks, the queuing time could be considerably reduced.

Some of the sidelights of production in the Aarey Colony of the milk trade as narrated by Mr. Khurody were: The annual turnover of Bombay's milk trade was worth Rs. 10 crores; the cost of cattle-feed and hay consumed in the colony every year is about a crore of rupees; about 200 wagons were required daily for the transport of cattle, cattle-feed and hay in addition to 200 motor trucks engaged likewise or otherwise; the area of land where grass for cattle was grown was 1,00,000 acres; during the season between five and eight lakh labourers were engaged in harvesting, transport and baling and storage; the colony dairy capacity was 40,000 lbs. per hour, while the bottle-washing and filling capacity was 800 per minute; 2,50,000 bottles were filled daily to be brought to Bombay.

The fat contents of the milk produced in the colony compared favourably with that produced in other countries, he said.

* * *

INDIAN MYNAHS IN AMERICA

Top honours awarded to the three Indian Mynahs at this year's exhibition of rare and exotic birds at the Bronx Zoo in New York may greatly enhance the market value of these birds in India.

Their valuation at 1,000 dollars (nearly Rs. 5,000) each is indeed a very big jump from the pre-war price of Rs. 5 to Rs. 20 at which they were available in the bird markets in India.

According to Dr. D. S. Laud, ex-superintendent of the Bombay Zoo (Victoria Gardens), there are nearly 10 to 12 varieties of these beautiful birds identifiable in India and nearby countries according to their habitat.

These are: The rose-coloured Starling or Gulabi Mynah found all over India except the lower and eastern Bengal.

The common Indian Starling or Tilia Mynah, a migratory bird and a winter visitor to India, where it is common in the Himalayas and the North-West Provinces, extending to the Deccan in the south.

The grey-headed Mynah or Parvi found throughout India and most common in N. W. Provinces and some parts of Bengal.

The Andaman Mynah of the Andaman and Nicobar Islands.

The black-headed or Parvi Mynah or Monghir Parvi found in the whole of India and the Himalayas.

The black-necked Mynah found in Upper Burma, and Cochin-China etc. These thrive well in an aviary or small cages, being sociable birds.

The common Mynah or Dessi Mynah is found all over India and on the Himalayas at altitudes 3,000 to 8,000 feet.

The Bank of Ganga Mynah, found in the Gangetic provinces of Bengal and Uttar Pradesh, extending through the Central provinces.

The Jungle or Pahari Mynah, found all over India, ascending the Himalayas upto 8,000 feet or so.

The Black-Crested Mynah whose habit is China, but like the Common Mynah may thrive well in captivity.

The Pied or Ablak Mynah which is very common in Bengal and is found also in Central Provinces and parts of Upper India.

The Indian Crackle or Nepali Hill Mynah is distributed along the lower ranges of Himalayas and also in Andamans and Nicobars Islands.

According to Dr. Laud, most of these birds thrive well in captivity and they also breed in that state. Many of them are sociable and make good pets in India. The Nepali Hill Mynahs are, when trained, particularly intelligent and talk easily with remarkable fluency and accuracy.

Mynahs are found in almost all zoo gardens in India. In the Bombay Zoo they are housed in the small aviary near the pond for the aquatic birds. When the late George Bernard Shaw and his wife visited the Gardens in 1933, they were particularly interested in the pair of Mynahs then kept in the aviary. One of the birds kept on saying "Mynah, Mynah, Allah, Allah".

Evening News of India.

* * *

BANDRA SLAUGHTER HOUSE, BOMBAY

Dr. D. S. Laud, G.B.V.C., F.R.H.S., F.Z.S., Ex-superintendent of the Municipal Markets and Slaughter House Department of the Bombay Municipality, writing

in the Evening News of India, Bombay, welcomes the news that the Bombay Municipality, with the approval of the Government of Bombay, has after all decided to shift the Slaughter House from Bandra to Leonar in another year. He recalls the history of this Slaughter House in relation to the City Markets and also the various proposals he had put forward when he was in the service for the shifting or remodelling of the structure which, however, could not be effected on account of financial stringency and difficulty of getting plant and equipment from abroad. He hopes that this decision to shift the abattoir would soon be put through.

* * *

PROTEIN VALUE OF CANNED MEAT

According to Dr. Max S. Dunn, a Chemist at the University of California, Los Angeles, who tested 74 specimens of Canned meat and Fish for their amino-acid content, none of the amino-acids had been significantly altered by the heat sterilising used in canning. —(American Reporter).

* * *

RETURNED FROM ABROAD

The Mysore State-sponsored Veterinary Scholar—Dr. Chandrasekhar—has returned home after completing his studies at the Michigan State College. During his stay of nearly three years there, he obtained M. S. Degree in Animal Husbandry in 1948, M. S. degree in Bacteriology in 1951 and Ph. D. degree in Animal Husbandry in 1951 with Animal Genetics statistics and Dairy as Minor—all from the Michigan College. He has also spent about 8 months in the Dewey Reath Farm at Vulcan. He is thus returning after making good use of his stay abroad and should be in a position to assist the State in the various problems relating to Animal Husbandry. His previous experience in the State, we understand he has already put in a service of nearly 15 years, should be of great use to him in putting his additional knowledge into practice.

* * *

Retirement

PROFESSOR R. N. NAIK

Professor R. N. Naik retired from government service on 5th July 1951 after a meritorious service of 31 years.

Born at Honawar in North Kanara District in the year 1896 and educated in the Basel Mission High School, Honawar, he joined the Bombay Veterinary College in 1917 and graduated in November 1919. As a student both at school and college, he showed great capacity for hard work which he maintained throughout his service period.

Soon after graduation he served for a short period of 8 months in Bombay Municipal Corporation and then joined the Civil Veterinary Department, Bombay. He served for about 7 years as a Veterinary Assistant Surgeon. During this period his work on the economic loss due to tick infestation in cattle was highly appreciated by the then Superintendent, Civil Veterinary

Department, Bombay. In the year 1928 he was selected and appointed as Assistant Veterinary Research Officer at the Indian Veterinary Research Institute, Muktesar-Kumaon. His work, during his stay there, was highly appreciated and in the year 1932 he returned to his province as Disease Investigation Officer. There he worked on the use of goat virus as a prophylactic in actual outbreaks of Rinderpest and he carried out a large number of vaccinations. His work on harmful effects of tick infestation was of great value and the first dipping tank constructed through the help of Sir Purushottam Das Thakur Das was opened at the Gowrakshak Mandal's Farm at Betegaon by Sir Frederic Sykes, the then Governor of Bombay.

Later on, he was appointed as the Professor of Bacteriology and Vice-Principal of the Bombay Veterinary College, which he continued to be till the date of his retirement. During his stay in the College, he had organised a Research Scheme for carrying out research work and has contributed a number of papers to veterinary periodicals and popular magazines.

We join his friends in wishing him a happy long life to enjoy his hard earned retirement.

ESSAY CONTEST—INDIAN DAIRY SCIENCE ASSOCIATION

An Essay Contest open only to bona fide students has been organised by the Indian Dairy Science Association. Competitors who are studying for a Diploma in Dairying (awarded by the Government of India) are required to write an essay on "Organisation of Milk Supply to Urban centres in our country and the scope for introduction of a quality control programme," while all other students who may be interested in dairy science must write an essay on "Present Position of Dairy Industry in India and the Role of the State and Private enterprise in its improvement", to qualify for the contest. The essays must be in English and must not exceed 3,000 words (10 foolscap pages of typewritten matter, double space) and 3 typed copies must be submitted on or before 31-12-1951. For further particulars regarding rules of the contest and other details, please write to: Hon. Secretaries, Indian Dairy Science Association, Hosur Road, Bangalore 1.

DIAMOND JUBILEE CELEBRATIONS of the Bombay Veterinary College AND

XI All-India Veterinary Conference

Will be held at the Bombay Veterinary College,
From 25th to 28th December 1951.

All Members of the profession are cordially requested to attend
and make the Celebrations and Conference a grand success.

