

428

The Indian Veterinary
Journal

1942 - September

VOL. 19. NO. 2.



JL
KZm2.N24
N42.19.2
79803

Vol. XIX

SEPTEMBER 1942

No. 2

THE ¹¹⁴
INDIAN VETERINARY JOURNAL

Published Bi-monthly

(THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION)

428
EQUINE STREPTOCOCCAL INFECTIONS

In the sulphonamides, Sulphanilamide and SOLUSEPTASINE, the profession now has an effective, rapid and reliable treatment for pneumonia in horses, as was shown by the work of Hignett and King on this infection. (Hignett and King, 1940, "Veterinary Journal," Vol. 96, p. 81.)

In other streptococcal infections in horses the evidence is less substantial but the sulphonamides are frequently of value in preventing and treating wound infections and joint-ill of foals.

Further trial is indicated in purpura hæmorrhagica and metritis in mares. In strangles, results have been less favourable and little benefit seems to be obtained from Sulphanilamide.

Sulphanilamide (May & Baker) and SOLUSEPTASINE are supplied as follows:—

Sulphanilamide (May & Baker)

Containers of 250x0.50 gm. at Rs. 5-10

Packets of 25 gm. powder at Rs. 1-4

★ SOLUSEPTASINE

10 per cent. solution

10x5 c.c. ampoules at Rs. 9-10

20 per cent. solution

Ampoules of 30 c.c. at Rs. 5-12

★ TRADE MARK



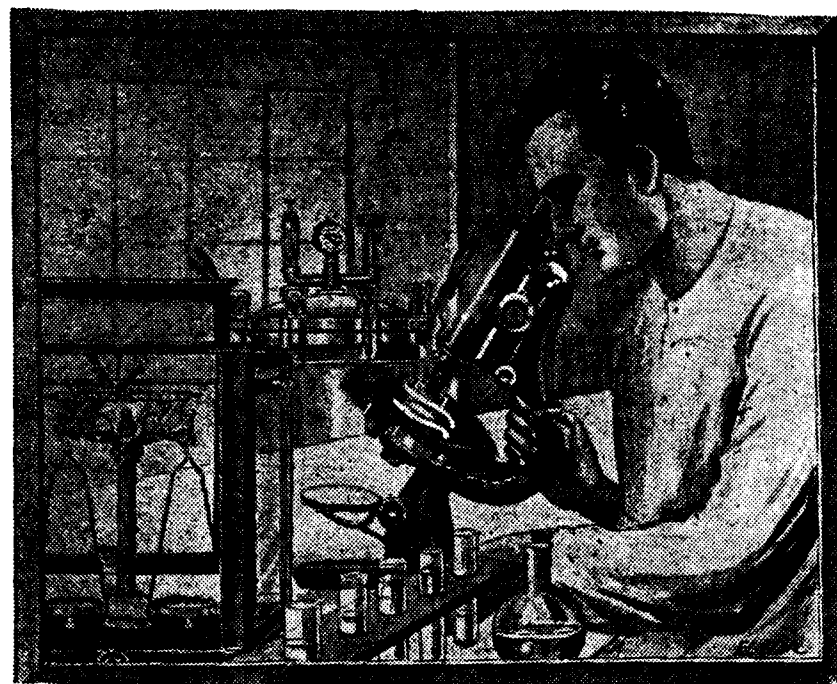
BOMBAY

CALCUTTA



JL
KZm2, n24
N42.19.2
79803

We specialize in
CLINICAL LABORATORY
and
Hospital Equipment



PLEASE CONSULT FOR ALL YOUR PROBLEMS
THE ANDHRA SCIENTIFIC CO. LTD.

Head Office & Works :
Masulipatam
Phone : 47.

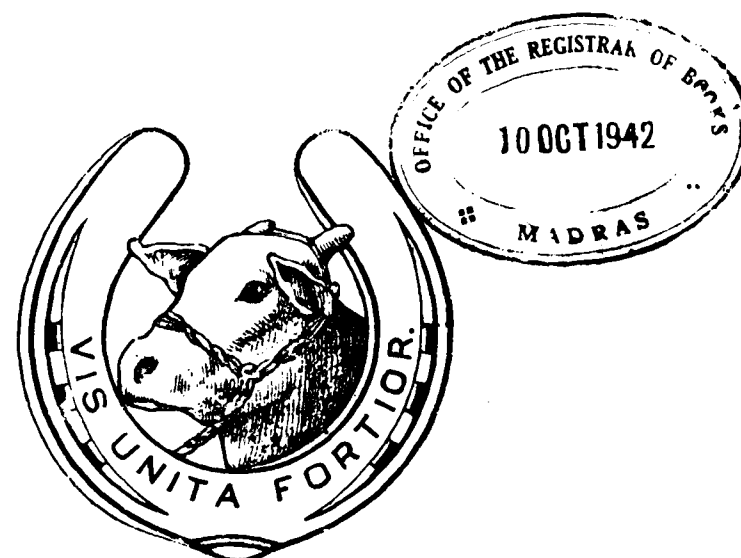
4, Blackers Road
Mount Road, Madras.
Phone : 86275.

When writing to advertisers, please mention this Journal.

Published Bi-monthly
Vol. XIX.

September 1942
No. 2

The Indian Veterinary Journal
(The Journal of the All-India Veterinary Association)



Editor :

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

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

PRINTED AT
CENTRAL ART PRESS, WALLAJAH ROAD, MOUNT ROAD, MADRAS
1942

NOTICE

The Indian Veterinary Journal

A Bi-monthly Record of Veterinary Medicine and Surgery
Devoted to the Cause of Veterinary Profession

PUBLISHED FOR THE ALL-INDIA VETERINARY ASSOCIATION



EDITOR:

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

SUBSCRIPTION:

For members of the profession and students:—Rs. 4 or 6s. 8d. per annum including postage, in advance. Re. 1 or 1s. 8d. per part.

For others:—Rs. 8 or 13s. 8d. per annum in advance, or Rs. 2 or 3s. 4d. per part.

1. Original Articles, Clinical Notes, Society Reports and Notes on interesting cases are invited. Contributors of Original Articles will receive 25 copies of their papers *free* if wanted.

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

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

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

STERODIN

The Non-Specific Antigen.
Excellent response in
Distemper, acute febrile diseases

e. g. pneumonia, bronchitis etc.,
and other infective conditions.

Issued in 2, 5 & 10 c.c. ampoules and 30 c.c. R/C phials.

For detailed literature please write to:

UNION DRUG CO. LTD. CALCUTTA.

285, BOWBAZAR STREET

T'Phones:
Cal. 1159.
Cal. 4975.

T'Gram:
"Benzoic"
Cal.

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 nucleic acid in 5 c.c. ampoules

BENGAL CHEMICAL

CALCUTTA : : BOMBAY

When writing to advertisers, please mention this Journal.

THE Indian Veterinary Journal

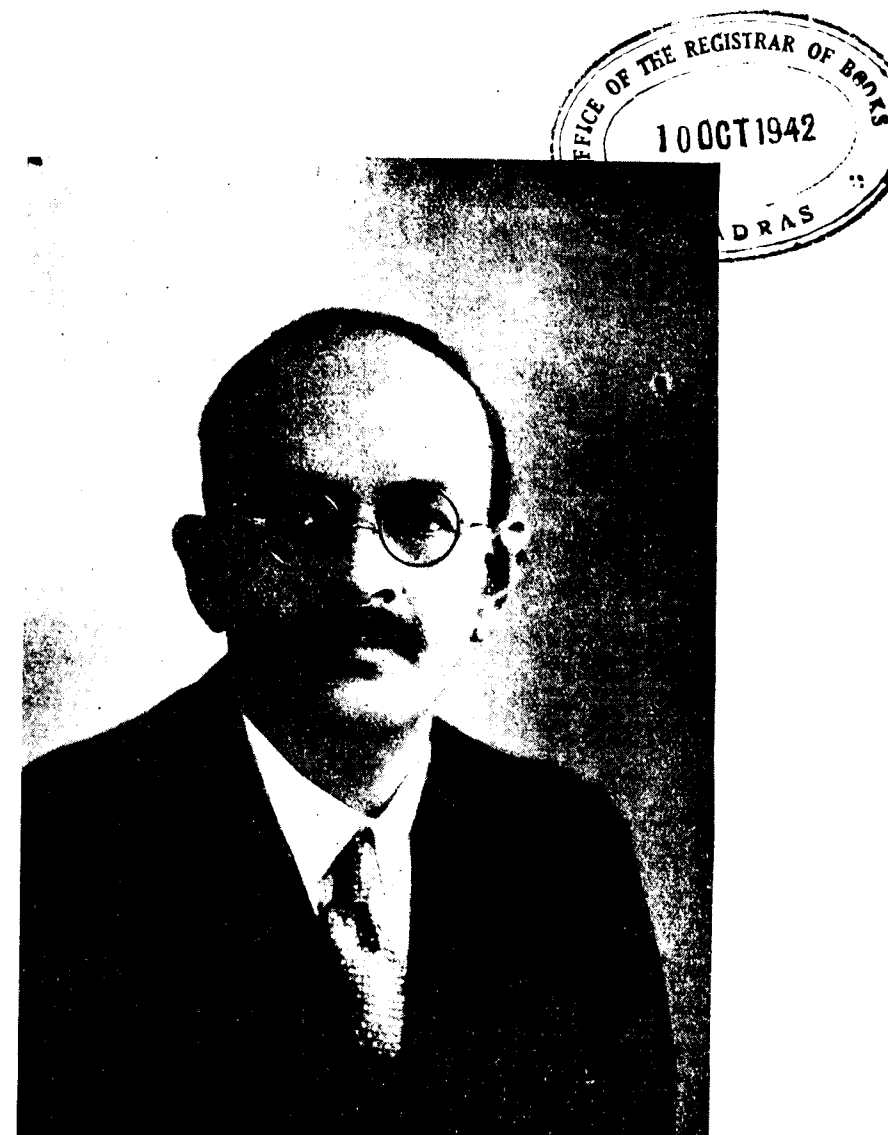
(The Journal of The All-India Veterinary Association)

Vol. XIX SEPTEMBER, 1942 No. 2

CONTENTS

General Articles	PAGE
The Topical Application of Sulphonamides in Veterinary Practice.—By H. C. Swann, M.R.C.V.S. ...	49
Human Encephalitis due to the virus of Equine Encephalomyelitis.—By Carl M. Eklund, M.D. ...	63
Scours in Dairy Calves, with special reference to White Scours, Coccidiosis and Verminous Gastroenteritis.—By Bennet T. Simms, D.V.M., Donald C. Boughton, Ph.D., and Dale A. Porter, S.O.D. ...	72
A. R. P. Hints for Animals.—By K. R. Alur, G.B.V.C., P.G. ...	81
Editorial	
The All-India Veterinary Association, Madras Branch ...	85
M. Anant Narayan Rao—A Life Sketch ...	87
An Appeal ...	93
Clinical Cases	
A Case of Hypoglycaemia in a she-buffalo.—By B. Ramiah, G.M.V.C. ...	95
Melanotic Tumour on the Fetlock of a bull.—By K. S. Prakasa Rao, G.M.V.C. ...	95
A Case of Contracted Tendons in a Calf.—By G. Sitarama Murty, G.M.V.C. ...	96
Bee Sting (?) In a Calf.—By S. Ramanarayanan, G.M.V.C. ...	98
A Case of Alopecia in a Horse.—By Md Takiuddin Ahmed, G.V.Sc. ...	99
Haemolytic Anaemia in a Mare due to Sulphanilamide.—By W. A. Dickinson, M.R.C.V.S. ...	100
An Outbreak of Ovine Rabies.—By J. A. Henderson ...	101
Paddy Spikes in the jaw of a bullock.—By K. S. Prakasa Rao, G.M.V.C. ...	103
A Queer Case of Dyspnoea in a Horse.—By M. D. Vaishnav, G.B.V.C. ...	104
A Humane Method of killing Pets.—By V. G. Khare, G.B.V.C. ...	105
Association News	
The All-India Veterinary Association—Statement of Receipts and Payments of the Indian Veterinary Journal for the year 1941-42 ...	106
„ Proceedings of the Executive Committee Meeting of the Madras Branch ...	106
Panikkar Memorial Fund—An Appeal ...	107
List of Subscriptions received for the Panikkar Memorial Fund up to 1-9-42 ...	108
College News	
Bengal Veterinary College Supplementary Examination Result, July 1942. ...	109
Review	
Annual Report of the C.V.D., Barwani State, for the year 1939-40... ..	110

Plate No. 1. The Indian Veterinary Journal. Vol. XIX, No. 2



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

Lecturer in Parasitology,

Madras Veterinary College, Madras.

who has proceeded on leave from 1-9-42, preparatory to retirement.

Imperial Veterinary Research Institute, Mukteswar

POST-GRADUATE COURSE 1942



Left to Right.

1st Row :—S. Sen, L. Subai, Dr. H. N. Ray, Dr. B. S. K. Sen, Dr. F. C. Minett (Director), J. R. Haddow, Dr. G. D. Bhalariao, V. R. Rajagopalan, (Staff)
 2nd Row :—J. L. Parimoo, G. S. Dehuri, J. A. Idnani, K. S. Sankaram, S. B. Sen Gupta, R. P. Sing, K. P. Patankar, B. V. Rahman, M. Akhtar Hosain
 3rd Row :—G. M. Siddiqui, K. G. Pataskar, Gopal Singh, M. S. Ralendran, K. R. Alur, Mahmud Khan, I. D. Mantranurti, (N. W. F. P.)

THE Indian Veterinary Journal

(The Journal of The All-India Veterinary Association)

Vol. XIX

SEPTEMBER, 1942

No. 2

General Articles

THE TOPICAL APPLICATION OF SULPHONAMIDES IN VETERINARY PRACTICE*

BY

H. C. SWANN, M.R.C.V.S.,

King's Lynn.

Introduction

The value to be derived from the oral or parenteral administration of sulphonamide compounds in the treatment of some of the local and general infections of animals has proved to be of overwhelming importance in veterinary practice.

When administered sulphonamide is absorbed into the blood, and it is then conveyed by the blood-stream to the scene of bacterial activity, being brought into intimate contact with the causative organisms through the medium of the tissue fluids. The beneficial effect on the patient is due to a bacteriostatic action on invading organisms, control over the multiplication of those organisms enabling the leucocytes and natural antibodies of the patient to get the "upper hand."

For the successful treatment of infection it is necessary that the drug be maintained in a certain concentration in the blood-stream for a sufficient length of time, and that the organisms causing the infection be of a type susceptible to the drug's bacteriostatic action. After oral administration the maximum blood concentration is reached within six or seven hours and if a further dose is not given this concentration then begins to drop, the drug being almost entirely eliminated with 24 hours. In practice, therefore, it is

* Reprinted from the "Veterinary Record" May 2, 1942.

necessary to commence treatment with a dose large enough to induce the required blood-concentration, and to maintain this concentration by regular repetition of the drug until the infection is more or less under control.

It has been found that in many local infections bacteriostasis can be induced by the topical application of sulphonamide direct to the affected tissues. Although this latter method of treatment is already gaining popularity in the field, it is owing to the apparent lack of literature on the subject that the writer has been prompted to publish this article.

The value of the treatment appears to have been first recognised in 1939 by Jensen, Johnsrud and Nelson¹, who implanted sulphonamide powder into compound fracture wounds and reported that, with no changes in surgical technique, the incidence of infection rate fell from 27 per cent. to 5 per cent. Since then the treatment has been popularised by the medical profession, and amongst earlier reports as to its value one may refer to Jeffrey², who quotes the treatment with apparent success of several hundred war wounds in France (1940).

Practical Considerations

The application of sulphonamide to an injured skin or mucous membrane does not cause irritation and, in fact, it is often found that the drug exerts a soothing effect on damaged tissues, rendering them much less painful. Many of the antiseptics used in local injuries are only able to act in a concentration which is also damaging to the tissues. Although sulphonamide has no bacterial effect in the true sense of the term, it does not cause local tissue injury, and this, of course, is a decided advantage.

The success of local treatment depends upon the following factors:—

1. *Contact*.—For effective bacteriostasis, it is necessary that the drug be brought into intimate contact with every part of the lesion or organ under treatment.

2. *Maintenance of Local Concentration*.—As in the case of oral administration, beneficial results will only be obtained if a sufficient concentration of the drug is maintained at the site of bacterial activity long enough for the defence system of the patient to get the infection under control. Local concentration should be maintained in practice by using a preparation of sulphonamide which will be only slowly absorbed, and repeating the applications when necessary. The nature of the injury or infection does not always lend itself to repeated treatment *e.g.* wounds sutured after implantation, and if there is reason to fear absorption of the drug before the risk of infection is entirely eliminated, the limitations of the treatment in that particular case should be appreciated, and oral administration of the drug commenced without delay.

3. *Early Application*.—The action of sulphonamide is greatly reduced in the presence of large numbers of bacteria and toxins. Unless it is possible to make a very early application of the drug to an injured tissue or organ, care should be taken to cleanse the part before commencing local sulphonamide treatment. Local necrosis, thickened walls of inflammatory reaction, profuse discharges and deep infections, are other factors which, occurring as sequels to local injury, are detrimental to the beneficial effects of the drug.

Although the benefits to be obtained by this method of treatment even when applied in the later stages of such infections, are sometimes spectacular, efforts should be made to commence treatment as early as possible.

4. *Nature of Infection*.—It will be appreciated from experience gained by oral administration of sulphonamide that the drug is only effective in infections caused by certain types of pathogenic organisms, *e.g.*, some strains of streptococci, staphylococci, etc. The same remarks apply to the local application of the drug, but fortunately the group of susceptible organisms constitute a very large percentage of those which commonly cause local infection in animals.

5. *No Generalisation of the Infection*.—Local infection is the result of pathogenic organisms invading the tissues and attempting to overcome the resistance of the host. Depending upon the tissue involved, initial damage, virulence of the organisms, and resistance of the host, the infection may either become generalised, remain localised, or become eliminated. Local application of sulphonamide is of very great assistance to the patient, and will on many occasions prevent a localised infection becoming generalised. It is necessary, however, for the clinician to attempt to visualise this battle between host and parasite, and if owing to the nature of the local disease or injury, etc., there appears to be a risk of the disease becoming generalised, oral or parenteral administration of sulphonamide should be used instead of, or as a supplement to, the local treatment without delay.

6. *Toxicity*.—It might be thought that the application of a large quantity of sulphonamide to a highly vascular organ or tissue would be attended by toxic symptoms in the patient, owing to rapid absorption. It has been suggested³ that the concentration in the blood likely to be reached by absorption from a topical application in man is not likely to be dangerous, and these remarks appear to be equally applicable in the case of animals. No cases of toxicity following local application of the drug appear to have been recorded in veterinary literature, and the writer has found that the introduction of large amounts even into such a highly vascular organ as the uterus can be safely carried out without fear of toxicity.

Methods of Treatment

Before considering the special application of the drug to the various parts of the body, it is proposed to consider the methods in which treatment may be carried out.

It does not appear necessary to employ sterile preparations of the drug for local treatment. Harrell and Brown⁴, in the experimental treatment of infected wounds, conclude that, if the preparation is contaminated by organisms or their spores, the bacteriostatic properties of the drug will effectively deal with either the organisms present or those developed from their spores. Needless to say, however, it is desirable to carry out local treatment under conditions which are as aseptic as circumstances will allow.

Sulphonamide may be applied in the form of powder, ointment, suspension or solution. There are many sulphonamide preparations on the market which are known by various trade names. Some of these preparations are solid, and others are in solution, or ointment form. It should be appreciated that all of them resemble one another, in so far as they contain one or more sulphonamide group⁵, and it is upon the bacteriostatic action of these chemical groups that the action of the drug mainly depends. For economical reasons, the preparation of choice will probably be sulphanilamide, which is also known as streptocide, sulphonamide-P or prontosil-album, and is usually supplied in the form of a white or yellow powder.

Topical application of the powder may be carried out with the clean hand or by means of a powder dredger or insufflator. A powder dredger is very useful for large surface wounds, enabling a thin coating of the powder to be economically dusted into the wound as frequently as necessary. An insufflator is also useful for surface wounds of this kind, but is particularly valuable for deep ragged wound, the pressure obtained in the insufflator carrying the powder into the depth of the wound. In other instances it may be found more effective to apply the drug in the form of an ointment. Of the proprietary preparations of this nature one may particularly mention "Prontosil ointment" and "Uleron".

An extremely useful ointment may be dispensed to either of the following prescriptions⁶ :—

℞
Sulphanilamide powder 5 per cent.
Zinc oxide
Liq. paraffin aa p.ae.
Ft. Pasta.
Or :—

℞
Sulphanilamide powder 5 per cent.
Iodoform
Liq. paraffin aa p.ae.
Ft. Pasta.

It will be noticed the latter prescription resembles B.I.P.P., the bismuth being replaced by 5 per cent. sulphanilamide.

In the case of tubular wounds with small apertures, Legroux⁷ recommends the use of sulphonamide "crayons" about 2 in. long, each containing 2 grammes of the drug. The writer suggests that this method of treatment would be particularly valuable in the local treatment of the vagina and uterus in small animals. Gelatine capsules containing the drug, or tablets intended for oral administration, could be used under similar circumstances.

Herrel and Brown (1940)⁸ suggest that the best method of application is by means of a thick suspension which they prepare by adding 2 grammes of powdered sulphanilamide to 100 c.c. of an 0.8 per cent. solution of sulphanilamide in physiological saline solution. They have used this suspension with success in open or closed wounds of various types, and particularly in the treatment of infected operation wounds. The writer has used, with success, a suspension of the drug in liquid paraffin, adding sufficient of the powder to the oil to make a thin paste. Were it not for war-time conditions, glycerine would probably prove a particularly useful vehicle to be used in similar circumstances.

A useful emulsion of the drug may be dispensed as follows :—

℞
Sulphanilamide powder, grs. 175
Ol. morrhuae, 4 oz.
Acid oleic, m 36
Aq. calcis ad oz. viii

The solubility of sulphonamide in water is low, being only about 1 per cent. It might be thought that even at this concentration beneficial effect would be derived from the topical application of an aqueous solution, but this does not appear to be the case. Perhaps this is due to the drug being too rapidly absorbed from the site of infection.

Appleby⁹ has suggested the use of propylene glycol and triethylene glycol as solvents of the drug with urea, claiming that these preparations in themselves have a bactericidal effect on various organisms. These substances, however, now appear to be unobtainable in this country, and, in any case, the solubility of sulphanilamide in them is not very high, being in the region of only 5 per cent.¹⁰ There are also various proprietary preparations marketed in solutions containing high percentage of sulphonamide, but

these are generally too expensive to warrant their economical use as a local dressing.

All things being considered, it will usually be found more successful to employ the drug in solid form, ointment, or suspension, rather than actual solution, in that a solution favours too rapid a rate of absorption from the site of infection for the bacteriostatic effect of the drug to be obtained to its full advantage.

Practical Application

(a) *The Treatment of Accidental Wounds*:—Accidental wounds met in veterinary practice vary considerably, not only according to their situation, but also in their appearance. No hard-and-fast rule can, therefore, be laid down as to their treatment, each wound being treated according to its merits. In view of the unhygienic environment of the patient, however, it can usually be taken for granted that every wound is infected before treatment commences.

In the case of incised wounds caused by sharp objects, attempt should be made to bring about primary union by rendering the part aseptic and suturing the wound's edges. After the arrest of hæmorrhage and clipping of the surrounding hair, the possibility of gross infection should be considered, and, if necessary, attempts made to eliminate it. Care should be taken to avoid the use of antiseptics which have an injurious effect on the tissues, and for this primary treatment the writer prefers the use of a hypertonic solution of saline or even plain warm water. The wound should then be implanted with sulphonamide, sutured and treated as an ordinary wound.

Provided the initial cleansing of the wound is carried out thoroughly and efficiently, the success of this treatment as shown by primary union and healing without suppuration is often amazing, even in wounds which are grossly infected at the commencement of treatment.

In the treatment of lacerated wounds, arrest of hæmorrhage and removal of hair should be carried out, but even greater attention must be given to the primary cleansing. Apart from searching for foreign bodies, particular care should be taken to attend to any pockets or crevices which are likely to harbour infection. Such wounds are always suffering from various degrees of contusion, and care should be taken not to increase this local damage by the use of irritant antiseptics, hypertonic saline again being particularly valuable for this purpose. The wound is then implanted with sulphonamide and usually left as an open wound. The sulphonamide treatment should be repeated at intervals, and if the powder is used it may be prescribed for the owner to use as an ordinary dusting powder. If infection persists in the wound to any extent after this treatment, it usually meant

that a pocket of infection has been left, owing to incomplete cleansing of the wound at the commencement of treatment, or that the sulphonamide has not been brought into contact with all the damaged area. In such cases, immediate drainage should be provided, and in the event of any risk of generalisation of the infection sulphonamide should be given orally.

In other wounds where advice is not sought until infection is well established, ordinary routine surgical measures to provide drainage, etc., should not be neglected, local sulphonamide treatment being used to supplement the normal treatment of the wound.

Broken knees and other conditions frequently treated with B.I.P.P. may similarly be treated with sulphonamide ointment for which a prescription has already been given.

There is evidence that under experimental conditions sulphonamide has an activity on *Cl. tetani*¹¹, but passive immunisation against tetanus should not be neglected in those cases where it is usually adopted as a routine measure.

CASE REPORTS

Case No. 1. 20-6-41: Suffolk gelding, aged five years, with a deep wound on the outer part of the off-fore coronet, caused by corrugated iron. Haemorrhage was found to be excessive; a tourniquet was applied to the limb, and the wound was then bathed with warm water, packed with a wet wool swab, and lightly bandaged, the attendant being instructed to remove the tourniquet in one hour.

22-6-41. The hæmorrhage had now completely ceased. The wound was carefully bathed with clean warm water, implanted with sulphonamide-P, and then sutured under local (Plantar) anaesthesia.

25-6-41. The stitches had held, and the wound appeared to be progressing satisfactorily. Sulphonamide was dusted on the wound.

28-6-41. The stitches were carefully removed, and primary union appeared to have taken place. Sulphonamide-P was dusted on the surface wound, and the attendant was instructed to dust the wound with the powder twice daily. For cleanliness the animal was now turned out.

3-7-41. The wound presented a healthy appearance and showed no evidence of suppuration. No further visits or treatment were necessary.

Case No. 2. 5-8-41. Mongrel dog, aged six years, with puncture wound in the skin of the neck in the mid-cervical region, with extensive suppuration in the subcutaneous tissue. The wound was enlarged under local anaesthesia and the subcutaneous tissues syringed with hypertonic saline solution. Streptocide suspended in liquid paraffin was then injected and repeated daily.

8-8-41. The dog appeared more comfortable and there was no subcutaneous swelling or suppuration. Another injection of the sulphonamide preparation was made, the owner being instructed to bathe the wound with dilute Eusol once daily until it had healed. The owner subsequently reported that the dog had made a complete recovery.

Case No. 3. 25-1-42. Chow dog, aged two years, with deep painful lacerated wound 5 inches in diameter over left side of thorax, thought to be due to injury by a bull. The muscle was very badly torn, and a "pocket" extended for 3 inches in a lateral direction, terminating at a rib. The surrounding hair was removed, and the wound thoroughly syringed with warm hypertonic saline. Sulphonamide-P was implanted into the wound. The owner was instructed to dust the wound with the powder twice a day.

28-1-42. The owner reported that the wound was much less painful the next day, and the dog appeared much more comfortable. There was an excessive exudation of serum and the torn muscle presented a salmon-coloured appearance, presumably due to a layer of the powder in the serum. The owner was instructed to continue the sulphonamide treatment.

2-2-42. The wound presented a very healthy appearance, was not painful or suppurating, and there was no dry crust on the wound surface such as usually accompanies dry dressings. The "pocket" was much smaller and an active repair process was taking place. As the effusion of serum had carried some of the powder on the coat below the wound this was removed by bathing, taking care that none of the liquid touched the wound. The sulphonamide treatment was continued.

10-2-42. The deep "pocket" had filled up, the wound was much smaller in diameter, and its surface presented a very healthy appearance. The owner emphasised that throughout treatment the dog appeared to be in no pain and the wound had never developed any pus. It was not thought necessary to see the case again.

(b) *The Treatment of Compound Fractures.*—In the treatment of compound fractures, implantation of sulphonamide is particularly valuable for helping to control local infection. The manner in which it is applied depends upon the method adopted to treat the fracture. After the initial cleansing of the wound and removal of destroyed tissue or loose pieces of bone, etc., the wound should be thoroughly implanted with sulphonamide. If a temporary splint is applied a dressing of wool or lint impregnated with sulphonamide powder should then be applied under the bandage. If possible, a window should be left in the bandage and a splint over the wound, and implantation of sulphonamide carried out once or twice daily until healing has occurred.

(c) *The Treatment of Surgical Wounds.*—Mueller¹² (Roosevelt Hospital, New York City) reports the treatment of 75 consecutive cases of peritonitis following ruptured appendix and appendectomy without a failure (20 per cent. of such cases normally die). The treatment he adopted was sulphonamide applied locally.

In view of the persistent risk of infection in surgical wounds of animals, the importance of this method of treatment cannot be over-emphasised. Such treatment may be indicated at various stages in a surgical wound. If before suturing there is reason to fear infection owing to extensive manipulation or interference, as for instance might occur in the dissection of a deep tumour, implantation of sulphonamide before suturing is a valuable adjunct in warding off infection.

If, owing to the position of the wound or the species of the animal, it is necessary to apply a protective dressing and supporting bandage, the application of sulphonamide to the surface of the wound will assist in the prevention of infection, especially if the surface of the wound becomes wet owing to the exudation of serum so favourable to bacterial growth.

If, because a wound becomes infected, or owing to subcutaneous hæmorrhage or suppuration along a stitch-track, surgical interference is necessitated, implantation of the wound with sulphonamide, whether the wound is subsequently re-sutured or not, is again most useful.

In abdominal surgery, sulphonamide may be introduced directly into the peritoneal cavity. Although it is difficult to see how the drug can possibly reach every part of the peritoneum, it has been used with great success in human surgery¹³. It is claimed that at least part of this success is due to local effect, and not entirely due to a general effect after absorption. Its many indications, particularly in small-animal practice, are obvious.

In the open treatment of surgical wounds, *e.g.*, castration, fistulous withers and poll-evil operations, rig operation, etc., implantation of sulphonamide directly into the wound is also of value. It is, of course, not suggested that this treatment be carried out as a routine measure in all operations of this kind, but it is particularly indicated where extensive interference, hæmorrhage, or other factors favourable to infection have occurred.

CASE REPORTS

Case No. 4. 8-12-41. Female kitten, aged seven months. This animal was spayed on 29-11-41, and the owner now reported that the wound was discharging. The wound appeared swollen and suppuration was occurring along a stitch track. The kitten appeared to have no systemic upset. Despite dissection, it was not possible to trace the offending stitch. The wound was bathed in warm water and implanted with sulphonamide-P. The owner was advised to dress the wound with sulphonamide-P twice daily.

12-12-41. All discharge had ceased, and the wound had almost healed.

Case No. 5. 2-1-42. Cross-bred cow—due to calve at the end of February. This animal was found to be suffering from acute indigestion due to feeding on an excessive quantity of sugar beet pulp. Attempts were made to remove the gas by means of a probang, but these were unsuccessful. Owing to risk of asphyxia, it was decided to puncture the rumen by trocar and cannula, sufficient, but no complete relief being obtained. All food and water was withheld, purgatives and anti-zymotics were given, but it was thought advisable to leave the cannula *in situ* for three days.

5-1-42. The cow had completely recovered and appeared quite comfortable. The cannula was removed and the attendant was instructed to bathe the wound with warm water and Dettol twice daily.

9-1-42. The upper aperture of the wound was swollen and painful, owing to the development of a deep abscess. The wound was thoroughly cleaned and streptocide

implanted into the edges and depth. The attendant was instructed to apply the powder twice daily.

13-1-42. The wound now appeared normal, and the abscess had completely subsided. Sulphonamide treatment was continued.

17-1-42. The wound appeared to be making satisfactory progress, and, owing to the expense of streptocide, the attendant was instructed to continue treating the wound with dilute Dettol solution.

No further treatment was necessary.

(d) *The Treatment of Skin Disease and Burns.*—The writer has had several cases of acute eczema responding most satisfactorily to repeated dressings with sulphonamide powder. Before commencing treatment, all hair on and around the lesions is removed, and the affected parts are then thoroughly cleaned to remove all discharges and scabs. If hydrogen peroxide is used for this purpose, care is taken to remove all traces of it afterwards, owing to its incompatibility with sulphonamide.