Clinical Articles

FURTHER WORK ON THE TREATMENT OF FRACTURES BY MEANS OF MODIFIED CLOUSTON WALKER HUMAN MANDIBLE SPLINT AND STEINEMANN'S PINS

By

G. B. SINGH, B.A., M.R.C.V.S.,

Director of Animal Husbandry and Veterinary Services, Orissa.

and

M. MASAN RAO, G.B.V.C.,

Veterinary Assistant Surgeon, Cuttack.

In a previous article published in the Indian Veterinary Journal of March, 1951 and May, 1951, we have tried to stimulate some interest in the treatment of complicated fractures by sound surgery, use of antibiotics and unpadded plaster cast. This treatment gave good results in fractures of the lower regions of the legs etc., but fractures of the pelvis, scapula, femur and humerus in dogs could not be treated with much success, due to the difficulty in reduction and impossibility of retention. Workers in foreign countries have progressed a great deal in this direction by the adoption of fixation splints and bone pinning but we believe that these appliances have not been used in this country so far.

The advantages of bone-pinning over the other methods of fracture repairs are:—

1. There will be complete immobilisation of the fractured ends with free movement of the limbs as a result of direct application of the pins to the bone fragments.
2. The parts can be used immediately after pinning; circulation is not hindered and atrophy is avoided.
3. The pins cannot be tampered with so easily as with plaster casts and other dressings.
4. After-care is negligible.
5. Union of the bone is perfect due to better alignment and retention.

The success of this operation depends upon

- (a) proper preparation of the site and the patient,
- (b) complete anaesthesia,
- (c) strict asepsis and
- (d) sharp pins,

The following case reports of Fractures treated by means of modified Clouston Walker human mandible splint and Steinemann's pins would, we are sure, be found interesting:—

Photos illustrating Mr. G. B. Singh's article
on the Treatment of Fractures



Fig. 1



Fig. 2



Fig. 3

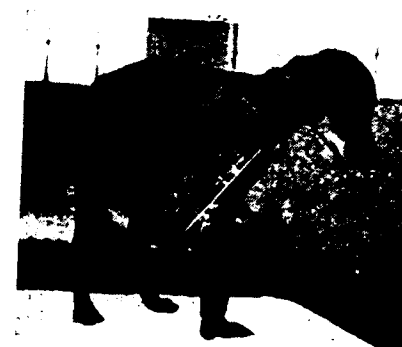


Fig. 4



Fig. 5

Photos illustrating Mr. G. B. Singh's article
on the Treatment of Fractures



Fig. 6



Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11

FURTHER WORK ON THE TREATMENT OF FRACTURES

205

Case No. 1. Subject:—A light brown cross-bred puppy about 4 months old.

History.—Due to an accident, the puppy sustained multiple simple fracture of the distal end of the femur on 30—3—51. Unpadded plaster cast was applied but the fracture could not be set as both the hip and stifle joints could not be immobilised effectively. The owner was advised for intra-medullary pinning to which he consented.

Preparation.—On 4—4—51 the plaster cast was removed, and the part from stifle to the hip (both joints included) was shaved and sterilized. A sterile pad soaked in acriflavine in spirit, 1 in 1000, was put on and bandaged.

Anaesthesia.—Kemithal Sodium intravenously.

Site.—The trochantric fossa of the femur.

Technique.—The sterile pad was removed by an assistant. The part was again scrubbed with Tincture Metaphan. The animal was draped with sterile sheets with a window at the site of the operation. The site was protected with four sterile towels and clamped with B.H. towel clips. The intra-medullary pin attached to a chuck was introduced at the external aspect of the head of the femur at the trochanteric fossa and passed along the medullary cavity until it reached the site of fracture, and then the fractured ends were reduced and kept in correct alignment by an assistant. The pin was further introduced into the distal epiphysis of the femur till the point of the pin could be felt under the skin. (Fig. 1)

Post operative treatment:—Practically no treatment was required. On the first day when the pup recovered from anaesthesia, it started tampering with the pin but with little success. Later on, it got used to it and was able to place weight on the foot. After one month the pin was removed. There was a circular wound at the site of introduction of the pin. It was dressed with acriflavine in spirit, 1 in 1000, for four days. The wound healed up and the animal walked normally. (Fig. 2)

Case No. 2. The subject was a non-descript pup aged about 4 months.

History:—The pup met with a car accident on 30—6—51 and sustained a simple fracture of the left humerus at its lower third. The owner was advised 'bone-pinning' to which he consented. The pup was prepared for the operation as in Case No. 1. (Fig. 3).

On 1—7—51, the fracture was repaired by pin assembly under Nembutal anaesthesia. Since the fracture was at the lower third of the humerus, all the pins could not be put on this bone. So 2 pins were fixed at the middle third of the humerus above the fracture at convergent angles

and two at the radius just below the elbow joint and connecting rods were fixed with full extension of the joint. The pup could place weight on the limb the following day. (Fig. 4).

The pins were removed on the 19th day. Small circular wounds were caused at the site of the introduction of the pins. They were dressed with Acriflavin in spirit, 1 in 1000, for four days by which time they healed up. There was a slight lameness which disappeared after 10 days. (Fig. 5).

Case No. 3.—The subject was an Alsatian bitch which sustained comminuted oblique over-riding fracture of the tibia and fibula at the middle third due to an accidental fall on 30—6—51. The owner was advised 'bone pinning' but he did not like it because he did not want to put the animal under general anaesthesia. So unpadded plaster bandage was applied. Due to carelessness of the owner the bitch was let out and, on 9—7—51, another dog removed the plaster at the paw and at the site of the fracture by biting. The owner brought the bitch to the hospital on 11—7—51 by which time the site of the fracture had become gangrenous and the paw was swollen. There was callus formation but the fractured bones were over-riding due to imperfect reduction (for want of anaesthesia) with the result that the leg was short by $\frac{3}{4}$ of an inch. (Fig. 6). This time the owner consented for bone-pinning.

The animal was prepared for the operation as in case No. 1 and was anaesthetised with Nembutal. The callus was broken and the fractured bones brought into alignment. Pin assembly was fixed as in (Fig. 7).

After-care.—The leg was very much swollen and gangrenous. She was put on pencillin for 7 days (Durasillin 4 lakhs daily for 7 days.) by which time the swelling was reduced and she could place weight on the leg. (Fig. No. 8). The pins were removed on the 21st day. The fractured bones had completely united. There was slight lameness which disappeared after 10 days. There was no shortening of the leg. (Fig. 8)

Case No. 4.—The subject was a R. I. R. cock aged about 9 months. It sustained simple oblique over-riding fracture of the left femur at its middle third. (Fig. 9)

The fracture was reduced and intra-medullary pin introduced. (Fig. 10). The pin was removed on the 21st day. The bone had united completely. There was slight lameness which disappeared after a week. (Fig. 11)

Conclusion

1. We feel that, with the advent of these new inventions, practically every fracture in small animals can be tackled with fair amount of confidence.

2. By better care in aseptic technique and non-removal of exudate as it forms at the site of entry of pins, we hope the formation of small pin point wounds in future cases would be avoided.

3. The aid of flouroscopy during the reduction and application of pin assembly, introduction of intra-medullary pins, is absolutely imperative for good results. 'X' Ray during resolution and the final stages will be helpful to find out the progress of callus formation etc.

UNUSUAL SICKNESS AMONGST BUFFALO CALVES

By

LIEUT COLONEL J. D. KAPUR, A.D.R.V.F.,
Army HQ., Simla.

An unusual sickness affecting 33 buffaloe calves initially broke out in the Military Farm, Bareilly, (U.P.) in July '50. In all 67 cases occurred. No cases occurred after 30th September, '50. In August '50, a similar outbreak was reported from the Military Farm, Deolali (Bombay District). Calves between the ages of 6 months to 1 year only were affected but those of 6 months age were found to be the most susceptible to the disease. After 2-3 weeks' treatment, the affected calves were discharged as cured. It was interesting to note that there was no mortality amongst the affected calves. Investigations were carried out by the local Military Veterinary Laboratories and a Research Officer from the Indian Veterinary Research Institute but no definite conclusions regarding the nature of the etiology of the disease could be made. A brief history of the outbreak at both the Military Farms is given below.

Military Farm, Bareilly

Symptoms:—Acute inflammation of one or more fetlock joints, temp. between 103° to 107° proportionate to the swelling of the fetlock joints affected, off feed, restlessness and watery discharge from eyes.

Treatment:—In the beginning of the disease, symptomatic treatment to control pyrexia was adopted. Thus, Spirit Ammonia Aromatic and Spirit Aetheris Nitrosi were given internally. Mag. sulph. was given in drinking water. Sulphanilamide was later tried but was found to be of no use. Soda Salicylas and Sodium Iodide also did not prove successful. During the period of sickness, local analgesic treatment to the inflamed fetlocks joints was adopted with very little improvement in condition.

Laboratory Findings:—Blood smears and smears from exudates of the joint swellings were examined microscopically by the Command Veterinary Laboratory, Lucknow, with negative results. Material from cutaneous thickenings was also examined for filariasis/ova but was found negative. Cultural and animal inoculation results were also negative.

Investigations were also carried out by a research officer from the I.V.R.I. Izatnagar and his findings are reproduced below:—

"Microscopical, cultural, biological and histo-pathological studies indicated that the disease in the dairy buffalo-calves was not of an infectious nature nor were any micro-organisms seen or isolated. The simultaneous affection of many calves in the dairy, the uniform affection of joints in all animals characterised by swelling, lameness, pain and absence of any mortality in the affected stock indicate that the condition is one of Rheumatic Arthritis brought about by dampness in the rainy weather. The cutaneous nodules seen in the animals are caused by biting insects."

Military Farm, Deolali

Symptoms:—These were exactly the same as were observed at the Military Farm, Bareilly. No loss of appetite or any other constitutional disturbance was noticed in the affected cases at this farm.

Treatment:—Initially the same treatment as described above in the case of the Military Farm, Bareilly, was given but it met with very little success. Later on administration of Calcium Gluconate Solution intravenously proved effective (Dose: 10% Sol. of Calcium Gluconate, 2 ounces at a time—2 to 7 injections at an interval of 24 hrs.) This lessened the duration of sickness and the calves did not lose much condition.

Lab. Findings:—Investigations were carried out by the O. C., No. 2 Command Veterinary Laboratory, Poona—"Blood examination, cultural and animal inoculation results obtained were all negative. Urine of affected calves was tested and declared negative for albumen, sugar and flourine. It was suspected that the presence of flourine in the drinking water from the Nullah running by the side of Farm to which the animals had access, might have produced this type of rheumatic affection but a sample of water from the Nullah on test was found to be negative for flourine. In the absence of any bacterial infection and constitutional disturbance, the unusual sickness was classified as an acute Rheumatic affection of unknown origin. The possibility of the condition resulting from unbalanced diet, deficiency of phosphorus and Vitamin A could not be established."

The outbreak started at this farm on 21st August '50. In all 122 cases were affected out of which 120 were cured and 2 are still under treatment.

Conclusion:—The disease has baffled us as firm diagnosis could not be established. The average period of sickness was 2-3 weeks. The severity and duration of disease decreased with the age of calf. No calf below five months of age was affected. Although the disease was not fatal yet it affected the condition and growth of animals for a considerable period.

A CASE OF PUS IN THE MAXILLARY SINUS IN A BULLOCK

By

G. B. SINGH, B.A., M.R.C.V.S.,

Director of Animal Husbandry and Veterinary Services, Orissa.

Subject.—A grey local-bred bullock, aged 8 years.

History.—The owner brought the bullock on 8-9-50 with the complaint that it was having a discharge from both the nostrils for the last 2 months with progressive loss of appetite and condition.

Symptoms.—There was a thick creamy pus-like discharge from the nostrils which formed pools on the ground whenever the animal stood for a while. The animal was dull and debilitated. Profound anaemia of all the visible mucus membranes. Temperature ranged between 102°F to 102.8°F.

Diagnosis.—Pus in the Sinuses.

Cultural examination of the Nasal discharge proved positive for B. Coli and streptococcal infection.

Treatment.—The bullock was put on Sulpha drugs for five days. The temperature came down to normal, but the other symptoms continued unabated.

The owner was advised to agree to the operation of trephining of both the maxillary sinuses and he consented.

First the left maxillary sinus was opened. As the animal was in very poor condition, only one sinus was opened at a time.

Preparation.—The animal was kept fasting overnight and the site was shaved and washed with warm water and soap, then cleansed with Acriflavin in Spirit 1 in 1000. A sterile pad soaked in Acriflavin in Spirit was bandaged over the site.

Prior to operation.—

- (i) 300 c.c. of blood were transfused intravenously.
- (ii) 500 c.c. of 5% Glucose at body temperature was injected intravenously.
- (iii) 8 pints of N. S. S. at body temperature were injected sub-cutaneously.

Anaesthesia:—10 c. c. of 5% Procaine Hydrochloride into the infra-orbital foramen and 10 c. c. into the Supra-orbital foramen were injected.

Site:—1½" in front of Zygomatic ridge.

Technique:—The head was draped with sterile sheets with a window at the site of operation and it was clamped with 4 sterile towels. A crucial incision of 2" diameter was made and after separating the skin and the sub-cutaneous tissues the fascia and periosteum were scraped with a chisel. Then

the Maxillary Sinus was trephined with 1½" diameter trephine. The circular piece of bone was removed and the slit-like opening communicating with the nasal chamber was enlarged with the chisel to ensure thorough drainage from the maxillary sinus to the nasal cavity. The sinus was irrigated with hot N. S. S. and packed with Sulphanilamide powder and plugged with gauze. Two retention sutures were put in the skin opening and a many tailed bandage applied.

After treatment :—

- (i) 4 c. c. of Adrenaline Chloride were injected intramuscularly.
- (ii) 10 c.c. of Camphor in Oil were injected sub-cutaneously.
- (iii) 500 c.c. of 5% Glucose at body temperature were injected intravenously.
- (iv) 8 pints of Normal Saline Solution at body temperature were injected subcutaneously.

After 48 hours, the retention sutures were removed, the skin flaps cut and the sinus was irrigated with hot N. S. S. followed with Acriflavine lotion, 1 in 1000, and Glycero-iodine gauze was put in it and bandaged. The dressing was repeated for a fortnight after which the right maxillary sinus was also trephined and treated alike. The dressing of both the wounds continued for two months by which time the trephined wounds were closed and the nasal discharge stopped completely. The animal started picking up condition and was discharged as cured.

My grateful thanks are due to Dr. M. M. Rao, Veterinary Assistant Surgeon, Cuttack for help during the operation, after treatment and for keeping record of the case.

A CASE OF DYSTOKIA DUE TO CONGENITAL POLYCYSTIC KIDNEY

By

M. R. MARATHE, G.B.V.C.,
Assistant Veterinary Officer,

Government Milk Colony, Aarey, Goregaon, Bombay State.

A variety of foetal deformities has been described as causes of dystokia in cattle and other animals. But, as far as I am aware, dystokia due to polycystic kidney of the foetus has not been recorded. A case of this nature was encountered at the Government Milk Colony, Aarey, Bombay, and I hope it would be found interesting.

On the morning of 22—8—51, I was urgently called to attend on a buffalo in the Colony which was having trouble in calving since the previous night.

The subject was she-buffalo about 12 years old and in good condition. She was bred in the second week of November, 1950. Though she should have ordinarily taken another month or so to deliver, her imminent parturition appeared nearly as good as at full term. The membranes had ruptured in the early hours of the 22nd; but, as there was no progress in the direction of a normal calving until 8 A.M., help was sought.



FIG. 1

Photograph of the still born calf. Note the distension of the abdomen due to polycystic kidney and also the pronounced oedema over the neck.



FIG. 2

View of the calf after the abdomen was opened, showing multiple cysts.

DETTOL IN BOVINE MASTITIS

By

RIS. DHARAMPAL R.V.F.C., V.A.S.

Military farm, Kanpur.

To the American and Western Farmer, Dettol is now well-known as a panacea for Bloody milk in his dairy cow. According to him, an ounce of it in a pint of milk repeated once or twice daily for a period of two or three days will fix it up. His conclusions are correct and Dettol as such has become a home treatment for him in Mastitis in early stages. In Military Farms in India, Dettol has been tried with the first signs of abnormal milk and has stood the test.