In the treatment of local pustular conditions, such as impetigo in dogs, and the pustular type of follicular mange, local treatment by the drug is very beneficial, a preparation in the form of the ointment usually being found most satisfactory. For the local treatment of burns, sulphonamide in ointment form is also very useful, the most suitable preparation for this purpose being an emulsion of the drug with olive oil or castor oil, for which a prescription has already been given. All dead skin and destroyed tissue should be removed, and the part thoroughly cleaned before commencing treatment. Apart from preventing suppuration, the painful nature of the condition is relieved.

CASE REPORT

Case No. 6. 1-7-41. Fox terrier dog, aged 6 years, with moist eczema of the neck and back. This dog had been treated for a similar condition on several previous occasions. The hair on and around the lesions was removed and the moist patches were then thoroughly cleaned with warm water and soap. Sulphonamide-P was dusted on the lesions twice daily. Internally, a purgative was given, followed by mag. sulph. 10 grs., mag. carb. levis, 5 grs., *b. i. d.*

5-7-41. The lesions appeared much drier, and were not suppurating. They were again cleaned with warm water, and were found to be much less painful. The treatment was continued—recovery was uninterrupted, it being especially noticed that thickening of the skin was not so marked as on previous occasions.

(e) *The Treatment of Injuries and Diseases of the External Ear.*—Sulphonamide is a very useful drug to control infection in the external ear. In small animals, when a wound or ulceration of the concha necessitates immobilisation of the ear-flap by bandages, the injured part should be cleaned, and sulphonamide then applied as a dressing.

The writer has also had considerable success with the use of sulphonamide in the treatment of acute and chronic otorrhoea. Before

commencing treatment, the inside of the ear is thoroughly cleansed with warm water and peroxide or olive oil, etc. The sulphonamide is then implanted as a powder, and the treatment repeated according to the severity of the condition. If the condition in the ear is very dry and painful, a suspension of the drug in olive oil or liquid paraffin is found to be the most useful preparation. Recovery, especially in acute case, is usually very rapid.

CASE REPORTS

Case No. 7. 20-6-41. Alsatian bitch puppy, aged 3½ months. This puppy was suffering from a painful condition of the left ear, due to multiple small pustules in its inner surface. Treatment with antiseptic lotions had been carried out for the past three days without any sign of improvement. The ear was thoroughly cleansed and then filled with streptocide, the owner being instructed to apply the powder twice daily.

23-6-41. The ear had almost completely recovered, it only being found necessary to continue the treatment for a further two days.

Case No. 8. 5-12-41. Cocker Spaniel dog, aged seven years. The patient had been under treatment at intervals during the past few months for chronic otorrhoea, various dressings having been used. For the past ten days treatment of a flare-up of the condition had consisted of daily cleansing with warm water and peroxide, and dressing with an iodoform dusting powder. This treatment had not been attended by much success. The ears were well cleaned with olive oil, the powder and secretion being removed. They were then filled with streptocide, and this application repeated twice daily.

9-12-41. The owner reported that the dog was in much less pain, and he had not noticed such an offensive smell. The ears were then cleaned with olive oil, and the owner instructed to dust them with streptocide daily.

18-12-41. The ears were considerably improved, there being almost complete absence of suppuration and pain, despite their thickened condition. The case was not seen again—the owner being advised to dust the ears with the powder occasionally as a routine practice.

(f) *The Prevention of Metritis and Vaginitis.*—There appears to be no record of the use of sulphonamide as an application to the uterus or vagina. The writer has adopted this treatment on several occasions recently in large animals, and believes it to be a useful means of preventing metritis and vaginitis after difficult parturition or retained placenta, especially in mares.

The treatment of the post-parturient uterus, so far as the removal of the placenta is concerned, has always been a very debatable subject. The following practice is adopted by the writer.

In the event of a difficult parturition, attempts are made to remove the placenta as soon as possible, provided the operation can be carried out without causing hæmorrhage or damage to the uterus. This has been found particularly important in mares and in cows where laceration of the genital passage has occurred at parturition. Uterine irrigation is carried out only if the uterus is in a particularly unhealthy state, and for this purpose—the

writer prefers a hypertonic saline solution. If irrigation is practised, care is taken to remove all the solution introduced, the uterus afterwards being swabbed with cotton-wool.

Implantation of the uterus with sulphonamide is usually carried out in the latter operation, sulphonamide is introduced at each visit. Once the placenta has been removed and sulphonamide implantation completed, no further local treatment of the uterus or vagina is attempted. This appears to be particularly important. If laceration of the vagina has occurred at parturition, implantation of sulphonamide directly into the wounds appears to be a valuable means of preventing abscess formation or gangrene.

Sulphonamide may be implanted into the uterus in powder form, in gelatine capsules, or as a suspension or emulsion. The writer prefers the powder, the moisture in the uterus quickly taking it up from the operator's hand. Quantities up to 8 oz. may be introduced as the initial dressing, smaller amounts being employed if, owing to retained placenta, the dressing is repeated.

Apart from economy in the use of sulphonamide by this method in comparison with oral administration, a more concentrated amount of the drug is probably maintained for a longer period at the actual site of infection. Moreover, the method is simpler, especially in mares where the attendant is usually incapable of administering capsules or balls, and drenching cannot be accomplished without a certain amount of risk.

It is not suggested that every case of dystokia should be treated in this way, but the writer adopts it as a routine measure in all cases of difficult parturition or retained placenta in mares and in any cases in cows where there are obvious reasons for fearing acute metritis or vaginitis. These methods should not be relied upon for the treatment of acute metritis, as owing to the risk of generalisation of the infection, oral administration is imperative.

CASE REPORTS

Case No. 9. 14-1-42. Shire mare, six years old. This mare was reported to be having difficulty with a premature foaling, slight labour pains having been in evidence for 18 hours. Examination revealed an anterior presentation of the foal, with a lateral deviation of the head and retention of the right fore-limb, the foal being wedged in the pelvic inlet. Owing to the narrowness of the pelvic inlet, the decomposed state of the foetus, and the duration of labour, extreme difficulty was experienced in correcting the presentation. The foetus was eventually removed by traction, passage through the vagina being assisted with the aid of a lubricant. The foetus was so decomposed that a front digit was torn off at the fetlock joint during the operation. The placenta was removed soon afterwards, and most of the fluid contents expelled. Six ounces of streptocide were then introduced into the uterus.

15-1-42. The mare appeared bright, with normal appetite, pulse, temperature and respirations. Mag. sulph., 2 oz., and pot. nit., 2 drachms, was prescribed, *b.i.d.* The

uterus was not interfered with, but the perineal region was cleaned and the root of the tail bandaged to aid cleanliness.

17-1-42. The mare still appeared normal. No further treatment was prescribed, and she made an uninterrupted recovery.

Case No. 10. 28-1-42, 3-30 p.m. Thoroughbred mare, nine years old. This animal had foaled prematurely at 10 a.m., and as she was still in pain, the owner sought professional advice. Another foal was delivered without difficulty. The placenta was firmly attached to the uterine wall and could not be removed. Sulphonamide-P, 4 oz., was diffusely distributed in the uterus. 10-30 p.m.: As it was 12 hours since the first foal was born, and the placenta, although firmly attached, was becoming decayed, it was thought advisable to attempt its removal. Haemorrhage of the uterus occurred during the operation, and the placenta, unfortunately broke, leaving a large piece of membrane in the left uterine horn, which owing to firm attachment, it was impossible to remove. Sulphonamide-P, 3 oz., was introduced into the affected horn and 10 c.c. pituitrin was given intramuscularly.

29-1-42, 8-30 a.m. The mare was fairly bright, and had a normal temperature, but accelerated pulse. The remaining piece of placental membrane could only be partially removed in shreds, a smaller piece at the end of the horn being out of reach; 3 oz. of sulphonamide was again introduced into the affected horn. Mag. sulph., 2 oz., pot. nit., 2 drachms, was prescribed, *b.i.d.*, and a guarded prognosis was given.

30-1-42. The mare appeared normal, with good appetite, and normal respirations, temperature and pulse. Rectal examination revealed a satisfactory progress of uterine involution.

1-2-42. The mare was still normal, except for the presence of a slight uterine discharge. No further treatment was prescribed, and she made an uninterrupted recovery.

(g) *The application of Sulphonamide to the Mammary Gland.*—It might be thought that the introduction of sulphonamide into the mammary gland would be an effective means of treating streptococcal mastitis, but in the writer's experience this has not been found to be the case. In the actual cases treated, the patients were in active lactation so that the failure of the treatment may have been due to it not being possible to leave the drug *in situ* for a sufficient length of time to enable it to be maintained in contact with the causative organisms. The writer has now abandoned this method of treatment in preference to oral administration of the drug.

Stableforth and Hignett¹⁴ made an experimental investigation of the value of intramammary introduction of sulphonamide several years ago and their findings were very disappointing.

The oral administration of sulphonamide is not effective in eliminating carriers of streptococcal mastitis and experimental investigations as to the value of the local application of sulphonamide in such cases are at the moment being carried out by several research workers. It is to be hoped that their findings will pave the way to a more successful method of control of this very serious disease of dairy cows.

Summary

1. The uses of a local application of drugs of the sulphonamide group are discussed, particularly from the clinical point of view.
2. The value of the treatment is shown to depend upon several factors, including the maintenance of a local concentration of the drug for a sufficient length of time, the existence of a type of infection susceptible to the specific action of the drug, absence of excessive numbers of bacteria and toxins, and absence of generalisation of infection.
3. Various methods of treatment are discussed and consideration is given to the requirements in the treatment of accidental and surgical wounds, compound fractures, skin diseases, burns and diseases of the ear.
4. Evidence is given as to the value of local application of sulphonamide to assist in the prevention of acute metritis and vaginitis after dystokia or retained placenta, especially in mares.
5. The possible value of the intramammary introduction of the drug in the control of chronic streptococcal mastitis is discussed.
6. It is emphasised that the local application of sulphonamide should be used in conjunction with and not to replace other routine methods of treatment such as the provision of drainage, *debridement*, control of hæmorrhage, uterine irrigation, and any general method of treatment of the patient which might be necessary.

REFERENCES

1. Jensen, N. K., Johnsrud, L. M., and Nelson, M. C. (1939). Prelim. rep. *Surgery*, 6: i.
2. Jeffrey, J. S. (1940) *Edin. Med. J.* 47: 727.
3. May & Baker Publication: The Prevention and Treatment of Infection in Wounds by Sulphonamides, page 12.
4. Herrell, W. E., and Brown, A. E. (1940) Proc. Staff Meetings, Mayo Clinic. 15: 611.
5. Hignett, S. L. (1940) *Vet. Rec.* 52: 457.
6. Vernon Jones, R. (1941) *Brit. Med. J.* No. 4207, p. 266.
7. Colebrook, L. (1940) "Treatment of War Wounds by Sulphonamida Packs". *Lancet*. 2: 113.
8. Herrell, W. E., and Brown, A. E. (1940). Proc. Staff Meetings, Mayo Clinic. 15: 612.
9. Appleby, A. (1941) *Vet. Med.* 36: 300.
10. May & Baker, personal communication.
11. May & Baker Publication: The Prevention and Treatment of Infection in Wounds by Sulphonamides, page 10.
12. Editorial. *Vet. Med.* 36: 6.
13. Rosenberg, S., and Wall, N. M. (1941) *Surg. Gynec. Obstet.* 72: 568.
14. Hignett, S. L. Personal Communication.

HUMAN ENCEPHALITIS DUE TO THE VIRUS OF EQUINE ENCEPHALOMYELITIS *

BY

CARL M. EKLUND, M.D.,

Senior Epidemiologist, Division of Preventable Diseases, Minnesota
Department of Health.

Before discussing human encephalitis of the equine type, brief mention should be made of what is included under the name "encephalitis." The term covers a variety of unrelated diseases which can be roughly divided into two groups; those that occur sporadically, following various immunization procedures, such as small-pox vaccination or rabies immunization, infectious diseases such as measles and mumps, or from the use of certain drugs and exposure to lead compounds—and those that occur in epidemic form. These have aroused the greater interest. Three infectious types are recognized in the United States.

Lethargic Encephalitis

Lethargic encephalitis was first noted in France and Roumania in 1915. Von Economo's study of the Vienna outbreak of the winter of 1916-17 established it as a definite clinical entity and gave it its name. The disease appeared in this country in 1918 and many cases were reported during the winter months of the 1920's. This disease has a varied clinical picture, many sequelae and often runs a protracted course. Von Economo states that 40 per cent of the patients died, 20 per cent suffered serious sequelae, 26 per cent recovered with defects and only 14 per cent made complete recoveries. Lethargic encephalitis with its serious prognosis is the disease both physicians and the laity refer to as encephalitis or "sleeping sickness". No etiologic agent has been established.

St. Louis Encephalitis

St. Louis encephalitis first appeared in Paris, Illinois, in 1932. Severe outbreaks occurred in St. Louis during the summers of 1933 and 1937. It was the first epidemic of encephalitis for which an etiologic agent was established. A filterable virus was isolated in 1933. This type is widespread in the United States, however no large outbreaks have occurred since 1937.

Equine Type of Encephalitis

The equine type of encephalitis, caused in man by the eastern and western strains of equine encephalomyelitis virus, was definitely established in 1938 by the isolation of these strains of virus.

* Presented at the 28th annual meeting of the Eastern Iowa Veterinary Association, October 5-7, 1941. *Veterinary Medicine*, February, 1942.

Lethargic encephalitis in its epidemic form is a winter disease, the other two types are summer diseases. There has been much speculation as to whether these diseases, all three recognized but recently, represent new diseases or are old diseases not formerly recognized.

Equine encephalomyelitis is believed by many to be an old disease dating back 70 or more years and during that time confused with other equine diseases. If any disease of this sort did occur in man it has been so effectively buried under other diagnosis that it is impossible to find any evidence of it. The history of the discovery of the virus by Meyer, Haring, and Howitt in 1930 and of the isolation in the east of a strain of virus by Ten Broeck, and by Giltner and Shahan in 1933 is familiar to all as is the demonstration by them that this virus differs serologically from the type isolated in the west. Thus came about the terms "eastern" and "western" strains. The isolation last spring of the eastern strain in Texas has made the terms "eastern" and "western" strains less appropriate.

Although Karl Meyer, in 1932, reported three cases of encephalitis in persons who had been closely associated with sick horses at a time when extensive outbreaks occurred among horses in various sections of the country, up to 1937 there was no increased incidence of human encephalitis in the same areas. In 1937 more than 47,000 horses were reported affected in Minnesota. In a north-western county of that state where the disease was prevalent among horses, there were six cases in humans, two of whom died. Autopsy of one showed microscopic evidence of encephalitis. Blood was obtained from three survivors and Ten Broeck found that the blood of one neutralized the western strain of equine virus.

In 1938, epidemics of encephalitis occurred in many parts of the country. In Massachusetts it was recognized in horses for the first time and shortly humans were affected. Thirty-four cases were recognised. The eastern strain of virus was isolated from the brains of several fatal cases. There was a high incidence in children (66 per cent were under the age of 10), a mortality of 73 per cent and sequelae in the survivors such as mental retardation and paralysis. At the same time during a California outbreak the western strain of virus was isolated from the brain of a child and later from the blood serum of an adult. Sera of encephalitis cases of that year and of other year were studied by means of the neutralization test. Twenty-nine were found positive, mainly 1937 and 1938 cases. Some sera, however, were from cases as far back as 1935. It is of interest to know that serum, obtained from one of Meyer's cases, who had the disease seven years previously, was still weakly positive.

In addition to California and Massachusetts, the disease occurred in Minnesota, North Dakota, and Saskatchewan. In Minnesota during the summer, 36 cases of encephalitis were reported, in 14 of which the diagnoses

were established by neutralization tests. In Southern Saskatchewan 29 cases were found and but one case gave a positive neutralization test. However, in 1939 virus was isolated from the brain of a patient dying in the epidemic area of the previous year.

In 1939 and 1940 cases among both humans and horses generally were uncommon. However, in Kern County, California, there were 46 cases in 1939 and 48 in 1940. Nearly all gave positive neutralization tests. In the Yakima valley, Washington, 31 cases were reported in 1939 and 86 cases in 1940. The 1940 cases were peculiar in that so many had sera neutralising both the western and the St. Louis strains of virus. Over 25 per cent. of the controls also neutralised the St. Louis virus. The investigators believe that mixed infections of both viruses must have occurred, but study of their data shows that, in comparison with the control series, there has been a marked increase in sera showing neutralization of the western strains of equine virus, while it is doubtful that the neutralization of the St. Louis virus was increased. In most cases it probably represented past exposure to the virus.