Attempts were made to give Dettol a specific role in Mastitis treatment. With this in view, abnormal milk samples before starting any treatment were collected and examined in the Laboratory, the results of which are recorded in the attached table. Subjects of these experiments were only buffaloes as the Military Farm, Kanpur, where these trials were held, had exclusively that class of stock.

It is evident from the table that Dettol has proved effective against streptococci, haemolytic streptococci and strep. agalactiae. Dettol has proved useful in one case against a combined infection of haem. strep. and staphylococci.

Case No. 2 in the table (C-334 Gargi) which did not respond to Dettol treatment had one hind test blind from the previous lactation and the second was involved in this lactation. When the animal was first admitted for treatment, her strippings were examined and found to contain purulent secretion. The case was declared as that of strep. mastitis by No. 1 Command Vety: Lab: Lucknow. Dettol was tried over a week twice a day in one ounce doses but to no avail. The animal was then put up on Sulphonamide therapy but here again she failed to improve. Apparently from the history of the case she had the infection in an advanced and chronic stage from last lactation and results as such were not unexpected.

It is clear that Dettol is worth trial in early stages when the only signs of abnormality in milk are presence of flocculi, watery appearance and blood admixture. 'Strip-Cup' method to detect early changes of milk is therefore absolutely essential. This is devised under field conditions by painting black the bottom of any metallic tin and first strippings from all tests verified before milking into the milk pan. From the trials it seems that Dettol can be relied upon (in early stages) against streptococcal mastitis including strep. agalactiae and haem. streptococci.

PENICILLIN IN A CASE OF TETANUS IN A BULLOCK

213

It will not be out of place to mention here that, according to clinical data, it has been seen that the water buffalo mainly gets streptococcal infection of udder and that possibly through teat canal, probably owing to her disposition in muddy ponds. The staphylococcal infection in this class is less common whereas corynebacterium infection of udder is rarely seen.

Again, effects of Dettol treatment were observed on comparative basis when given in milk and in water. Both vehicles proved equally effective and preference for selection as vehicle is not claimed by either, except purely for nutritional value.

Table of Milk Samples (Mastitis) examined for Pathogenic Organisms
By No. 1 Command Vety: Lab: Lucknow.

Sl. No.	Class of animal	No. & Name of animal	Nature of abnormality in milk	Date admitted	Date discharged	Lab: Report	Remarks
1.	Buff.	C-133 Garipo	Bloody Milk	13-9-50	17-9-50	+ for Strep. agalactiae	Responded to Dettol.
2.	"	C-334 Gargi	Purulent discharge from teat, one teat blind from previous lactation.	1-9-50	15-10-50 (not cured)	+ for Strep. tococca. mastitis	Dettol & Sulpha. both failed.
3.	"	C-299 Matwali	Bloody milk	6-12-50	9-12-50	+ for Haem. Streptococci	Responded to Dettol.
4.	"	C-815 Kitten	do.	22-1-51	26-1-51	+ for Strep. tococcal mastitis.	do.
5.	"	C-365 Champa	do.	2-2-51	6-2-51	+ for Haem. Streptococci	do.
6.	"	C-291 Sarai	do.	17-3-51	21-3-51	do.	do.
7.	"	C-902 Kohat	Watery discharge and flocculi present	23-3-51	27-3-51	+ for Strep. tococcal mastitis.	do.
8.	"	C-389 Rangai	Bloody milk	15-5-51	19-5-51	+ for Haem. Strep. & Staphylococci	do.

PENICILLIN IN A CASE OF TETANUS IN A BULLOCK

By

B. MOHAN RAO, G.M.V.C.,

Veterinary Assistant Surgeon, Anakapalli, Madras State.

Subject:—An Ongole draught bullock, about 8 years old and weighing about 1000 lbs, belonging to the Government Sugarcane Research Station, Anakapalli.

History:—The animal was brought to the dispensary on 13-3-51 with the report that the bullock had not taken its feed and that its bowels

On examination, the dilatation of the passage was found to be adequate. The presentation was posterior, and both the hind legs were felt in the passage. They were, however, so thin and small that I wondered what could possibly have locked up so small and ill-developed a foetus; on further exploration, the foetal abdomen was found to be greatly distended and occupied the best part of the uterine cavity. The foetus appeared to be all abdomen and nothing else.

From the extent of the distention, it was obvious that delivery of the entire calf was well-nigh impossible. The foetus was not viable. An incision about 3" long was therefore made in order to evacuate the abdominal contents. The feel of it was like an advanced case of dropsy and I had expected a gush of a large quantity of fluid. But only a pint or two of amber-coloured fluid came out. Another soft and fluctuating mass was felt inside the foetal abdomen which easily yielded to my pressure. Masses of yellowish fibrinous material came out with more fluid, which contained grape-sized cysts. This was very peculiar and I decided to bring out the calf with the least mutilation possible. The abdominal distention, though persisting, was nevertheless sufficiently reduced to yield to reasonable traction. With loops of strong cord applied on the legs, the foetus was pulled out. The buffalo was treated in the usual manner and recovered uneventfully.

The foetus.—The foetus was very poorly developed (Vide Fig. 1 on Page 211). The particulars of its measurements are as under. For comparison, average measurements of six new-born calves in normal condition are also given.

	Foetus under review.		Normal calf.
Age	...	280 days	308 days
Weight	...	46 Lbs.	68 Lbs.
Length of fore leg	...	16 in.	28.4 in.
Length of hind leg	...	15 "	28.2 "
From base of skull to tip of nose	...	8 "	12.5 "
From base of skull to tip of tail	...	28.5 "	48.1 "
Girth	...	17 "	28 "
Abdominal circumference	...	60 "	42 "

(*Actual after about a gallon of fluid was removed.)

The musculature was poorly developed, oedematous and pale. Growth of hair was very poor. The right lobe of the Thyroid was enlarged and oedematous. The thorax was very poorly developed, obviously due to pressure of the distended abdomen. There was subcutaneous oedema all over, but very pronounced on the neck. It is estimated that the abdomen contained about 2 gallons of fluid. On opening the abdominal cavity,

hundreds of grape-sized cysts were detected (Fig. 2 on Page 211). They were adhering to one another and all of them were contained in a thick but soft and friable covering. The cysts consisted of thin transparent membrane containing clear watery fluid. At first they were thought to be parasitic, but were not found to be so by the Parasitologist, Bombay Veterinary College, who examined them. All the abdominal organs were distinctly ill-developed. One kidney, the right one, was missing!

A part of the material was sent to the pathology department of the Bombay Veterinary College, where sections of the cysts revealed their true structure—the missing kidney!

Discussion.—Distention of the foetal abdomen due to polycystic kidney and causing dystokia has not been recorded in cattle or other animals. In human beings, however, MacCallum³ has mentioned the enormity of abdominal distention of the foetus, due to this condition, resulting in difficult labour. All the same the condition is very rare. Boyd¹ records that it is met with only once in 500 autopsies. Ribbert as quoted by MacCallum³ holds that it is the result of improper union of the component structures, during embryonic development and that the glomerular portion dilates into a cyst. On the other hand, Boyd¹ though uncertain of the cause of the condition, believes it to be only a persistence of one stage of renal development. Both in men and animals, individuals having congenital cystic kidney have been known to reach adult age without any serious handicap. Runnells⁶ regards this condition as the most important malformation from the standpoint of Pathology. Cystic kidneys extensively involved are often met with in animals slaughtered for food, but which had shown no clinical symptoms during life.²

I am very thankful to Dr. Iyer, Professor of Pathology and Bacteriology, Bombay Veterinary College, for having carried out the pathological examinations in this case. My thanks are also due to Dr. J. S. Khurana, Veterinary and A. I. Officer, Government Milk Colony, for his encouragement and guidance.

BIBLIOGRAPHY

1. Boyd, William. Text Book of Pathology. P. 643. 1947.
2. Boyd, William. Surgical Pathology. P. 410 *et. seq.* 1947.
3. Davis, G. O. Gaiger and Davis, Text Book of Veterinary Bacteriology and Pathology. 1946. P. 650.
4. Huttyra, R., Marek, J., Manninger, R., Special Pathology and Therapeutics of the Diseases of Domestic Animals. Vol. 3: 51. 1947.
5. MacCallum, W. G. Text Book of Pathology. P. 1218. 1947.
6. Runnells, R. A. Animal Pathology. P. 405. 1946.

were constipated. When made to walk, slight stiffness in the gait was noticed. Temperature 101.6°. Urine normal. Suspecting the case to be one of Ephemeral fever, it was given the usual treatment for the disease and sent back.

14-3-51. Animal was stiffer in gait with the legs stretched wide apart; shivering; ruminating now and then; temperature 101.8°; bowels constipated and respiration slightly accelerated. Soap water enema was given. 150 c.c. of 10% solution of Cal. Gluconate was given intramuscularly. Internally, an electuary containing Mag. Sulph-4 oz; Sodi Iod-1 dr; Soda Salicylas-4 drams and Ammon Chlor-one dram was given. Blood smears were examined for Trypanosomes and were negative.

15-3-51. No improvement was seen. Animal became stiffer with increased shivering of the limbs and staggering gait. Temperature 102.4°. Nothing could be detected in the blood smears examined to day also. There was slight tympany and the dung was passed in pellets. As there was a previous history of Trypanosomiasis in this Farm among bovines, and though nothing could be seen in the blood smears, it was considered advisable to give Ant. Tart. Ten grains of it were given intravenously in 20 c.c. of distilled water at about 8 A.M. By 11-30 A.M., 1½ ozs of saturated Mag. Sulph solution was given intramuscularly. Internally one ounce of chloral hydras was given as an electuary.

The animal was seen again at 5 P.M. and the following symptoms observed. Respirations very much accelerated; temperature 103.2°; anxious expression; membrana nictitans protruding; abdomen slightly tympanic. Animal suddenly fell down unable to move or bend its limbs. The neck was slightly stretched forward and the animal was not able to take even a few bits of straw. It was very excitable when approached. A typical picture of tetanus could then be seen. Mouth could not be opened easily. As in the case of horses, the reflexes were very much exaggerated in this case. A search for the presence of wounds revealed only a few scratches in the heels and at the interdigital space. The case was then confirmed clinically as one of Tetanus and it was decided to start a course of Penicillin.

16-3-51. 30 Lacs of Procaine Penicillin₆ (Glaxo) was given in doses of 5 Lacs at a time at 7 A.M; 10 A.M; 1 P.M; 4 P.M; 7 P.M; and 10 P.M. Nothing else was given. The small wounds in the heels and interdigital space were dressed.

17-3-51. The animal was seen at about 8 A.M. The improvement noticed was marvellous. All the symptoms noticed the previous day had disappeared. Animal was chewing a bit of straw. But for the stiffness of limbs the other symptoms had disappeared. Another 5 Lacs of Penicillin were given.

18-3-51 to 27-3-51.—Treatment consisted of daily injections of 1½ ozs. of saturated Mag. Sulph solution intramuscularly and application of linaments and fomentations to limbs and injected parts. Internally general tonics and nourishing diet. Light walking exercise was given from 24-3-51.

28-3-51. Animal normal in all ways and put to usual work from 6-4-51.

I am grateful to the Farm Superintendent of the Sugarcane Research Station, Anakapalli, for all help rendered and to the District Veterinary Officer, Visakhapatnam, for the encouragement given in the preparation of this article.

MULTIPLE BIRTHS IN A COW

BY

B. MOHAN RAO, G.M.V.C.,

Veterinary Assistant Surgeon, Anakapalli, Madras State.

Though uniparity is generally the rule among cattle, we have been occasionally seeing cases of twins. Reports of triplets among cattle are very rare and cases of living triplets are rarer still. I therefore desire to record the following extraordinary performance of a cow which gave birth to triplets on two occasions and quadruplets on another occasion.

The subject was an Ongole cow, born in 1941, belonging to Sri Chinta Subramanyam Garu of Anakapalli. The calving record of this cow is as under.

Serial no. of delivery	Year of calving.	No. of calves born.	Remarks.
1.	1944	One female calf.	Normal delivery.
2.	1945	3 Bull-Calves.	All born alive. Fig. 1 shows the mother with the young calves. Fig 2 represents the up-to-date photo of the triplets now living and working as draught bullocks with the owner.
3.	1947	4 calves	Aborted during the 7th month of pregnancy; all still-births. Sex of calves not known.
4.	1948	1 Female calf.	Normal delivery.
5.	1949	1 Male calf.	do.
6.	1951	3 Calves (2 male and 1 female).	All still-born. I attended on the cow for this delivery. All the calves were found dead inside. The head and some limbs of one bull calf and the fore limbs of the heifer calf, with lateral deviation of the head, was the presentation. The third was with the head bent in between the legs. Positions corrected and calves delivered—vide Fig. 3.

So far as I have known, there are no similar cases on record. The cow died sometime after the last calving but the mother of this cow is still alive and has given birth to 16 male and 2 female calves.

I am extremely grateful to the District Veterinary Officer, Vishakapatnam, for giving me encouragement in preparing this article and to the owner, Sri Ch. Subramanyam Garu, for kindly supplying the photos and history of the cow.

CONTAGIOUS OTORRHOEA IN CATTLE

By

ABDUL KHADAR, G.M.V.C.,

District Veterinary Officer, East Godavari, Kakinada.

During my tour in the month of December 1950, it was brought to my notice at Amalapuram hospital that a large number of cattle attended the institution with what has been named as contagious otorrhoea. On enquiry I learnt that the complaint was more prevalent during the rainy season and that it was now subsiding. I also learnt that it was prevalent in delta area and not in the uplands of the district and that it was believed that flies transmitted the disease.

Thereupon I collected the following data from the staff and compiled into an article for publication.

History.—Both buffaloes and cattle were affected but the disease was mostly in buffaloes. Young as well as adults were equally affected. General condition had very little to do with the susceptibility of the disease.

No. of cases treated under various heads in different institutions:—

	Kothapeta.	Razole.	Draksha- rama	Amalapur.	Mummid- varam.	Rama- chandra- pur.
(a) Ears affected.	256	30	82	270	273	36
(b) Eyes and ears affected.	64	10	96	45	39	36
(c) Eyes, ears, and udder affected.	...	...	2	...	1	...
(d) Eyes, ears, udder and body affected.	...	...	...	1	...	...

The duration of the disease was about 10 days, if there were no complications.

Influence of weather.—Cold weather aggravated the condition,

Symptoms: Ears.—Profuse purulent greenish white discharge. Pustules were seen on inside the ear at the base. The animal constantly shook its head and kept the ears moving. Sometimes scratched with the hind legs or rubbed the ears against hard objects. Generally both the ears were affected.

Eyes.—Muco-purulent discharge from the eyes. Small pustules were seen on the eye-lids. Eye-lids were highly inflamed and the eyes were completely closed discharging later thick white pus. There was opacity of cornea in some cases.

Body.—Round or elliptical purulent eruptions were noticed on the body.

Diagnosis.—Contagious Otorrhoea. Microscopical Examination of pus smears from the ear revealed Gram-positive and negative organisms.

Discharges from the eye and ear on cultural examination revealed organisms of coli-aerogenes group.

Treatment: Ears.—Cleaned antiseptically and dressed with emolient dressings like neem oil and zinc oxide.

Eyes.—Washed with boric lotion and pencilin ointment applied.

Body.—Cleansing with potassium permanganate solution and Sulphanilamide ointment applied.

Mortality.—There was no mortality.

Sequelae.—Loss of milk yield and loss of condition.

Frequency of the disease.—The disease prevailed during 1935–36 in this district with the same virulence in a highly contagious form.

General Remarks.—The disease was found to be akin to a certain type of pox as the lesions noticed on the body and ears looked like typical pox-lesions though the presence or absence of umbellification could not be said with any certainty as the cases were brought to our notice when the lesions were in a shrunken stage. The nature of the contagion was such that in a herd of 10 or 12 animals only one or two were affected and in a pair of animals only one was affected.

I would like to know from my colleagues particularly in the neighbouring districts and the other districts of the State in general if such a malady existed in their districts at any time and if so request them to give a brief account through the medium of the *Indian Veterinary Journal*.