During the summer of 1940 a small outbreak occurred in northern Colorado among both humans and horses. The symptoms presented were those usually associated with the disease caused by the western strain of equine virus, but neutralization tests indicated that the St. Louis virus was the most likely cause both in the human and equine cases. Cox and his associates of the Rocky mountain spotted fever laboratory, who made these tests, showed that horses are susceptible to intracranial inoculation with the St. Louis virus and that the symptoms produced in the horse cannot be distinguished from those caused by the western strain of virus.

During the past summer the most extensive outbreak of acute encephalitis on record occurred in this country. By the middle of September the cases were as follows: North Dakota was highest with 1,080 cases and 96 deaths, an incidence of 167 per 100,000. In Minnesota there were 851 cases and 65 deaths, an incidence of 38 per 100,000. Leake of the United States Public Health Service states that 434 cases occurred in Manitoba, about the same number in Saskatchewan, 180 in South Dakota and 250 in Nebraska. The mortality among these cases has varied from 8 to 16 per cent. All seem to be a part of one epidemic. Herald Cox, of the United States Public Health Service, has isolated the western strain of virus from several brain specimens, and at the Minnesota Department of Health it has been isolated from three brain specimens and many positive neutralization tests have been obtained. Workers at the Rockefeller Institute have isolated the western strain from a Canadian case and have had positive complement fixation tests on sera from both Canadian and Colorado cases. Cox and the Division of Veterinary Medicine at the University of Minnesota have isolated similar strains from horses. To date it appears that the St. Louis virus has played a minor role in this outbreak.

The clinical picture in human encephalitis of the western type resembles the St. Louis disease closely. There is usually an abrupt onset with severe headache and high fever, together with chills, chilly sensations, nausea, or vomiting, pain in the neck, the back, the abdomen or in the extremities. In young children the onset is sudden with high fever and convulsions. A day or two after onset drowsiness appears, the temperature continues to be elevated. The patient becomes mentally slow and when not disturbed drops off to sleep. Shortly, tremors about the mouth and hands are apt to appear. Delirium and disorientation take place in severe cases. In most cases, drowsiness progresses to coma. Stiff neck is the most frequent finding, but absent abdominal reflexes and tremors of the lips, tongue and hands are common. Other findings, although less frequent, are positive Kernig and Babinski signs, changes in the tendon reflexes, difficulty in speech or swallowing and nystagmus. Sequelae are rather uncommon except in children. Mental retardation and paralysis sometimes occur.

Geographical Location	Reported western cases.	Incidence 1941 rate per 100,000
<i>Prairie country</i>		
1. Minnesota	1937, 1938, 1941	38
2. North Dakota	1938, 1941	167
3. Saskatchewan	1938, 1939, 1941	
4. South Dakota	1941	28
5. Montana	1938, 1941	12
6. Manitoba	1941	66
7. Nebraska	1941	19
<i>Irrigated areas</i>		
8. California	1935, 1937, 1938, 1939, 1940	
9. Washington	1939, 1940	

The temperature is high for about five days, then it drops quickly. About two days after the temperature declines the symptoms ameliorate and in 10-14 days the patient is well on the road to recovery. In fatal cases, the fever continues high, drowsiness progresses to coma and death usually occurs in 5-7 days.

The mortality appears to be about 10 per cent. although 7 to 20 per cent have been reported.

In a typical case a diagnosis of encephalitis is not difficult but it is impossible to state whether it is St. Louis or equine type. It is often difficult to differentiate this disease from abortive poliomyelitis or tuberculous meningitis and, when there are no neurological findings, from the common infectious diseases such as undulant fever. An etiological diagnosis can often be made. The virus itself is most often isolated from the brain at autopsy. It has rarely been isolated from the blood or spinal fluid. Most often the diagnosis is made by the neutralization test in which a series of ten-fold

dilutions of virus are made. Virus suspensions diluted 1000, 10,000 and 100,000 times are mixed with equal amounts of the patient's serum and groups of mice are inoculated intracerebrally. If the patient has had the disease the mice will be protected. Serum may have protective power as early as one week after onset of the disease. The time when the serum has its maximum protective power is not known, but when taken at the end of the second or third week will probably in most cases show protection. Protective antibodies have been demonstrated in the sera of patients two years after recovery from the disease and it is possible that they may persist longer. Patients with no history of encephalitis, seldom have sera which show protection so that a positive neutralization test, together with the clinical findings of encephalitis, justifies a diagnosis of encephalitis of the equine type. It is preferable, where possible, to secure blood serum early, and demonstrate that antibodies were not present early in the disease, but developed during the illness or convalescence. To date complement fixation tests have been used by Rockefeller Institute workers only. This test offers quick and apparently reliable method of diagnosis.

The general type of pathology in lethargic encephalitis is St. Louis encephalitis, and the equine type is the same; differences consist chiefly in the degree and extent of involvement. The severity of the lesions is greatest in the equine type.

1. *Lethargic Encephalitis*

- (a) Winter disease
- (b) Greatest incidence in ages 15 to 45
- (c) Contact spread (?)

2. *St. Louis Encephalitis*

- (a) Summer disease
- (b) Incidence increases with age
- (c) Transmission: mosquitoes (?)
- (d) Mortality 20%: sequelae rare.

3. *Equine Encephalitis*

- (a) Summer disease
- (b) Males predominate, all ages affected
- (c) Transmission: mosquitoes (?)
- (d) Mortality 10% (?); sequelae uncommon.

Grossly, the surface of the brain is injected; on section petechial hæmorrhages may be found. Microscopically, the most striking features are the cellular infiltrates which are perivascular, nodular and diffuse and they may be found in the cortex, mid brain, brain stem and upper cord. In some brains large numbers of polymorphonuclear cells may be seen. Also there are various degrees of nerve cell destruction and there may be small areas of hæmorrhages and perivascular degeneration.

The manner in which the virus spreads in this disease is not clear. In the human disease the following observations have been made. Outbreaks have been limited to agricultural areas. Within these areas the disease appears simultaneously at widely separated points. Contact between the cases is seldom established nor is there usually more than one case to a family. Attendants of cases, such as nurses and physicians, seem to have no increased incidence of the disease. History of close contact with a sick horse occasionally occurs but in most cases such history is not found. In most epidemics no particular age group is affected. In California, two outbreaks have been reported in which 50 to 60% of the cases were persons under ten, but this is contrary to the usual experience. Males were affected more often than females. This sex difference is most pronounced in the age group 15 to 55, in which about 70% of the cases were males. The disease always occurs in summer with its peak usually in August. The above observations can be explained readily by the assumption of insect transmission, while attributing spread to contact necessitates the assumption of a great number of carriers for which no evidence was been found. Similar results in the early study of the disease in horses led to the assumption of insect spread and resulted in the study of the possible role of mosquitoes.

Minnesota Encephalitis Cases—July 4, 1941 to September 30, 1941 inclusive

Age Group	Total Cases	Per cent Male
Under 1	16	56.3
1	9	44.4
2	10	50.0
3	2	50.0
4	4	100.0
5-9	23	47.8
10-14	66	63.6
15-19	81	82.87
20-24	70	74.3
25-29	58	77.6
30-34	68	77.9
35-39	35	68.6
40-44	41	90.2
45-49	35	68.6
50-54	39	76.9
55-59	51	56.9
60-64	59	62.7
65 and over	91	59.3
Unknown	93	61.3
Total	851	68.7

Since 1933, ten varieties of *Aedes* mosquitoes have been found able to transmit one or more of the equine viruses. Eight of these can transmit the western strain and seven the eastern strain. Five of the varieties transmitting the western strain have been found in Minnesota. In laboratory experiments, mosquitoes are allowed to feed on suspensions of infected brains or on animals at a time when virus is present in the blood stream. In about one week after this feeding, the mosquitoes can transmit the disease to a susceptible animal. Infection has been transmitted to mice, guinea pigs, birds and horses. There is no reason to believe that the *Aedes* mosquitoes cannot transmit the disease from horse to horse in the field or between horses and man, but such a simple chain of transmission cannot explain the entire spread of the disease. The difficulties are:

1. *Aedes* mosquitoes found in Minnesota cannot survive over winter as adults and there is no evidence of transmission from generation to generation through the egg. Such mosquitoes must be infected each season and cannot be looked upon as a permanent reservoir of infection. Hammon has recently reported the isolation of the western strain of virus from *Culex tarsalis* caught in the field. To date there is no report that this mosquito can transmit infection. It is found west of Mississippi and is especially common in the west coast states. In this area at least it does not appear capable of explaining the entire spread of virus. Riley and associates in surveys in the Minneapolis area found it to be much less frequent than *Aedes vexans* and it did not appear to feed frequently on man. Birds seem to be the preferred hosts. Also, the problem of survival of virus over winter does not appear to be solved by the discovery of infection in this insect. Although survival of this mosquito over winter probably occurs in the adult stage it remains to be shown that it can carry infection over winter.

2. The horse has virus in the blood stream for a short time only early in the disease. There is no evidence of a chronic carrier state or that the horse can carry the virus over from one season to the next. In order to find the reservoir for the virus a large number of mammals and birds have been examined. The eastern strain has been isolated from the brain of a pigeon and from pheasants and the western strain was recently isolated by the United States Public Health Service from a prairie chicken. These isolations were made during periods when outbreaks were occurring among both humans and horses.

In addition to searching for virus, the susceptibility to inoculation of various species of animals through several routes has been tested. The following list of mammals and birds includes those which have been shown susceptible to inoculation with the western strain: Calf, goat, vole, white footed and field mice, kangaroo and wood rats, Richardson's ground squirrel,

puppy, cotton tail rabbit, pigeon, burrowing owl, guinea fowl, domestic mallard duck, Gambel and English sparrow, thrasher, valley quail, junco, turkey and chicken, chicks up to five weeks are very susceptible, but pullets and old hens vary in susceptibility. This incomplete list indicates the wide host range of the virus. In addition to testing in the laboratory to find the susceptibility of animals, Hammon and co-workers have bled a variety of domestic and wild animals in the state of Washington and have found antibodies in the blood serum of the cow, dog, goat, horse, pig, sheep, field mouse, white footed mouse, weasel, chicken, duck (domestic mallard), pekin duck, domestic goose, great horned owl, domestic pigeon, turkey, red shafted flicker, sparrow hawk, killdeer, ring-necked pheasant, California quail and robin. Ten Broeck and Howitt had previously demonstrated antibodies in chickens as she reports that she has demonstrated them in chickens raised under conditions precluding infection. Eastern virus has been isolated from the blood of birds of various species experimentally infected that have shown no evidence of disease. This was done over a period of a few days only.

These results indicate that a widespread is possible when the virus is once established in an area; however, in none of these animals has a chronic carrier state been demonstrated. To serve as a permanent reservoir an animal of wide distribution must be postulated. It must be one not too susceptible to the disease and one which harbours the virus for long periods in some blood rich organ such as the spleen, liver or bone marrow; or there must be a relationship such as obtains in plague, where the rat and flea are continually passing the infection back and forth between themselves. Because the disease appears over such wide area simultaneously it has been assumed by some that a bird would be the most likely reservoir. Ten Broeck was apparently the first one to present this theory following the study of the disease in the horse. The possibility of the virus persisting over winter in ticks has been suggested and work has been presented to show that the tick *Dermacentor andersoni* can harbour and transmit the western virus and can also transmit it from generation to generation in the tick itself. The work needs confirmation and could not account for spread in large areas. Conenose bugs have been found infected in nature in Kansas and have been shown able to transmit the disease to guinea pigs; however, this bug is not found in many areas where the disease has been prevalent.

The relationship of the disease in horses to the disease in man is obscure. In California according to Howitt the big outbreaks among horses occurred during 1930, 1931 and 1932, at which the human cases did not appear to be unusually prevalent. Most human cases were recognised during 1937, 1938 and 1939 at a time when the disease in horses was not as prevalent. In Minnesota during 1937, over 47,000 horses were affected.

Six human cases were recognised. It is very possible that cases of human encephalitis were missed but it is not believed any great epidemic was overlooked. In 1938 about 25,000 horses were affected and 36 human cases reported. The past summer, while the incidence among horses was higher than in 1939 and 1940, it was low compared with 1937 and 1938, yet the incidence among humans was very high. Reports from North Dakota indicate a similar experience. It is possible that immunization and previous exposure to the disease have cut down the incidence in horses greatly. It is evident that an extensive outbreak of the disease in horses may not be accompanied by epidemic appearance in humans and that many cases among humans may be coincident with only a moderate number among horses. When the disease was first diagnosed in horses, the virus did not appear to have much virulence for man, or it may be that the vector spreading the disease among horses did not often attack man. In recent years the virus may have spread to new hosts, passage through which has enhanced its virulence for man or to a host that has insect vectors that attack man frequently.

The eastern type of this disease was recognised among horses in 1933, but no human cases were recognised until 1938 although Ten Broeck had long been interested in the possibility of human infection. It may be significant that 1938 was the first year that virus was isolated from pheasants and a pigeon.

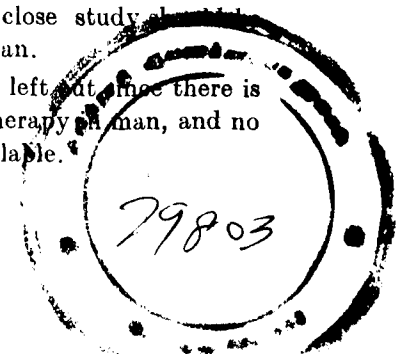
At present the problem of spread in the disease is still that of finding the reservoir host and establishing insect vectors by finding them infected in the field.

Before closing I wish to mention the recent developments in the study of the St. Louis type of encephalitis since they so closely parallel those in human encephalitis of the equine type.

1. Horses are susceptible to experimental inoculation and one outbreak among horses was apparently due to this virus.
2. Hammon's studies of the neutralising power of sera from many domestic and wild animals indicate wide exposure to this virus.
3. Hammon states that he has isolated the St. Louis virus from *Culex tarsalis* mosquitoes in the state of Washington.
4. Studies of Howitt in California and Hammon and Howitt in Washington show that in many cases sera neutralize both the western virus and the St. Louis virus.

These observations need to be confirmed and close study made of all epidemics involving both the horse and man.

Discussion of therapy and immunization has been left out since there is as yet no demonstration of the value of any specific therapy in man, and no refined vaccine for human use has been generally available.



SCOURS IN DAIRY CALVES, WITH SPECIAL REFERENCE
TO WHITE SCOURS, COCCIDIOSIS AND VERMINOUS
GASTROENTERITIS*

BY

BENNET T. SIMMS, D.V.M., DONALD C. BOUGHTON, Ph.D., AND
DALE A. PORTER, SC.D.,

*Regional Animal Disease Research Laboratory, Bureau of Animal
Industry, U. S. Department of Agriculture, Auburn, Ala.*

The average dairy animal spends the first few months of its life under highly artificial conditions. On most dairy farms the young calves are kept in very small pens or paddocks, which are used more or less continuously for months or years. In many instances several baby calves are kept in the same pen. It is the usual practice to feed only twice daily. The milk given is from a few hours to a day or more old. It may not be at body temperature and some or most of the butter fat may have been removed. As might be expected, morbidity and mortality among dairy calves are very high; much higher than among beef calves which are raised under much more nearly natural conditions.

Several of the more important diseases of calfhood have been subjected to serious study of research workers but in most instances such workers have been specialists concerned with a single disease entity. They have not had an opportunity to combine their efforts and study health and disease over extended periods. This is unfortunate because not only are health and disease themselves the product of a multitude of factors, but some of the common symptoms observed in unthrifty and unhealthy animals may be caused by more than one set of conditions.

Prominent among the symptoms of lack of well-being in dairy calves is diarrhoea. Regardless of etiology, the herdsman or handler usually calls any disease accompanied by diarrhoea "scours." This symptom may be the result of any one or more of many different causes such as lack of vitamin A, overfeeding, feeding from insanitary pails, consuming milk too-high in butterfat, eating spoiled feeds, bacterial infections of the digestive tract, coccidiosis and verminous gastroenteritis. In this paper the authors will discuss the last three named, taking them up in the order of their appearance in the young calf. Coccidiosis is discussed in greater detail because it is felt that this disease is probably least understood of any of the three conditions under consideration.

White Scours

White scours or *dysentaria neonatorum* is one of the most serious maladies of young calves, causing heavy losses in many herds in all sections

of the country in which dairying is extensively practised. Early work by Jensen¹ incriminated *Escherichia coli*. Later investigations have shown that many other organisms, among which *Salmonella enteritidis* is very important, may be associated with diarrhoea in calves. It is generally believed that the typical, acute, severe cases occurring within the first 15 days following birth are usually *E. coli* infections, while those occurring after two or more weeks are apt to be caused by other organisms.