My thanks are due to the staff of this district who co-operated with me in furnishing me with the necessary information for compilation of this article.

Association News

THE ALL-INDIA VETERINARY ASSOCIATION

[The following Rules and Regulations of the All-India Veterinary Association as revised by the Committee appointed for the purpose during the last All-India Veterinary Conference is published for general information. These Rules will be taken up for discussion at the XI All-India Veterinary Conference at Bombay on the 27th December 1951 and, if passed will be adopted as the revised Rules of the Association. General Secretary A.I.V.A.]

Revised Rules and Regulations

1. *Name, Head-quarters and Jurisdiction.*—The name of the Association shall be THE ALL-INDIA VETERINARY ASSOCIATION with jurisdiction over the whole of the Indian Union. It shall have, as its constituents, branches affiliated to it in all the States of the Indian Union. Its headquarters will be the place of the Secretary.

2. *Objects.*—The objects of the Association shall be

- i. To work for the development of the Livestock Wealth of the country.
- ii. „ help the advancement of Veterinary Science in all its aspects and enable the Veterinary Practitioner function efficiently as the 'Doctor of the Farm and a guarantor of the Nation's food supply'.
- iii. „ improve the professional knowledge of its members.
- iv. „ uphold the dignity and honour of the profession and safeguard its rights and interests, and
- v. „ create an *esprit de corps* amongst the members of the profession.

In fulfilment of the above objects, the Association shall, among other things, take steps (a) to organise branches under its auspices in the different States of the Indian Union (b) to arrange for the holding of Congresses and Conferences for the discussion of subjects pertaining to the Veterinary and allied sciences (c) to conduct a Veterinary periodical as its Official Organ and (d) to consider and express its views and opinion on all matters affecting the Veterinary profession and also its relation with the public health and economic well-being of the people.

3. *Official year.*—The Official Year of the Association shall be the calendar year.

4. *Membership.*—Any person possessing a recognised Veterinary qualification is eligible to become a member of the Association. Every member of a Branch Affiliated Association is *ipso facto* a member of the A.I.V.A.

5. *Constitution.*—The constitution of the Association shall be as given hereunder and it shall consist of members who will be classified as follows:—

- (i) *Elected Members.*—These will be elected by the affiliated Branches of the Association in the Constituent States of the Indian Union on a scale of one Representative for every 50 members or part thereof on their rolls. These members will be elected by the affiliated branches during the last fortnight of December every year and will hold office for a full period of the succeeding year.
- (ii) *Direct Members.*—These will consist of persons who are not in a position to enrol themselves as members of any Branch, as for instance, Members of the Army, and they will be enrolled as Direct Members by the Managing Council of the Association.
- (iii) *Honorary Members.*—These will consist of persons of high distinction, or of persons who have rendered conspicuous service to the Association, or the profession, and they will be invited to become members by a special resolution of the Managing Council of the Association.

6. *Mode of admission.*—Every application for Membership shall be made to the Secretary of the Association in the prescribed form, who shall then place it before the Managing Council for decision. The power to admit, refuse or re-admit vests in the Managing Council.

Any Provincial Association may apply for affiliation with the A.I.V.A., by making an application in writing to the Secretary along with a copy of its rules and list of members who will then deal with it in the same was as an application for Membership.

7. *Subscription and affiliation fee.*—The annual subscription, which shall always be payable in advance, shall be Rupees Ten in the case of Direct Members. In the case of Elected Members, no separate subscription shall be collected beyond the affiliation fee paid by the affiliated branch.

No subscription shall be collected from Honorary Members and they will not be eligible to vote on any matter. Members in arrears of subscription for over one year shall cease to be members of the Association. Such members are eligible for re-admission only on payment of arrears. On a lump sum payment of at least Rs. 100/- a Direct Member can become a LIFE MEMBER. Such Members do not, however, enjoy any special privileges.

The fees for affiliation of the Branch Associations shall be calculated at 10% of their annual income and shall be paid at the beginning of each year calculating on the income of the previous year.

8. *Office-bearers and Management.*—The Association shall have the following office-bearers for the proper management of its activities:—

- i. A President
- ii. A Vice-President
- iii. A Secretary
- iv. A Joint Secretary and Treasurer
- v. Three representatives and
- vi. The Editor of the Indian Veterinary Journal.

All these office-bearers will be elected annually at the meeting of the General Body and will hold office for the year, or until their successors are appointed. They shall constitute the Managing Council of the Association. The President can co-opt for any one meeting up to three members who, however, will have no voting power. The Council shall have power to fill up interim vacancies.

The Association shall correspond, or be corresponded with, or sue or be sued, or otherwise dealt with in the name of the Association through the Secretary and all documents required to be executed by the Association shall be signed by the Secretary.

9. *Meeting.*—The Council of the Association shall meet once in four months or as often as is necessary. The quorum for such meetings shall be five.

The General Body of the Association shall meet ordinarily once a year in December, or at the time and place of the All-India Veterinary Conference, or at any other time and place as decided by the council, the quorum for such meeting being 20% of the total number of effective members on its roll. Extraordinary meetings of the General Body or of the Council can be convened on a signed requisition to that effect from at least 25% of the total number of members in the case of the General Body and at least 4 members in the case of the Council. The Secretary shall call for such meetings not later than 4 weeks in the case of the General Body and not later than 2 weeks in the case of the Council from the date of receipt of the requisition. The quorum in the above cases will be 25% of the total number of members for the General Body and 5 for the Council.

Ordinarily, at least 2 weeks' notice of the meeting shall be given to all the members giving the place, the date and time of the meeting and also the agenda for it.

In cases of urgency, the Secretary, in consultation with the President, can call for a meeting at a shorter notice but, in no case, shall it be less than 10 days.

The President, and, in his absence, the Vice-President shall preside at the meetings of the Association or of the Council. When both the President and Vice-President are absent, the members present shall elect a person other than the Secretary and Treasurer as Chairman for the meeting.

At all meetings of the General Body and of the Council, the decision of the majority of those present shall prevail: and, in cases of equality of votes, the presiding officer shall have a second or casting vote.

Any member of the Association can move at the General Body meeting any resolution in furtherance of the objects of the Association, provided notices thereof had been given to the Secretary at least 3 weeks in advance.

The Council, however, reserves the right of admitting or rejecting any resolution without assigning any reason therefor. The author of a rejected resolution shall have a right of appeal to the General Body.

If the general conduct of any member is such as to render his removal necessary in the interests of the Association, it shall be open to the General Body to expel such a member by a specific resolution.

10. *Functions of the Council.*—The Council shall form within itself Committees of not more than 3 members for specific purposes, such as finance, propaganda etc. One such committee shall be called the Journal Committee to look after the Official Organ of the Association viz. The Indian Veterinary Journal. The Editor of the I.V.J., will be an ex-officio member of the Journal Committee.

The Council shall be the body in whom the entire management and administration of the Association shall rest and it may frame appropriate rules for convening meetings either of its own or of its Committees. It shall have power—

- i. To admit, refuse or re-admit admissions.
- ii. „ sanction all expenditure of the Association.
- iii. „ arrange for the audit of the accounts of the Association.
- iv. „ arrange for Conferences and Congresses.
- v. „ prepare bye-laws in furtherance of the objects of the Association subject to the approval of the General Body at its next meeting.
- vi. „ entertain, investigate and determine any dispute, or reference or matter that may be brought to its notice by any member, and

- vii. To take all other steps for the fulfilment of the objects of the Association.

The Council shall prepare an annual report of the work of the Association together with an audited account of its finances and present it to the General Body of the Association at its annual meeting for adoption.

11. *Duties of the President.*—The President shall

- i. preside at all meetings of the Association, Council and of the Committees of which he is a member, and
- ii. guide and control the activities of the Association.

12. *Vice-President.*—The Vice-President shall help the President in the discharge of his functions and carry out the duties of the President during his absence.

13. *Secretary.*—The Secretary shall be the custodian of the records and properties of the Association and maintain an inventory of them in his office. In close collaboration with the President, he shall

- i. look after the business of the Association.
- ii. give effect to the rules, bye-laws and resolutions of the Association, of the Council and of the Committee.
- iii. convene all meetings of the General Body or of the Council by circulating a notice thereof with an agenda of the meeting and do all other acts for the fulfilment of the objects of the Association.

In cases where there may not be sufficient time, or where it may not be possible to convene a meeting of the Council, the Secretary may obtain orders of the Council by circulation of the papers amongst the members of the Council.

14. *Joint Secretary and Treasurer.*—The Joint Secretary and Treasurer shall

- i. help the Secretary in all his duties.
- ii. be the custodian of the funds of the Association, and
- iii. maintain a correct account of the receipts and disbursements of the funds of the Association and submit it to the Council as and when required.

15. *Funds of the Association.*—The funds of the Association shall be deposited in a Government Bank and withdrawn as and when necessary. They shall be audited annually by such person or persons and on such terms as the Council may determine.

16. *Relationship of the affiliated branches.*—The affiliated branches will be autonomous bodies as regards their internal arrangements are concerned, but their rules and regulations shall not be in conflict with the parent Association. They should submit a copy of their annual report together with statement of accounts by the 1st February of the succeeding year. They should also communicate any amendments or alterations in their rules then and there. The A.I.V.A., and the affiliated branches shall not be mutually responsible or liable for the debts and liabilities incurred by either of them.

Bye-Laws

1. The Secretary, working in close collaboration with the President, shall facilitate the work of the Council by circulating all members by post whenever necessary to obtain the opinion of its members.
2. The Secretary shall maintain the following records—
 - i. Register of members with their correct names and addresses.
 - ii. Inventory book containing a list of properties of the Association with all particulars.
 - iii. Minutes book containing the minutes of the General Body and of the Council of the Association.
 - iv. Correspondence register.
3. The Treasurer shall maintain the following records—
 - i. Subscription book showing clearly all the relevant details.
 - ii. Receipt book
 - iii. Cash book
 - iv. Voucher file
 - v. Bank pass book.
4. The Secretary shall have a permanent advance of not more than Rs. 20/- and recoup it from the Treasurer with the necessary vouchers.
5. The Treasurer may keep an advance of not more than Rs. 5/- with him and withdraw from the Bank only on demand from the Secretary for *bonafide* expenses of the Association.
6. Items of expenditure not exceeding Rs. 10/- can be authorised by the President. Any items of expenditure exceeding that amount must have the sanction of the Council.
7. Vouchers for all expenses as far as possible, and necessarily for all amounts exceeding Rs. 2/-, must be obtained and filed in the Office of the Treasurer, who shall present them for audit

purposes as and when required. These vouchers need not be kept after the annual meeting in which they are adopted.

8. Under the auspices of the All-India Veterinary Association, there shall be organised an All-India Veterinary Conference, every year or at suitable intervals, as decided by the Council of the Association, at a place and date to be notified at least 3 months in advance by the Secretary of the Association, who shall enter into correspondence with the affiliated branches sufficiently early and ascertain which of them is in a position to invite the Conference.

THE ALL INDIA VETERINARY ASSOCIATION

Application form for Membership.

To

THE GENERAL SECRETARY, A.I.V.A.

Sir,

Please enrol me as a LIFE/AN ORDINARY MEMBER of the above Association. A sum of Rs. _____ is sent by M.O. or Postal order.

Signature.

Name of the applicant (in block letters).—

Qualifications.—

Year and place of graduation.—

Designation.—

Address.—

N.B.—Members are particularly requested to intimate to the Secretary any change of address to facilitate correspondence.

Correspondence

[The views and opinions expressed in correspondence are those of the writers themselves. Ed. I.V.J.]

Veterinary Public Health Service and Human Welfare

Sir,

Veterinary public health service means a service in which Veterinarians play an important role towards the welfare of human race in all public health organisations particularly in municipalities. In all advanced countries its importance is so much recognised that there is not even a single municipality without a well-organised Veterinary section, the object being to prevent the animal diseases communicable to man through various media. As a result of which the authorities have fully realised the contribution of the veterinary profession to the improvement of national health and vigour. They have well-planned and properly equipped abattoirs with

all modern fittings for the scientific inspection of meat and internal organs before it reaches the consumers' mouth. They have been entrusted with the responsibility of inspecting dairy cows regularly to see if there are any diseases affecting the milk supply, inspection of stables to find out and investigate the existence of any diseases transmissible to man such as anthrax, H. S., F. M., and various sorts of skin diseases. Quarantine of any animal coming from outside is another most important work of a veterinarian and found very helpful in controlling diseases from being spread.

Men eat to live and not to assimilate diseases. So in a real welfare state we must have plenty of good and nutritious food at a cheaper rate and purer state, besides other factors like better living conditions, plenty of fresh drinking water, modern drainage system and prevention and suppression of contagious diseases among man and animal. Purity of meat and milk food depends on the health of animals and health depends on how the animals are fed and managed and the sanitary condition of stables. The only man who, with his intensive training and experience, has a thorough knowledge of animals during health and disease is the Veterinarian. He must, therefore, have an important place as important as the Health Officer in public health administration. Hence more advanced countries are very particular in having one or more of "Vets" to carry out the above duties. As one who has had long experience in such service outside India I can claim the advantages of such work for human prosperity.

But in India (particularly S. India so far as I have seen personally) Veterinary public health work as mentioned above is not realised by any one of our authorities with the result that not one major municipality has a planned and systematic programme of work introduced so far. The fact that no one has taken interest to study this problem even after the attainment of our independence can be seen from the management of the existing slaughter houses in big cities like Madura, Coimbatore etc. and from the absence of systematic inspection of cattle sheds, pony stables and dairy establishments. The unrestricted and free movements of stray dogs, half starved and sickly, along main roads and lands, is detesting. Veterinary public health work in these places is at present confined only to a casual meat inspection conducted in a most unsystematic, unsatisfactory and unscientific manner. It is nothing else. The authorities are under the impression that this is the only work that can be assigned to a "Vet" and nothing more than that. This is what I closely observed during my stay in Madura though I tried on more than one occasion by correspondence and conversation to impress upon the Health Officer the necessity of a better organised programme of work as is done in other places. Another important feature is that the place of a Municipality "Vet" is not attractive because

of the low salary, poor future prospects and no prestige or status. What I have experienced is that the municipal authorities want only a good amount of money every year and the Government in turn want only the statistics of animals according to sex slaughtered before the tenth of the month. None of the above authorities take any interest in the repair or alteration or extension of buildings on modern lines or implementation of proper rules and regulations for the sake of efficiency and discipline.

I took some pains to go through the pages of the District Municipalities Act and Madras Public Health Act and on a close perusal it was a surprise to me to have seen not a single word mentioned about a veterinarian and his work any where connected with animals. This is an additional proof to show that when these books were written there was no one interested to specify the nature of the work in a municipality to a Veterinary Surgeon. To point out a glaring omission, I would like to draw the attention of the readers that Act No. 61 lays down that prevention of infectious diseases transmissible to man from animals and prevention and suppression of such diseases among animals is the sole concern of the Health Officer and not the Veterinary Surgeon. Again power to destroy stray dogs responsible to cause the spread of that horrible disease 'Rabies', general control over stables, cow sheds, cattle yards, slaughter houses, inspection of dairy animals, investigation of diseases caused by milk—all these which ought to have been in the control of Veterinary Surgeon—are also the main concern of the Health Officer. If they had only mentioned 'in consultation or co-operation of the Veterinary Surgeon' it would have some meaning. The result of all these is that a 'Vet' has no place in the municipality for anything connected with animal and he has no say in the matter. It is not my intention to cast any reflections on any authorities, but I only point out the bare fact that 'a right man is necessary in a right place'. Meat and milk inspection is a special branch of Veterinary science and, in countries like U. K., only a veterinarian is employed by municipalities to look after this work. They even insist a P. G. course of one year leading to the Diploma of D. V. S. M. before entrusting them with this work. But, in India, a person with or without a knowledge of this study, can be engaged to look after meat inspection. This can be further corroborated by the appointment of Sanitary Inspectors to look after meat inspection when qualified Veterinarians are not available.

Considering the above facts I would like to put forth the following suggestions to the authorities concerned to tackle this problem which has been long overdue in the interest of human welfare.