Typical white scours, attacking calves from less than one to ten days old, and accompanied by severe diarrhoea with liquid, white, foul-smelling faeces, dehydration and depression, with high mortality occurring within two to six days after the first symptom is seen, is so well known to all veterinarians that it would be a waste of time to describe the syndrome.

Once the colon infection becomes established in a barn, it is very difficult to control. Even though cleaning and disinfection are very thoroughly done, the disease may persist for months or years. Williams, Hagan and Carpenter² hold that prenatal infection is common. The fact that farmers who attempt to accumulate calves from several dairy herds and raise them on a single farm sooner or later find nearly all their young animals regardless of origin, developing white scours is evidence that young calves may pick up the infection during the first few days of life.

While the colostrum of the dam is recognised as being of value in protecting new born calves from infections, every practising veterinarian in a dairy community has seen many cases of white scours in calves which had taken all the colostrum milk from their dams. In fact, once the disease is well established in a calf barn, the procedures usually recommended and carried out, such as cleaning and disinfecting the umbilical stump, muzzling the new born calf, and feeding according to special directions, fail to prevent the appearance of the disease.

Medicinal treatment has, until recently, been very disappointing. The new drugs, sulfathiazole and sulfaguanidine, have both been tried in a few cases and they seem to merit further tests. Our experience with them is so limited that definite conclusions are impossible. The intravenous injection of from 300 to 700 c.c. of either defibrinated or citrated blood from the dam has given good results but the technic is rather tedious. In our hands the most satisfactory treatment has been acidophilus milk, as recommended by Shaw and Muth³. On premises where the disease is causing serious trouble, each new born calf is given a pint to a quart of acidophilus milk once a day for two or three days, beginning the second or third day after birth or as soon as the calf has taken the colostrum from its dam. If this milk is warmed to body temperature and given in lieu of a regular feeding, the young calves take it quite readily. Many animals given this prophylactic treatment pass through the critical first two or three weeks of life without

*Reprinted from the "North American Veterinarian," March 1942.

developing any symptoms of white scours. If the disease appears, they are treated with two or four doses, given on successive days. On farms on which the malady is appearing sporadically, the administration of acidophilus milk is restricted to those calves showing symptoms. Results are sometimes almost miraculous, especially in those calves which are treated soon after symptoms appear. It is not unusual for affected calves to show improvement within 24 hours and recovery within two to four hours. Even though diarrhoea continues in some animals, they appear brighter and do not develop the toxic symptoms so frequently observed after the first or second day. It is desirable, of course, to keep treated calves in dry, clean, and properly bedded pens, which are protected from drafts and cold air. On farms with a very high mortality losses have dropped to less than 10 per cent, immediately after beginning the acidophilus milk treatment.

Those cases of diarrhoea which develop after calves are beyond 15 to 20 days old and which are associated with bacteria other than colon organisms have not responded so satisfactorily to the administration of acidophilus milk, although in many instances the treatment has been of some apparent benefit. It should be remembered, though, that this treatment is recommended primarily for the typical white scours in calves from one to 15 days of age.

Coccidiosis

Coccidiosis appears to be an important factor in scours in dairy calves in the South East. Our field studies on dairy herds in Alabama and Georgia have brought to light not only the classical type of infection characterized by bloody scours or red diarrhoea, but also the even more prevalent non-bloody, subclinical coccidiosis.

Herdsmen often complained to us of a more or less persistent diarrhoea in calves from one to three months old. They usually considered this condition as representing a prolongation of white scours. In several such instances, in which coccidiosis had not been considered previously, our examinations revealed large numbers of coccidia, the causative organisms of coccidiosis. This finding led us to make a survey, the results of which are reported here briefly.

Four herds were studied extensively, from 15 to 70 calves in each being examined repeatedly. In all four herds deaths from naturally acquired coccidiosis were verified by post mortem examination. The extent of the losses varied under different conditions and from time to time. At one period, in one of the herds, 50 per cent of the calves died. Numerous severe, but non-fatal infections were demonstrated also. In one herd for which it was possible to obtain individual weights at weekly intervals, there were several cases in which retarded growth appeared to be associated directly with heavy coccidial infections.

Observations were made also on 20 additional herds, four to twelve calves in each being examined once. For the most part, these herds represented the superior ones in the region. Of a total of 129 animals 122 (94 per cent) showed coccidial cysts in the dung. Very few calves less than three weeks old showed oocysts. There were 59 calves in the three-week to three-month age group; of these 20 showed the extent of coccidial infection often found in clinical cases. For 7 out of the 20 herds, the herdsmen reported at least an occasional recent death from bloody scours. In the two herds out of the seven, where post mortem examinations were possible, coccidiosis was established as the cause of death. In general, but not without exception, in herds in which the young calves were handled carefully, there was less trouble from coccidiosis than in those kept under insanitary conditions.

The prevalence of coccidial infections in dairy calves and the morbidity and mortality associated with the infections led us to a consideration of appropriate preventive and control measures. Before outlining these, we wish to present briefly some pertinent facts concerning the coccidia and the disease they produce.

Coccidia are microscopic protozoa, more or less related to malarial parasites. Like the latter, they have a two-phase life cycle. During the first phase, the coccidia are completely parasitic within the intestinal lining of the host. Here an asexual reproduction, quite similar to that of the malarial organism within the blood cells, takes place. Reproduction proceeds until an apparently limited number of generations have been produced. The time required for this asexual reproduction varies from one to four weeks, depending upon the species of coccidia. The number of parasites produced by an individual coccidian in succeeding generations has an upper limit, although the actual number may vary from species to species and even from generation to generation. The extent of infection at the end of the parasitic multiplication is, then, a function of the number of parasites that gain entrance into the host.

After the period of multiplication, coccidia produce resistant forms, known as oocysts. These are shed from the mucosa and discharged from the host in the dung. Oocysts are resistant, egg-like forms of microscopic size. The heavier the infection within the host, the greater will be the numbers of oocysts produced. Even in heavy infections, however, the shower of oocysts may last only a few days. Since oocysts are epithelial parasites prior to leaving the host, their discharge in large numbers must necessarily represent considerable damage to host tissue. It is important to recognise, nevertheless, that each oocyst actually represents the end of a line of parasitic reproduction. The massive discharge of oocysts, therefore, marks the end of parasite activity within the host.

The oocysts are the means of transfer of coccidiosis from one calf to another. Although they do not increase in numbers outside of the host, oocysts do undergo a brief period of development known as sporulation, requiring two to five days, depending upon the species of coccidia. After sporulation they are infective. This external, nonparasitic portion of the coccidian life cycle is a vulnerable one against which certain control measures can be directed with some hope of success. When a sporulated oocyst is ingested by a susceptible calf, the cyst wall is digested and the eight small forms (sporozoites) within are released. The latter penetrate epithelial cells of the digestive tract and begin anew the parasitic multiplication within the host.

The symptoms and lesions of coccidiosis in calves are the direct or indirect result of massive multiplication of the coccidia within linings of the small intestine, cecum, colon or rectum. Diarrhoea is the most common symptom. Straining accompanies the voiding of faeces, which may be little more than stringy masses of mucus and blood in severe infections. At this stage, enormous numbers of the oocysts of the particular coccidian species responsible can usually be demonstrated microscopically. Weakness and general emaciation are often seen. Pneumonia frequently develops. An animal which does not die within a week or two after the onset of an acute attack usually recovers; the blood disappears from the faeces which then becomes progressively less diarrheic, and there is an improvement in general condition. Some severe cases fail to show bloody discharges, being characterized by a watery diarrhoea, which may be accompanied by straining and general unthriftiness. Large numbers of oocysts can often be demonstrated under such conditions also.

Gross lesions, which are confined to the intestinal tract, include: (1) loss of surface epithelium; (2) thickening of the mucosa, with the formation of irregular, whitish ridges, and (3) hæmorrhages which may be petechial or diffuse. Shreds of clotted blood and mucus are often present in the cecum and colon. Heavy infections with certain coccidian species can be detected with the naked eye by the presence of numerous small white dots, pinpoint in size, scattered over the mucosal surface of the posterior third of the small intestine. The structures are described elsewhere in this journal (Boughton⁴). Each dot is a large schizont—one of the stages in the asexual reproduction of the coccidia—within which myriads of motile parasitic forms, the merozoites, develop. It is of interest to note that, even when gross examination reveals little to suggest a heavy infection, masses of developing oocysts and other stages of the coccidia can be demonstrated microscopically in fresh smears of mucosal scrapings and in stained sections from the lower small intestine and throughout the colon. The coccidia are often so abundant as to have replaced all the epithelial cells in various areas of the mucosa.

The acute outbreaks of bovine coccidiosis usually appear where young animals are crowded together. This is in line with the general observation that coccidiosis becomes of economic importance wherever mass production of animals involves crowding of the host population. We have found that calves confined in groups in small lots are more often heavily infected than calves on pasture. Acute infection may appear among yearlings confined in feed-lots at the end of the grazing season. Two factors are generally held to be responsible for outbreaks when young or previously unexposed older animals are confined in close quarters: (1) Such animals have less resistance than those that have already experienced infection, and (2) they are exposed to a relatively high concentration of parasites.

Control of coccidial infection and prevention of clinical coccidiosis in calves are based upon the following facts, indicated in the preceding brief discussion of the disease: (1) Coccidiosis carriers are almost universally present; (2) small numbers of the infected oocysts, such as might be derived directly from contact with a carrier, are not so likely to produce severe cases as are large numbers, such as would likely be derived from a severe infection; (3) sub-clinical infections resulting in little noticeable damage to the host produce large numbers of oocysts; (4) young stock is particularly susceptible to heavy exposure; (5) calves less than three weeks old seldom discharge oocysts; (6) oocysts are not immediately infective upon being discharged from the host.

The theoretical ideal for prevention would be a management practice designed to prevent the ingestion of any infective oocysts. This would involve isolation of the calves and daily removal of all fecal material so as to eliminate all oocysts before sporulation occurs.

Where isolation is impractical and daily cleaning of quarters is not practised, we have had good results with a segregation of the calves by ages. Four age groups can be employed as follows: (1) calves under three weeks old; (2) calves three to six weeks old; (3) calves six weeks to three months old and (4) calves over four months old. Each group has its own separate pen or lot.

The two youngest groups require particular attention, the upper age limit of the third being chosen more for convenience in caring for the animals than for any practical advantage in reducing coccidial infection. The first pen, shed, or lot, assigned to the youngest group, is used exclusively for these animals, calves of all other ages being excluded at all times. Upon reaching the three weeks age limit, all calves are removed promptly from the first pen and placed in the second pen. Because oocysts are rarely discharged by calves under three weeks of age, the first pen can be kept free from large numbers of oocysts. Newborn calves subsequently introduced are spared the severe infections that have such serious consequences

in very young animals and are given an opportunity to gain in bodily vigour and begin normal growth before being exposed to the older animals in the second pen.

Non-clinical infections may be expected to develop in the first few calves introduced into the second pen; the short stay there is designed to prevent excessive accumulation of infective oocysts which might otherwise take place as the calves subsequently introduced become infected. It goes without saying that sanitary measures are not to be abandoned upon the adoption of some such age-segregation plan. It is profitable to go to some pains to protect calves against severe coccidiosis in the early weeks of life, because thereafter they are usually able to withstand the coccidial infections to which they will ordinarily be subjected.

Treatment of clinical cases is directed toward the alleviation of symptoms and includes the judicious administration of astringents. Beneficial results claimed for various types of drug treatment are often open to question, because, as already pointed out, infections are often short-lived and hence a sharp reduction in numbers of oocysts following a given treatment may be just what would have taken place anyway. It seems fair to say that at least some of the cures attributed to drug administration in the past are due, in reality, to spontaneous improvement under favourable hygienic conditions.

Recent experiments conducted at the Regional Animal Disease Research Laboratory and presented in detail elsewhere (Boughton⁵) indicate that sulfaguanidine may prove to be effective against clinical cases of bovine coccidiosis. This drug is absorbed through the intestinal wall less rapidly than the other members of the sulfanilamide group in therapeutic use at the present time. When administered daily for a week, later in the incubation period, sulfaguanidine protected young calves from fatal experimental infections involving a mixture of coccidian species. The drug, which is expensive at present, has not been used in the field to date, and recommendations as to dosage cannot be made at this time.

Verminous Gastroenteritis

Verminous gastroenteritis is the last, in chronological order of appearance, of the three scours-producing conditions, discussed in this paper. In this disease, diarrhoea is due to the irritation of the gastric or intestinal mucosa by parasitic worms, particularly in strongylid nematodes. The larvae of these round worms hatch from eggs voided in the faeces of infected cattle and, following a short period of development, reach the infective stage, needing only to be ingested by a susceptible calf to complete their cycle of development. Except in rare instances, infection of calves is dependent

upon their grazing over previously contaminated pasture and sizeable infections are not acquired until the animal has ingested a considerable amount of grass. This is one reason why very young calves seldom harbour sufficient numbers of round worms to produce scours. Calves from four months to one year of age are the ones usually found to be suffering from verminous gastroenteritis in which scours is symptomatic. In scours associated with this condition, the faeces are usually dark in colour and quite watery in consistency. Unless complicated with coccidiosis or other factors, blood is not in evidence. The condition, although acute in severe infections, is more often of a chronic nature in which the animals become progressively unthrifty.

Several species have been incriminated in cases of verminous gastroenteritis in which scours was a noticeable symptom. Of these species, the small trichostrongylids, *trichostrongylus axei* and *Ostertagia ostertagi* in the stomach and the cooperids, *Cooperia punctata*, *C. pectinata* and *C. oncophora* in the small intestine have probably been the most noticeable offenders. Scours in calves has also been claimed as symptomatic of infection with stomach worms (*Haemonchus contortus*) and nodular worms (*Oesophagostomum radiatum*). The opportunities, however, to study the symptomatology of infections with each species of round worms, uncomplicated by the presence of the other species, have been rather limited. Under controlled conditions, Andrews⁶ has shown that experimental infections of otherwise normal calves with nodular worms will produce severe diarrhoea. On the other hand, the stomach worm *H. contortus* with which practitioners and dairymen are often familiar to the point of overlooking other roundworms, does not produce scours in calves. Repeated experiments at this laboratory in which the infective larvae were fed, to calves, have resulted in clinical anaemia, poor condition, parasite loads comparable to those observed in the field, but have failed consistently to produce diarrhoea.

The control of gastrointestinal roundworms should be aimed at separating the susceptible animal from the source of infection as much as possible. As moisture favours the development and longevity of the free living stages of these parasites, well drained pastures are preferable; low, wet areas should be avoided until drained, and drinking water should be supplied from wells or flowing streams, preferably in troughs raised above the ground. If permanent pastures are used, they should never be overstocked. Rotation, as often as available for age permits, is highly desirable in order that the freeliving stages will have a chance to succumb before susceptible animals are turned back in the field.

The segregation of calves by age groups so that young calves are not grazing over ground contaminated by older calves and yearlings reduces the

chances of heavy infection. Generous feeding of milk and supplements, aside from being a good nutritional practice, may reduce exposure to round worm larvæ by decreasing promiscuous foraging by the young calf in an attempt to satisfy its hunger. The importance of steps taken to have a calf in vigorous healthy condition by weaning time, when it is exposed to the roundworm parasites on pasture, cannot be over-emphasized. The control of white scours and coccidiosis by the methods previously outlined and the feeding of a sufficient, well-balanced diet should go a long way in increasing the resistance of calves to nematode parasites.

Where control measures have not been followed and it becomes necessary to resort to anthelmintic medication, the contemporary literature indicates phenothiazine to be the best drug now available. Doses of 10 to 20 gm., of powdered phenothiazine per 100 pounds of body weight, with a maximum total dose of 60 gm., have given satisfactory results in numerous cases of verminous gastroenteritis. In our experience, administration of the drug in hard gelatin capsules has been the most desirable, since this method insures that the animal receives the correct dosage. It is also indicated that equally good results are obtained in calves with or without a preliminary period of fasting (Porter, Simms, and Cauthen¹, Porter²).