1. As has been recently done in Bombay, a committee containing of a senior Health Officer, Director of Animal Husbandry and a few other

interested non-officials should be formed to enquire into the present working of the Municipal Veterinary work and to make recommendations for their improvements on modern lines as mentioned above. The committee should also suggest the possibility and suitability of establishing a full time man on an attractive salary giving him all duties connected with animal health in all major municipalities.

2. Both acts—M. P. H. Act and D. M. Act—to be amended substituting V. O.s in place H. O.s when dealing with animal diseases communicable to man, inspection of dairy farms, cattle sheds, pony stables and control and suppression of Rabies by strict licensing, destruction and vaccination.

3. Since municipalities are responsible for the supply of pure and healthy milk and meat for the consumption of its citizens, they must take interest in the production of these food materials by starting poultry and dairy farms under the supervision of a Veterinary surgeon and becoming self-sufficient. And for the supply of plenty of nourishing food for cattle, grass farms should be established in all major municipalities as has been done in Madurai.

4. Dairy sheds should not be allowed to be built at random inside the town area for keeping cows. Either the municipality or private individuals should be encouraged to build such sheds in the outskirts of the town limits and let them out for rent. This is advantageous for both the animals and men from the health point of view.

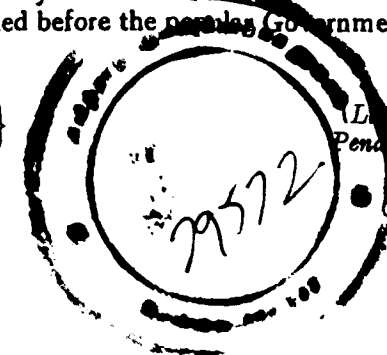
5. Rules and regulations should be made that sudden death of any animal in the city is reported to the Veterinary Surgeon and that no animal is to be disposed of without conducting a P. M. examination in a knackery built for the purpose. A register should be maintained to note down the cause of death and P. M. symptoms. This will greatly help in locating the outbreak of a disease and suppressing it by prophylactic methods.

6. A man bitten by a suspected case of rabies must report the matter to the police who will arrest the dog and keep it under observation in a quarantine station under the supervision of the Veterinary Surgeon whose duty it would be to report the matter to the medical Officer after the expiry of the quarantine period.

These are some of the Public health work which can safely be entrusted to the Veterinary Surgeon in the interests of human welfare.

It is my sincere wish that such a scheme may be recommended and submitted before the Madras Government for their consideration and sanction.

Trivandrum.
17-9-51.

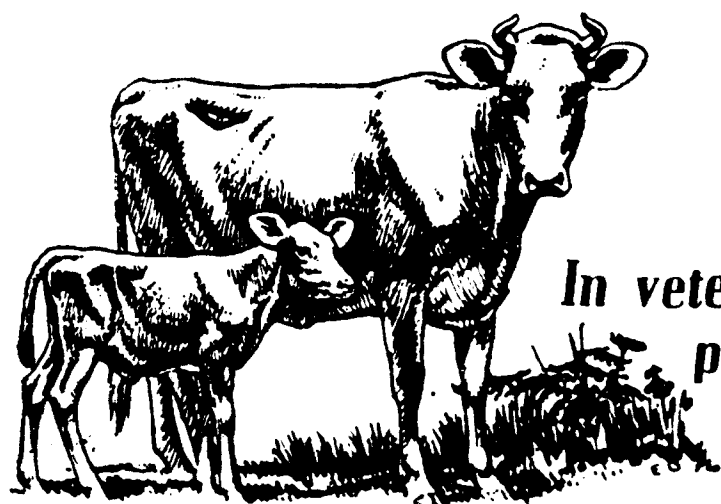


M. V. PILLAI G.B.V.C.,
(Late of the Veterinary Services,
Penang and Lahore) Trivandrum.

5L

KZ M2, N24

N51-28-3



*In veterinary
practice*

M&B Sulphonamides

★ **'M&B 693'** *brand sulphapyridine*

a well established sulphonamide for the oral treatment of
blood-borne bacterial infections

★ **'M&B 693' SOLUBLE** *brand sodium sulphapyridine*

for intramuscular or intravenous injection in systemic bacterial
infections and for intravenous injection in foot rot in cattle

★ **'TRINAMIDE'** *brand compound sulphonamides*

a new introduction for oral administration in
bacterial infections

★ **'THALAZOLE'** *brand phthalylsulphathiazole*

a sulphonamide of low toxicity highly active in
infections of the intestinal tract

★ trade mark



manufactured by
MAY & BAKER LTD

VA 29

distributors
MAY & BAKER (INDIA) LTD., BOMBAY - CALCUTTA - MADRAS - NEW DELHI - LUCKNOW - GAUMATI

Printed by T. Kannabiran, at The Paramount Press, (Proprietors: Jaya & Co.) High Road,
Triplicane and published by Dr. P. Srinivasa Rao, G.M.V.C., Editor,
The Indian Veterinary Journal, 26, Wallajah Road, Madras 2

ADVERTISEMENTS

A Few of Dr. Pangal's specialities to all Lovers of Horses, Cattle and Dogs.

1. "Race Horse Brand" Equitone. A valuable Blood Tonic and conditioner for Race Horses, Polo Ponies, Hunters, etc. Quite indispensable to keep the horses in hard work always fit.
Price per 2 lb. tin Rs. 8.
2. "Tendon Lotion". For Inflamed and Sprained Tendons, Ligaments and joints in Horses.
Price per lb. bottle Rs. 2
3. "Scented Pulvex". Tick specific. A wonderful Tick destroyer.
Price per big tin Rs. 4. per small tin Rs. 1-4.
4. "Boyotone". Best Tonic Powder for cattle containing Minerals and Vitamins.
Price per 2 lb. tin Rs. 2.
5. "Dr. Pangal's Resolvin". Indicated in absorbing—without firing—Splints, Ring bones, Spavins, Enlarged joints, Sprained Tendons and Ligaments; and cures Sore Shins, Capped Elbows and Hocks.
Price per 4 oz. bottle Rs. 8.
6. "Mange Dressing". A specific for all kinds of Mange.
Price per big bottle Rs. 3. Small bottle Rs. 1-8.
7. "Canatone". Vitamin Mineral Food for dogs.
Price per 1½ lb. tin Rs. 1-8.
8. Copper Nose Rings.—For leading bulls. Rs. 8.

DR. PANGAL'S VETERINARY INSTITUTE

26, WALLAJAH ROAD, MADRAS 2.

PASU SANKARAMAK ROG CHIKITSAK IN HIND

An useful book for students, stockmen and lovers of Hindustani language. Deals with contagious and infectious diseases in animals.

Price Rs. 5-9-0.

Copies can be had from the author at:-

DR. R. P. SINGH,

VETERINARY ASSISTANT SURGEON.

P. O. SHAHABAD (BIHAR).

Buxar, P.O., Shahabad Dt., Bihar.

STANES MINERAL MIXTURE

Staness 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.

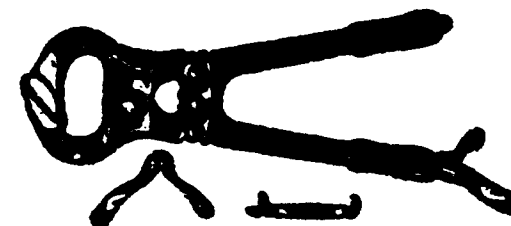
Sold in bags of 14 lbs., 28 lbs., for supply in the Madras Presidency.

For further particulars Apply to:-

T. STANES & CO., LTD.,
COIMBATORE

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

Burdizzo Castrators with Patent Cord-Stop at Jaws.



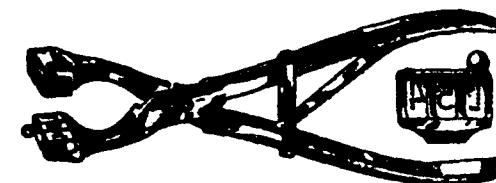
Beware of Imitation. Do not be misled by spurious makers.

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.

New consignment just arrived.

Further particulars on request from the
Representatives and Distributors:-

DR. PANGAL'S VETERINARY INSTITUTE

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

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