REFERENCES

1. Jensen, C. O. Ueber die Kalberruhr und deren Actiologie. *Monatsh. & Thierheilk* 4 (1893) 97-124.
2. Williams, W. L., Hagan, W. A., and Carpenter, C. M. White or calf scours. *J. A. V. M. A.* 57 (1920) 124-146.
3. Shaw, J. N., and Muth, O. H. The use of acidophilus milk in the treatment of dysentery of young animals. *J. A. V. M. A.* 90 (1937) 171-175.
4. Boughton, D. C. An overlooked microscopic intestinal lesion of value in diagnosing bovine coccidiosis. *No. Am. Vet.* 23 (1942) 173-175.
5. The effects of sulfaguánidine on experimental bovine coccidiosis (Abstract) *J. Parasitol. Suppl.* 27 (1941) 16-17.
6. Andrews, J. S. Some clinical aspects of experimental esophagostomiasis in cattle, (Abstract). *J. Parasitol. Suppl.* 27 (1941) 16.
7. Porter, D. A., Simms, B. T., and Cauthen, G. E. Field tests with phenothiazine as an anthelmintic in cattle. *J. A. V. M. A.* 99 (1941) 272-278.
8. Porter, D. A. Further tests with unconditioned phenolthiazine as an anthelmintic in cattle. *Proc. Helm. Soc. Wash.* 8 (1941) 38-41.

A. R. P. HINTS FOR ANIMALS

BY

K. R. ALUR, G.B.V.C., F.G.,
Lecturer, Veterinary College, Bombay.

Hints to Animal Owners

Animals depend on their owners to protect them as they cannot protect themselves.

Petrol rationing will necessarily increase the draught animal population in the city.

Do not risk working the nervous and frightful animals in the hour of danger.

Write telephone numbers of the nearest Animal First Aid Post on the wall, so that it could be read from a distance. Each figure should at least be 6" in height.

A solution of 2% Tannic Acid or very weak solution of Picric Acid should be kept in stock ready and be sprayed on animals after an incendiary fire.

Trenches for protection of the persons engaged in animal-service should be situated as near as possible to the stables so that early help will be available.

Stables and Byres

Generally stables cannot be rendered safe from a direct hit of highly explosive bomb unless it is very deep and underground which is not practical in case of animals. Hence it should be protected from splinters by strengthening the existing Baffle walls. The walls can be 10" reinforced concrete, 15" brick work, 12" concrete, or 2 feet 6 inches earth or 2 feet 6 inches sand bag at the thinnest point to stand against splinters. The overhead protection should be 4" concrete or 1½" mild steel plate or 18" of sand. The doors and the windows should have either Baffle walls or Internal Traverse walls in front of them.

No inflammable material should be used in the construction of stables. If such a structure exists, which cannot be removed, a fire resisting paint in two coats should be applied (21 lbs. of quick lime and 2 pints of water and 2 ounces of common salt.)

A yard should be provided to collect animals leading from the gangway in case of emergency. For 10 horses, a yard 50' x 50' is usually sufficient.

Use only "Quick release method" for securing the animals and avoid the use of chains.

Do not lock the stables and be away from animals in times of danger without keeping somebody in charge.

Do not have any obstacles in the gangway or doorway which will impede quick evacuation of animals if the stables were to be on fire.

In a stable where there are large number of animals there should always be sufficient number of people to act up in case of emergency.

Never collect animals in the open yard during an expected emergency and secure them by reins.

Storage of Hay, Fodder, and Water

It should be spread in limited quantities before the animals and on no account it should be stored overhead.

Hay should be stored in corner of the yard taking advantage of the two sides of the wall. It should be thatched with a roof and a layer of standard sand bag should be arranged on the top. The remaining two sides should be protected by sand bagging. A corner from this should be used for storing grains.

Water should be stored in underground tanks sufficient to last for a week.

General Instructions

Keep a stirrup pump party ready, one for every stable or 25 animals for quenching incendiary bombs falling within stables or yard.

A knife of 6" in length, a medium spade, a crowbar 6" long, an axe, and two rolling planks should be kept in a room which is easily accessible.

There should be hurricane lantern in each stable hung up against the wall outside.

Extra ropes of 8 ft. long should be in reserve, one for each animal with an iron peg and a sledge hammer (9 lbs.).

Working Animals in Public Streets

Usually bullock and horse drivers' conveyances are encountered in public streets. Immediately on hearing the siren the drivers of hack victoria should stop the conveyance and request the passengers to take cover in the nearest shelter. He should drive further to a by-lane or emergency siding and immediately release the animal which should be tied by a rope hung round the neck. The ears should be plugged with prepared "ear plugs" from cotton wool and food bag should be given to the animal. A knee halter should be put on horse over the knee to prevent the movements of animal. The conveyance should be wedged with wooden boards. The driver should then take to shelter himself.

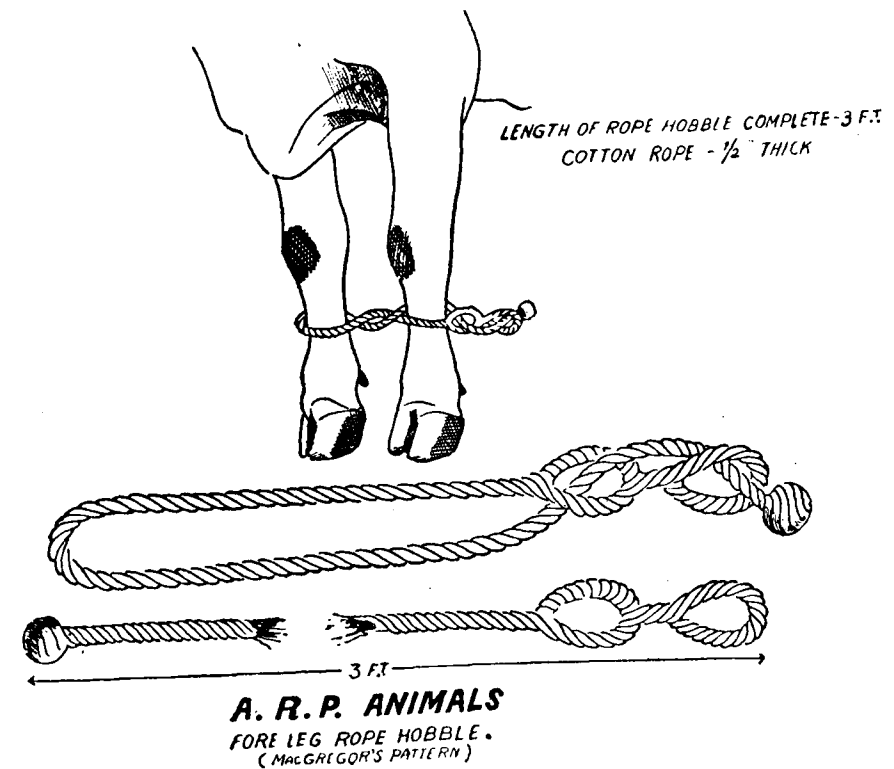
Bullocks should be tied by a rope round the base of the horn and other end should be tied to a yoke or wheel after it is wedged. Ears are to be plugged and little hay should be spread in front of them. This will make them mindful of their job. A halter should be put on to prevent the movements of the animal.

Do not tie the horse by reins to wheel or hub.

Do not tie the cattle by rope to the nose string.

Do not attempt to gallop off the horses to the places of safety.

Do not tie the animals to lamp posts, traffic beacons and area railing.



A. R. P. for Pets

The pets should be fastened by leather strips and kept indoors in a safe place. Ears should be plugged with cotton wool and well-fitting muzzle should be put on. In no circumstances the dog should be allowed to stray out. If the animals are restless a dose of sedative mixture should be given. Never attempt to take the dog with you to a public shelter. The animal should be fastened in a strong room in the building.



Dr. PANGAL'S
Veterinary Institute
26, Wallajah Road, Mount Road,
MADRAS

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. 5.**
2. **"Tendon Lotion."** for Inflamed and Sprained Tendons, Ligaments and Joints in Horses. Price per lb. bottle **Rs. 2.**
3. **"Electric Mange Cure."** An excellent remedy for all kinds of Mange and is a specific for Follicular Mange. Acts like magic. Price per bottle **Rs. 2.**
4. **"Scented Pulvex."** Tick specific. A Wonderful Tick destroyer. Price per tin **Re. 1.**
5. **"Canatone."** Vitamin Mineral Food for Dogs. Price $1\frac{1}{4}$ lb. tin **Rs. 1-8.**
6. **"Cough Electuary."** A specific for Cough and Catarrh in Horses. Price per lb. **Rs. 4.**
7. **"Bovotone."** Best Tonic powder for cattle containing Mineral Vitamins. Price per 2 lb. tin **Rs. 1-12.** 1 lb. tin **Re. 1.**
8. **"Mange Dressing."** A specific for all kinds of Mange. Price per big bottle **Rs. 2-4.** Small bottle **Re. 1-4.**
9. **"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.**
10. **"Dhum-Dhum."** A specific for Dhum, i.e., heavy breathing so common in horses. Acts like magic. **Price per 2 lbs. Bottle Rs. 4. 1 lb. Bottle Rs. 2**
11. **"Anodyne Paste for Horses."** Indicated in Treating swollen joints, inflamed tendons and ligaments (Work not disturbed). Price per 3 lbs. tin **Rs. 3.**

For Other Specialities please apply for Literature.

When writing to advertisers, please mention this Journal.

THE
Indian Veterinary Journal

(The Journal of The All-India Veterinary Association)

Vol. XIX

SEPTEMBER, 1942

No. 2

Editorial

**THE ALL-INDIA VETERINARY ASSOCIATION,
MADRAS BRANCH**

We are gratified to learn that the Madras Branch of the All-India Veterinary Association is just now showing signs of life and activity, after a long period—a very long period indeed—of suspended animation. The Executive Committee of the Association, which met recently, whose proceedings we publish separately, has decided among other things to hold a Provincial Veterinary Conference in Madras in the ensuing month of December. This is a step in the right direction, especially to recommence the activities, and we have great pleasure in acceding to the appeal of the President who desires that we should request the members of the profession to give him all support and co-operation in making the Conference a success. We are confident that the response of the profession will be ample and generous.

In this connection it would not be out of place to take a retrospective view of things so that the planning of the future may be on a well-ordered plane. The last time that the Veterinarians in Madras met in conference was in the year 1934. Since then much water has flown under the bridge. An unprecedented world war has been going on now for over 3 years with the object of "Creating a New World Order." Mechanisation has gone at such an unimaginable rate of progression as to vitally affect our past conceptions of transport, especially Animal Transport. Cataclysmic changes have taken

place all over the world upsetting the economic framework of the different countries. And yet, the Veterinarians in Madras, why, for the matter of that, practically all over India, have remained more or less static; and all efforts to rouse them to activity have been fruitless till now. What is this due to? Why this inertia and indifference? Are there no problems affecting the Veterinary profession which require consideration? Although the reasons have not been readily apparent, still, on close observation and study, one may safely put it down to lowered optimum vitality due to long continued inanition.

That is a plausible and possible explanation because that is what one experiences in veterinary practice. When an animal is kept and worked for a long period on a ration of low calorific value, then, it just manages to carry on. It does not become ill, but at the same time it is not well. To use a common expressive term, the animal has no kick in him. That is what happens to an organisation also—we mean a living organisation, not a dead one. The strength of an organisation lies in its individual members and if those members are kept in circumstances bordering on 'underfeeding and overworking' for a long period, then one need not wonder if they lack any energy or enthusiasm to do anything beyond what one really *must*. They simply carry on, more or less mechanically, a burden to themselves and to others as well. Of course such a thing is fatal to progress and efficiency; and, therefore, it is up to everyone to exert and see that such a thing is not allowed to continue. We, in our own way, have tried in these pages to remove this vital defect: we feel we could have done more but the co-operation of the members was not coming forth to the extent to which one would like. We are sorry to have to mention it; but there is no use blinking at bare facts. Man is a rational being and he should arouse himself even in the midst of depressing circumstances and exert himself to improve the conditions of his existence and surroundings. Otherwise he will forfeit his claim as a rational and intelligent being. It is therefore a matter for encouragement that the Executive Committee of the Madras Branch of the profession has decided on a Conference.

This is not an occasion to dilate upon the value and advantages of a Conference of the kind proposed. It is enough if it is realised that it creates a forum, a meeting place, for the professional men—young and old, experienced and non-experienced, forward and shy—to mix freely and exchange ideas and thoughts. What greater opportunity can there be to improve one's knowledge about men and things? What more is required to pool the experiences of various practitioners in different parts of the country? What better service can one do to advance the profession one is practising? We therefore earnestly appeal to the members of the profession to muster in numbers at the conference, discuss freely the various problems affecting the profession and find out ways and means to make the A. I. V. A. a living organisation so that it may fulfil the objects for which it was started, *viz.*,

- (i) to promote the professional knowledge of its members,
- (ii) to create esprit-de-corps amongst its members and
- (iii) to improve the status of the members in general.

These objects should appeal to everyone and, to the realisation of which, one and all should contribute, individually and collectively.

M. ANANT NARAYAN RAO—A LIFE SKETCH

Rao Sahib M. Anant Narayan Rao, Lecturer in Parasitology, Personal Assistant to the Principal and Resident Veterinary Officer, Madras Veterinary College, proceeded on leave on 1st September 1942, preparatory to retirement at the end of a long and distinguished service of nearly 32 years.

Born at Kasargod, S. Kanara, in August 1888, in the community of Saraswat Brahmins and as the fourth child of Rai Bahadur M. Raghunatha Rao, Assistant Inspector of Schools and a pioneer educationist in Coorg, he grew up in Coorg and was educated in the Central High School, Mercara, from which he matriculated in December 1904. The student, proficient in studies and athletics as well, availed himself of a scholarship for

higher Education and joined the Presidency College, Madras, for the First in Arts Course. Ill-health caused a break in this course in 1906, after which he resumed his studies in the Government College, Mangalore. Sir Lionel Davidson, the then Commissioner of Coorg, urged him to choose the Veterinary profession and Mr Rao entered the Madras Veterinary College in February 1908 as a Coorg scholar.

Of his teachers, he remembers with gratitude Major Gunn, and Messrs. Aitchison, D'Silva, Valladares, Sampath Iyengar and Kylasamier. His collegiate career was marked by the medals awarded to him for Handling of Animals, Physiology, Bovine Medicine and Surgery, Equine Medicine and Surgery, Operative Surgery and Therapeutics, and the prizes for Anatomy, Botany, Horse-shoeing, and Materia Medica. These distinctions could not have failed to attract any Principal, and Mr Aitchison had earmarked him for the College and offered him the post of House-Surgeon when he passed the Final Examination in December 1910. But Mr Rao agreed to serve the Coorg Government and underwent six months' training in Elephant Diseases under the Special Veterinary Inspector of the Forest Department, Mr F. X. Mascarenhas. He won the confidence of his officer soon after joining in January 1911, and was put in charge of elephant-camps and capturing operations. In 1912, he started a new dispensary in N. Coorg, and he was at this time responsible for the health of the elephants and other livestock belonging to the Forest Department. The Deputy Conservator of Forests repeatedly tempted him with a Range Officer's post in his department.

On 25th August 1915, he was appointed Third Lecturer in the Madras Veterinary College, owing to the efforts of Mr Aitchison, and was elevated to the Second Lecturership within a few months. In 1917, he underwent training in Bacteriology at the King Institute, Guindy, and in Pathology at the Madras Medical College. In 1921, he was promoted as Senior Lecturer, in 1922 Acting Assistant Principal, and in 1923 Personal Assistant to the Principal, Resident Veterinary Officer and Warden of the hostel. He was occasionally transferred to the mofussil

as District Veterinary Officer, Circle I in 1924, Circle II in 1922, and Circle V in 1929, when he was placed in the Gazetted rank. He obtained post-graduate training in Parasitology in the United Kingdom in 1929, and returning in 1930 was designated Lecturer in Parasitology. Thrice he had acted as the Principal, and as Lecturer had taught all subjects excepting Surgery. In 1937, the title of *Rao Sahib* was conferred on him and he was the first Graduate of the Madras Veterinary College to be so honoured.

When most others dreaded to manipulate the microscope, when guidance of any kind was lacking and when few understood the utility of the work, at such a time, did Mr Rao apply himself to original research work. He had to work upstream and suffer the sneers of the sceptic.

"Two men stood looking through the bars,
One saw the mud, the other saw the stars."

His acquaintance with helminth parasites began when he was conducting autopsies on elephants in 1911, and he developed a zeal for the subject of Parasitology thenceforth. He first worked on the clinical aspects of Ankylostomiasis in dogs and disclosed the possibility of pre-natal infestation, which was confirmed by scientists elsewhere, nine months later. His earliest publications were on *Microfilaria* in dogs and *Haemogregarina canis*, in 1925, soon after which he was deputed by the Government to conduct investigations on *Babesia gibsoni*, under the Indian Research Fund Association, at the King Institute. He had almost come to the conclusion that the vector for this parasite was *Haemaphysalis bispinosa*, but as more time was denied him, it remained for Lt.-Col. Shortt to prove it. He had his own microscope and laboratory at home till 1925, when Mr F. Ware, who with insight discerned this firefly in the bush, offered him assistance for advanced work. In 1929, Mr Rao left for England, and entering the London School of Tropical Medicine obtained his training under Prof. R. T. Leiper in Helminthology, Prof. J. G. Thomson in Protozoology, and Prof. P. A. Buxton in Medical Entomology. During his stay there, he met many prominent scientists of the country at the meetings of the Royal Society of Tropical Medicine and Hygiene, of which he was a

Fellow. His work in India on *Piroplasma canis* in jackals drew the attention of Prof. G. H. F. Nuttall of the Molteno Institute, Cambridge, who invited him to his place and obtained his autograph in the Distinguished Visitors' Book. He also paid a visit to Prof. Emile Brumpt in Paris, to whom, he says, he owes all his knowledge of Schistosomes. Having had the privilege of working in his Professors' rooms at the London School, and of visiting all Veterinary Colleges and Universities in Great Britain, France, Germany and Italy, he returned to India in 1930. His publications since then, a list of which is appended, cover a wide field in Parasitology, including trypanosomes, cestodes, nematodes, numerous new cercariae and many trematodes. His most distinguished work is on *Schistosoma nasalis* of cattle; our knowledge of its identity and life-history, and the disease caused by it and its treatment, is derived from him.

He has been till lately a Fellow of the Indian Academy of Sciences, and a member of the Indian Science Congress Association and the Madras Science Club; he has served on the Animal Diseases and Pests Committee of the Imperial Council of Agricultural Research, and represented Madras on its Advisory Board in 1939. He is responsible for the inauguration of the Helminthiasis Scheme of the ICAR in the Madras Veterinary College. He believes that the time is imminent when Parasitology will engage the attention of many scientists in combating animal diseases. A worshipper of liberty himself, he considers that research workers should be able to command greater freedom in the prosecution of their work than is now afforded, and that official routine should not be forced on research.

As a lecturer, he was greatly respected, and he had many a time, like the oyster that makes pearls of sand-grains, turned an unruly student to much good. With his wide capacity for friendship, no one who crossed his path could fail to fall under the charm of his geniality. He is fond of books and builds radio-sets as a pastime. He married in 1902, when he was barely fourteen, and has a daughter and three sons, of whom one is in the Indian Medical Service. He met Sri Ramana Mahrishi at Tiruvannamalai in 1932, when collecting material

for work on Schistosomes, and has been passionately attracted towards him ever since. He has a home in that place and plans to settle down there to practise *atma-vidya*. He is one who has suffered much, although in every storm of life he has been oak and rock. He retires to adopt a strange code of life, by which he will not feel the pain of living with us, and which will guide him towards peacefulness and happiness. Yet, he will be with us, his colleagues and friends.

M. ANANTARAMAN.

BIBLIOGRAPHY

1. Rat Bite Fever in Dogs. *Indian Veterinary Journal*, Vol. I, No. 1, 1924.
2. Life-cycle of *Microfilaria recondita*. *Veterinary Journal*, 1924.
3. *Haemogregarina canis*, James (1905). *Indian Veterinary Journal*, Vol. I, No. 4, 1925.
4. *Piroplasma gibsoni*, Patton (1910). *Indian J. Med. Res.* Vol. XIV, No. 4, 1927.
5. A new species of furcocercous cercaria, *Cercaria Anomala*, sp. nov. *Scientific Papers of the Civil Veterinary Department, Madras*, Vol. I, 1929.
6. ——— and Parameswara Ayyar, L. S. P. Some observations on Trypanosomiasis in Madras Presidency. *Indian Veterinary Journal*, Vol. VIII, No. 4, 1932.
7. ——— and Parameswara Ayyar, L. S. P. Heterophyes Species from Dogs in Madras. *Ibid.* Vol. VIII, No. 4, 1932.
8. ——— and Vaidyanatha Mudaliar, S. Larvae of *Porocephalus* sp. in the muscle of a fresh water fish. *Ibid.* Vol. 9, 1932.
9. *Cercaria Saundersi*, n. sp. *Ind. J. Veterinary Sc. and Anim. Husb.* Vol. II, pt. III, 1932.
10. *Cercaria Kylasami* sp. nov. *Ibid.* Vol. II, pt. III, 1932.
11. ——— and Ayyar, L. S. P. Triradiata tapeurorms from hounds and jackals. *Ibid.* Vol. II, pt. IV, 1932.
12. *Diplopilidium Nolleri*, Skrjabin (1924). *Ibid.* Vol. II, pt. IV, 1932.
13. ——— and Ayyar, L. S. P. A Preliminary Report on two Amphistome cercariae and their adults. *Ibid.* Vol. II, pt. IV, 1932.
14. Bovine Nasal Schistosomiasis in the Madras Presidency with a description of the parasite. *Ibid.* Vol. III, pt. I, 1933.

15. A Preliminary Report on the successful infection with Nasal Schistosomiasis in experimental calves. *Ibid.* Vol. III, pt. II, 1933.
16. *Cercaria Hurleyi* n. sp. *Ibid.* Vol. III, pt. III, 1933.
17. A Preliminary Report on the adult trematode obtained from Cercariae Indical XXIII, Sewell (1922). *Ibid.* Vol. III, pt. IV, 1933.
18. ———— and Ayyar, L. S. P. *Schistosoma Suis*, n. sp. a schistosome found in pigs in Madras. *Ibid.* Vol. III, pt. IV, 1933.
19. A comparative study of *Schistosoma spindalis* Montgomery (1906), and *Schistosoma nasalis*, n. sp. *Ibid.* Vol. VI, pt. I, 1934.
20. ———— and Vaidyanatha Mudaliar, S. Some observations on the trypanosomes of cattle in South India. *Ibid.* Vol. IV, pt. IV, 1934.
21. ———— and Swaminatha Ayyar, R. Ova of Schistosomes in the faeces of a dog (a Preliminary Report). *Ibid.* Vol. V, pt. I, 1935.
22. Lung flukes in two dogs in the Madras Presidency. *Ibid.* Vol. V, pt. I, 1935.
23. A note on *Taenia Solium* Lennaeus (1758,) in the Madras Presidency. *Ibid.* Vol. V, pt. I, 1935.
24. Further observations on Bovine Nasal Schistosomiasis. *Ibid.* Vol. V, pt. III, 1935.
25. The most practical methods of control of Entozoal parasites in India. *Ibid.* Vol. V, pt. VI, 1935.
26. ———— and Ramakrishna Pillay. Some Notes on cutaneous myiasis in animals in the Madras Presidency. *Ibid.* Vol. VI, pt. III, 1936.
27. ———— and Vaidyanatha Mudaliar, Observations on the treatment of Bovine Nasal Schistosomiasis. *Ibid.* Vol. VI, pt. IV, 1936.
28. A Preliminary Report on Canine Schistosomiasis in the Madras Presidency. *Ibid.* Vol. VII, pt. II, 1937.
29. *Dipetalonema dracunculoides*, Cobbold (1870). *Ibid.* Vol. VIII, pt. II, 1938.
30. *Poteriostomum ratzi* Kotlan (1919). *Ibid.* Vol. VIII, pt. II, 1938.
31. Rhinosporidiosis in Bovines in the Madras Presidency, with a Discussion on the probable modes of infection. *Ibid.* Vol. VIII, pt. III, 1938.
32. *Micipsella indica*, n. sp. *Ibid.* Vol. VIII, pt. III, 1938.
33. A Note on *Plasmodium bubalis*, Sheather (1919.) *Ibid.* Vol. VIII, pt. IV, 1938.
34. *Arthrocephalus gambiensis*, Ortlepp (1925.) *Ibid.* Vol. IX, pt. I, 1939.

35. A brief review of the Species of Schistosomes of the domesticated animal in India and their molluscan hosts. *Indian Veterinary Journal*. Vol. XV, No. 4, 1939.
36. *Gyalocephalus capitatus*, Looss (1900.) *Ind. J. Vet. Sc. and Anim. Husb.* Vol. IX, pt. II, 1939.
37. On a Species of *Joyenzia*, Lopez-Neyra (1927,) from a cat (*Felis catus domestica*). *Ibid.* Vol. IX, pt. IV, 1939.
38. On some worms of the genera *Trichostrongylus*, Looss (1905,) and *Cooperia*, Ransom (1907,) in South India. *Indian Veterinary Journal*. Vol. XVI, No. 5, 1940.
39. Animal Pathology, *Annual Review of Biochemical and allied research in India*. Vol. XI, 1940.

A N A P P E A L

At a meeting of the Executive Committee of the All-India Veterinary Association, Madras Branch, held at the Madras Veterinary College, on the 1st of August 1942, it has been resolved to hold a Provincial Veterinary Conference at Madras during the month of December 1942, and in announcing this resolution to the members of the profession, I make a special appeal to them to attend the Conference in large numbers and make it a success.

Papers on professional subjects and Notices of Resolutions to be read and discussed at the Conference may be sent to the Secretary of the Association before the 1st of December 1942, so that they may be printed and circulated in advance to enable a thorough discussion at the Conference.

As every one knows, it is a long time since a Veterinary Conference was held in Madras and it is high time that one is held soon. There are many problems awaiting consideration and discussion, not the least of all, the mobilisation of Veterinary Science for the economic advancement of the country. At a time like the present when great changes are hourly taking place, and the necessity for self-sufficiency, especially in the matter of

foodstuffs, is being driven home to every one in an intensive way, we the Veterinarians of the country have got a great duty to perform in the programme of things. The 'Grow More Food Campaign,' inaugurated some months back and which is being advocated all over the country depends for its success on the great co-operation of the Veterinarians. The problems that have to be tackled, the ways and means by which we could contribute our share to advance the prosperity of the country—all these are matters which could be solved only by frank and free discussions by members of the profession, meeting at a Conference. We should not fail in our duty and, therefore, it is highly essential that we, Veterinarians of this Province, meet soon in Conference to exchange ideas and formulate our course of action for the future.

May I here point out that the strength of the Association is greatly dependent, financially and otherwise, upon the members forming the Association. At present, out of nearly 400 Veterinary Graduates in the Province, only 100 are members of the Association. This is not satisfactory. Every one should make it a point of becoming a member of the Association, the only organisation of its kind, to consider matters of general veterinary importance. To facilitate this, the Executive Committee of the Association has proposed to the General Body the desirability of reducing the subscription from Rs. 2 to Re. 1 per annum. This should certainly make it easy for every one to become a member—much more to the youths of the profession, on whom a great deal of responsibility for the future depends and to whom the country looks for progress.

Rao Sahib K. KYLASAMIER
President,

A. I. V. A., Madras Branch.

Clinical Cases

A CASE OF HYPOGLYCAEMIA IN A SHE-BUFFALO

BY

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

Veterinary Assistant Surgeon, Bobbili, Madras.

On 17-1-42 at 5 p. m., an owner of a she-buffalo reported that his animal had calved four days previously and that she was showing the following symptoms:—lying flat on the ground, kicking with hind legs, now and then raising the head, not eating or ruminating and constipation.

I gave him a colic drench and asked him to administer it. He went home, gave the medicine to the animal, came back and reported to me at 6 p.m., that the animal was worse and was breathing hard. Thereupon I paid a visit and found the animal lying prostrate and unconscious on the ground with hind limbs stiff and extended. It was now and then raising the head wildly and dropping it. The temperature was 101°F. Milk fever was suspected and a subcutaneous injection of a solution containing the following was given:—

Sodium Chlor.	4 drachms
Glucose D	2 oz.
Boiled water	1 pint

The injection was given in two places. A turpentine enemata was also given. In a couple of hours, the buffalo stood up, but was not eating. I again paid a visit next morning and found that the animal was well for all practical purposes though she had a vacant look and did not mind the calf. I repeated the same injection in half the dose, and the animal was put on kanjee and light feed. The next day the animal was reported to be alright.

MELANOTIC TUMOUR ON THE FETLOCK OF A BULL

BY

K. S. PRAKASA RAO, G.M.V.C.,

Veterinary Assistant Surgeon, Bezwada.

*Subject:—*An Ongole cross Bull, red and white, Case No. 2931, aged 3 years, admitted into the Veterinary Hospital, Bezwada, on 20th December 1941.

*History and Symptoms:—*The bull was said to have had a warty growth on the fetlock which was operated on by a Touring Veterinary

Assistant Surgeon. There was a recurrence with increase in the size of growth. Local treatment had no effect. When first admitted, the growth was oval and indurated with an indolent ulcerated surface and bleeding readily on interference.

Treatment:—The tumour was completely excised leaving behind a circular depression. On dissection, the hard layers of the tumour were found intermixed with black pigmented tissue one blending with the other. Saturated saline solution mixed with 1 in 400 sol. of Hydrargyri Perchloride in equal parts was used as daily dressing. There was a recurrence of growth which had to be excised several times. To limit the spread of malignancy the wound was concentrically branded with line firing iron at about $\frac{1}{4}$ " away from the edge of the circular wound. The wound was cauterised once in three days with antimonii et pottassii tartras powder. Saline with mercury solution was continued as a routine dressing.

The following mixture was administered per orum from 25th December 1941 to 10th May 1942 with antimonium salt alone on alternate weeks:

R/-

Antimonii et Pot Tartras	v Grs.
Vinum Colchicum	$\frac{1}{2}$ oz.
Pul. Nux Vomica	1 „
Aqua	1 pint

In addition to the above, weekly injections of 1 per cent. sterile solution of antimonii et Pot. tartrate were administered intravenously in doses of 20 c.c. The growth became replaced by healthy tissue, and the wound gradually healed. The animal was finally discharged on 10th May 1942. There is no recurrence of the tumour ever since.

The Principal, Madras Veterinary College, who examined the growth, diagnosed it as 'Melanoma with inflammatory changes.'

A CASE OF CONTRACTED TENDONS IN A CALF

BY

G. SITARAMA MURTY, G.M.V.C.,
Veterinary Assistant Surgeon, Uyyur, Madras.

Subject:—An Ongole bull calf, aged 5 weeks.

History:—The calf was stated to have been born with the fetlocks of both fore flexed, the animal walking with the anterior part of the affected joints resting on the ground (see Fig No. 1 showing the case before operation). All attempts on the part of the owner to extend the tendons and bring the joint to normal position having failed, the calf was brought to hospital on 11-3-1941 about 5 weeks after its birth.

On examination, the young animal was found to have the flexor tendons on both fore contracted. Attempts to extend these proved futile and resulted only in causing extreme pain to the animal. The patient was prepared for an operation on 14-3-1941.



Fig. 1. Photo of the Calf before operation

Technique of operation:—The site of operation, i.e., the space about 3" above the fetlocks, was clipped, cleaned and washed with soap and water. Procaine Hydrochloride (3 per cent.) was injected subcutaneously on each side of the tendon. A longitudinal incision 3" long was made along the tendon and the superficial flexor was exposed and attempts were made to extend the joint; but as the deep flexor also was contracted, it was also severed 1" above the incision on the superficial flexor.

The wound was swabbed with 25 per cent. solution of Liquor Hydrogen Peroxide and the skin wound was finally sutured and sealed with collodium.

The other leg also was operated in a similar manner. The operation wound on either side was well packed with cotton wool and the foot from the hoof to elbow was well wrapped with tow and put in splints.

Healing by first intention was attempted but as the calf managed to get loose and jumped in the compound on the twelfth day, there was a slight pus formation and the wound was treated as an open wound. It healed completely by 25th day when the calf was able to bear the weight without the

splints. Still the splints were continued for another two weeks more and the calf was discharged cured on 21-4-41 (Fig. No. 2 showing calf after operation).



Fig. 2. Photo of the Calf after operation

No blemish of the operation wound could be seen after two months and the calf at the time of writing was reported to be in perfect condition in the village.

BEE STING (?) IN A CALF

By

S. RAMANARAYANAN, G.M.V.C.,
Veterinary Assistant Surgeon, Coonoor, Madras.

Subject:—A cross-bred bull calf aged about six months.

History:—On 6-6-1942, the calf was observed rushing blindly, shaking its head violently, with incoordination of the hind limbs and falling down often. The calf was immediately brought to the hospital for treatment.

On examination, a large painful swelling of the forehead was observed, rather giving the animal the look of a Rhinoceros. The swelling was puffy. No other swelling on the body was perceptible. The calf was very excitable, falling down when touched; the pulse and respiration were accelerated. The temperature was 103°F. No dung or urine had been passed since morning.

A CASE OF ALOPECIA IN A HORSE

Diagnosis:—A provisional diagnosis of Bee sting was made, as there were Bee Hives in the premises of the owner.

Treatment:—A warm soap water enema was given, when pellets of dung were passed. A dose of Ol. Arachis iv oz., with Spts. Aetheris ii ℥, Ol. Terebinthin 30 m. and Tr. Asafoetida ℥i was given internally.

The swelling on the head was sponged with weak Liq. Ammonia. Within a few hours of treatment the violent symptoms abated and the animal passed urine freely; but it was dull and would not drink milk.

On the second day there was improvement constitutionally and the swelling of the forehead went down considerably.

On the third day, i.e., on 8-6-42 drying of the skin of the nostril was observed; it subsequently excoriated, exposing a raw sore. From the fifth day onwards, drying and excoriation of the skin in small patches over the ears, neck and practically the dorsal aspect of the body was observed.

Appropriate dressings were applied and the calf was discharged cured on 22-6-42.

Discussion:—(1) It is interesting to note that at the time of admission, no definite swellings could be observed on the dorsal aspect of the body. Evidently the stings were there but could not be located on account of the thickness of the skin which is well covered by hairs.

(2) From the extensive skin lesions observed subsequent to admission it may be assumed as aforesaid that there must have been a good deal of stinging by many bees.

In the Veterinary Record, Vol. 53, No. 49, page 725, deaths among equines as a result of the Bee stings are reported, but apparently, the bovines are more resistant to the effects of sting.

A CASE OF ALOPECIA IN A HORSE

By

MD. TAKI UDDIN AHMED, G.V.SC.,
Mominabad (Dn.)

It was during the summer last year that I was transferred to the Military Veterinary Hospital, Mominabad Cantonment (Deccan). There was a chestnut mare on sick list entered as suffering from 'Alopecia' for over three months. The treatment that had been adopted was mere applications of cocoanut oil and water.

On examination, the condition of the animal was found really pitiable. The whole body was devoid of hairs and the poor horse was biting and

scratching like one gone mad. The mucous membranes were brick red in colour. The skin had become so delicate that the animal resented even mere touch. The cause of the condition was supposed to be impoverished condition of blood. And as microscopic examination was beyond reach, the scrapings were not examined.

Treatment:—An injection of Aricyl (Bayer) was given subcutaneously. The animal was daily bathed with carbolic soap (5 per cent.), and Odylen (Bayer) was rubbed over the affected parts of the body. A week later a second injection of Aricyl was administered. By now irritation had subsided and the animal had stopped scratching and biting. The colour of the mucous membranes became lighter. Roots of hair were noticed all over the body surface. Therefore, from the second week, the following dressing was rubbed instead of Odylen after bathing the animal.

R/-

Cupri Sulph 3i
Sulphur
Ol. Turpentine
Phenyle aa 3i
Ol. Cocoanut ad 3xx
M.ft. Emulsion

Two more injections of Aricyl were given and the above skin dressing continued.

In a month the animal had almost got a new coat, and after another month it was difficult to say that it was the same animal which had been denuded of any trace of hair on the body.

A word in conclusion. The recipe given above has been found very efficacious in all the skin troubles of domesticated animals whether contagious or non-contagious. (For animals with delicate skin, greater dilution with cocoanut oil is necessary). Greater benefit is obtained if the treatment is continued with internal administration of alternatives.

HAEMOLYTIC ANAEMIA IN A MARE DUE TO SULPHANILAMIDE*

BY

W. A. DICKINSON, M.R.C.V.S.
Crowland, Petersborough.

Communicating with Messrs. Pharmaceutical Specialities (May & Baker), Ltd., in connection with the case recorded below, they were kind enough to send me their comments upon it. They informed me that they considered the case to have been almost certainly one of an acute haemolytic anaemia

*Veterinary Record Vol. 54, No. 23

due to sulphanilamide, and that the case is the first of its kind, to their knowledge, to be reported in a horse, or, in fact, in any domestic animal. For this reason and also since haemolytic anaemia in equines is attracting some attention in connection with the phenothiazine, they urged the publication of a note of the case.

On April 12th I delivered a mare of a dead foal. The foaling was not particularly difficult, but, as the foal had been dead for a considerable time, and there was the possibility of metritis, I decided to administer a course of sulphanilamide, in addition to local treatment of the uterus, 3 oz. being given on April 12th, 1 oz. on the morning of the 13th, and 1 oz. the morning of the 14th, when its use was discontinued on account of the mare's condition.

On the 13th, progress was quite satisfactory, the condition in the uterus having improved. When, however, I examined the mare on the morning of the 14th at 10 a.m. (1 oz. of sulphanilamide having been given at 7 a.m.), the symptoms were alarming, although the uterus was progressing very favourably. Respiration was laboured, the pulse weak, fast, irregular and intermittent, and the temperature was 102°F. All the visible mucous membranes were a dirty yellow colour, there was a trickle of reddish fluid from the nostrils, and the urine was such as occurs in azoturia. Visiting the mare later in the day I found the symptoms more marked, death occurring about 7 a.m. Unfortunately I was unable to make a *post-mortem* examination.

I have used sulphanilamide and phenothiazine on a considerable number of cases, but I should like to be assured that this idiosyncrasy is an uncommon one, as such deaths are difficult to explain away to clients. If any members had had a similar experience it would be helpful, in assessing the danger attached to the use of these drugs, if they will record the facts.

AN OUTBREAK OF OVINE RABIES*

BY

J. A. HENDERSON,

Urbana, Illinois,

Department of Animal Pathology and Hygiene,
University of Illinois

While natural outbreaks of rabies in sheep are not rare, an opportunity to follow the course of an outbreak in the field is seldom afforded the practitioner, especially when relatively large numbers of animals are involved. The following report may therefore be of interest.

A flock of 845 ewes and rams and about 500 young lambs under the supervision of the Department of Animal Pathology and Hygiene was

*Veterinary Medicine, Vol. XXXVII, No. 2.

presumably attacked by one or more stray dogs on the night of March 7, 1941. The sheep had been confined in eight separate lots, but rabies later appeared in four lots containing a total of about 500 ewes and 350 lambs. Although the caretaker stayed in a shack 100 feet from the sheep pens and visited the flock every two hours during the night, he did not see the dogs.

One lamb was killed, and another died later from the effects of its wounds. Twenty-five ewes were severely bitten, 10 of them requiring treatment. The wounds were almost invariably around the lips, jaws, and nostrils, and in four ewes the frontal sinus had been penetrated.

It was supposed that the wounds had been inflicted by dogs, but the possibility of rabies was thought to be remote. There had been no evidence of rabies in the community: even when symptoms of deranged consciousness appeared in the ewes, the fact that the flock had been suffering severe losses from listerellosis at the time of the attack delayed the consideration of other diseases. However, on March 27th, the shepherd reported that three ordinarily timid ewes had boldly attacked him and were manifesting other unusual symptoms. Clinical symptoms of this character called to mind the possibility of rabies and it was then noted that these ewes all had healed wounds on their faces. Several sheep were immediately destroyed, and Negri bodies were found on microscopic examination of the hippocampi. On checking with the shepherd it was learned that four ewes displaying rabid symptoms had been destroyed between March 24th and March 26th. Losses continued at the rate of four or five a day for about two weeks, then tapered off, with individual cases appearing from time to time. The last case occurred on June 26th.

At the time the diagnosis of rabies was confirmed, all the mature ewes showing wounds or scars which could have been caused by the attack on March 7th were placed in a separate lot. This group totalled 53. Of these, 46 died after showing typical symptoms of rabies, a mortality of 88 per cent. In addition, a number of ewes and lambs, on which no scars or wounds could be found, died apparently of rabies. The total mortality was 60 mature ewes and 18 lambs.

There seemed to be no correlation between the severity of the bite and either the incidence of the disease or its incubation period. Some of the first ewes to show symptoms had received duly slight scratches, while one of the ewes whose frontal sinus had been pierced still showed no sign of the disease at the time this report was prepared.

Symptoms:—In a great majority of the cases observed the first symptom manifested was an increase in sexual desire, shown by repeated attempts to mount other members of the flock. This was usually accompanied by a tendency to pull wool, sometimes their own, and by light butting of other sheep. After about 24 hours, many of the affected ewes would charge the

caretaker or other persons who happened to be near them. If two of them were placed together they might draw back 6 or 8 feet from each other and come together repeatedly with great force. They became more zealous about wool pulling, and when a group at this stage was confined in a small lot, a patch of wool was soon torn from each animal. Some ewes after violent exercise exhibited what were apparently temporary fainting spells. As a rule, affected animals were unable to rise one to four days after the appearance of symptoms. In those few in which the disease was allowed to run its course, death occurred within two days from the onset of locomotory paralysis.

Differential Diagnosis:—Since losses from both listerellosis and rabies were occurring in this flock simultaneously, an excellent opportunity was presented to compare the clinical manifestations of these two encephalitic diseases. The differences were marked if the animal could be observed while on its feet. In listerellosis, circling somnolence, and pressing the head against objects were observed, while sexual excitement or belligerent action did not occur. If the animals were down when the first observation was made, clinical differentiation was more difficult, and it may be that some errors in diagnosis resulted. However, it seemed that in listerellosis the clinically affected animals had more vitality and were less completely paralysed. They moved their legs continuously as they lay on the ground, and in some cases lived three or four days after reaching the stage of inability to rise. Opisthotonos was common. On the other hand, in the paralytic recumbent stage of rabies, ewes seldom moved their legs, and opisthotonos was not observed. In rabid sheep, death invariably followed within 48 hours from the onset of locomotor paralysis.

[Sheep are not infrequently attacked by rabid dogs, but the practitioner seldom has the opportunity of observing an outbreak involving large numbers of animals, such as that reported here. This report is of further interest in that it describes the differential diagnosis of rabies and listerellosis.—Ed. *Vet. Med.*]

PADDY SPIKES IN THE JAW OF A BULLOCK

BY

K. S. PRAKASA RAO, G.M.V.C.,

Veterinary Assistant Surgeon, Bezwada

Subject:—Ongole Bullock, aged 12, from Venamalakuduru village, Bezwada Taluk, Kistna District, Case No. 523, admitted on 18th May 1942.

History:—The animal was observed to quid its food one morning. A few days afterwards a swelling commenced on the cheek and continued to increase in size.

Symptoms :—The swelling was circumscribed with a diameter of 4". It was hot, tense and painful and raised about an inch over the surrounding surface, the maximum rise being in the centre. Examined the mouth and found that the 3rd upper molar tooth opposite to the centre of the swelling was irregularly worn out presenting a sharp edge. There was a shallow ulcer opposite to this molar-tooth. The opening of the parotid duct was patent.

Treatment adopted :—Rasped the offending molar tooth and dressed the ulcer with weak Potassium Permanganate solution and a linctus containing equal parts of tincture Benzoin co., and Tr. Arnica florum. Stimulating liniment was rubbed over the swelling on the cheek. Internally the following prescription was given as there was no appetite :

R/-

Pul. nux vomica	1 oz.
Pul. gentian	2 oz.
Ammon. chloride	2 oz.
Pot. nitras	2 oz.
Sodii chlor	2 oz.
Aqua	ad 2 pints

m. ft. haust. Sig ½ twice a day

The treatment was continued till 28th May 1942, when it was found fit for an operation. On opening it, along with the pus about 40 spikes of paddy ear of various sizes from 1 to 1½" long were removed. The inside of the abscess was quite clean having no communication with the mouth. The abscess was dressed with fly-repellent dressing and the animal was discharged cured on 8th June 1942.

Remarks :—The spikes found on the top of the paddy straw might have pierced through the ulcer on the soft wall of the inside of the cheek in the act of mastication. The punctures made by them might have healed. The spikes lodged in the loose subcutaneous layers of the cheek, had set up an irritation with subsequent formation of an abscess. It is a rare occurrence. Fortunately it did not interfere with the flow of saliva through the Stensen's duct.

A QUEER CASE OF DYSPNOEA IN A HORSE

BY

M. D. VAISHNAV, G.B.V.C.,

Veterinary Assistant Surgeon, Ahmedabad

Subject :—An aged English Gelding used in a Victoria was brought for treatment in the month of January 1942 with the following history :—

The animal was apparently normal and healthy except that after a drive of over a mile or two, he snored, frothed at the mouth and showed signs of suffocation. This complaint was of two months' duration.

On examination of mouth and nose nothing abnormal was found. The owner was therefore advised to bring the horse in the Victoria when it was driven for about six miles. During that period he showed the above symptoms thrice. The symptoms appeared suddenly without any previous respiratory troubles. It used to disappear after rest for a minute or two. The animal's usefulness was interfered with only temporarily for a minute or two while the attack lasted. As physical examination did not reveal any abnormality, the cause of the trouble was not located. However, Potassium Iodide was prescribed for eight days but with no result. Then Potassium Bromide was prescribed which had a soothing effect after four days. The treatment was continued for about a month and then it was found that the trouble had completely disappeared.

The whole history of the case together with the treatment adopted was narrated to a well-known local Medical Officer who opined that it may be a case of Neurosis.

A HUMANE METHOD OF KILLING PETS

BY

V. G. KHARE, G.B.V.C.,

Veterinary Assistant Surgeon, Khambha, Baroda.

The Veterinary Surgeon has not only to cure the ailments of the dumb, but at times it falls to his lot, the unpleasant duty of taking the life of pet animals. It is, therefore, the duty of every Veterinary Surgeon to see that the animal is killed in as humane a manner as possible.

There are various methods suggested. Amongst these are :—(1) The bullet, (2) Chloroform inhalation, (3) Hypodermic injection of Morphine (4) Hydrocyanic Acid on tongue, etc. But ordinarily none of these are available to the field Veterinarian. The severing of posterior aorta through rectum in large animals is not so humane as is advocated.

Now, the intravenous or preferably intracardial injection of saturated solution of Magnesium Sulphate is found to be very quick in effect and the pain felt is almost nil. About 5 to 10 c.c. of the solution is sufficient to kill a dog of the size of Alsatian. The animal dies before the needle is taken out of the body. I have not tried it on large animals, but the effect would be the same. The drug is always available to the field practitioner. The action is probably the powerfully depressing effect on the heart.

I would be obliged if my brother Veterinarians publish their experiences and exact effect produced on the system by the drug.

Note :—This method is in vogue in Madras for the past some years. Even big animals like horses are destroyed by the intravenous injection of a saturated solution of Magnesium Sulphate.—[Ed. I. V. J.].

Association News

THE ALL-INDIA VETERINARY ASSOCIATION The Indian Veterinary Journal, Madras

Statement of Receipts and Payments for the year ending 30th June 1942

	Rs.	A.	P.	Rs.	A.	P.
To Balance on 1-7-1941	3,183	10	3			
„ Subscriptions	3,647	12	0			
„ Advertisement	537	6	0			
„ Sale of reprints	15	12	0			
„ Interest	80	0	0			
„ V. P. Postage recovered	48	8	0			
„ Miscellaneous	8	5	0			
By Rent				480	0	0
„ Salary				480	0	0
„ Honorarium				1,000	0	0
„ Journal Printing charges				1,824	10	9
„ Railway freight				60	0	0
„ Binding charges				33	0	0
„ Postages				863	12	9
„ Printing and Stationery				13	6	0
„ Commission on cheques				3	11	0
„ Audit fee				25	0	0
„ Subscriptions to Journals				3	14	0
„ Balance on 30-6-42				2,733	14	9
	7,521	5	3	7,521	5	3

Examined and found correct.

20, Thambu Chetty St. }
Madras, 2-9-1942 } K. GOPALAKRISHNA RAO,
Registered Accountant & Auditor.

THE ALL-INDIA VETERINARY ASSOCIATION, MADRAS BRANCH

Proceedings of the Executive Committee meeting held on the 1st August 1942 at 3 p.m., in the Library Hall of the Madras Veterinary College.

Members present :—

1. Sri Rao Sahib K. Kylasamier (*President*),
2. „ K. S. Nair,
3. „ Rao Sahib M. Anant Narayan Rao.
4. „ M. Y. Mangrulkar,

5. Sri R. Swaminathan (*Secretary*)
6. „ S. Vythianatha Mudaliyar,
7. „ S. N. Vaidyanathan,
8. „ D. A. Ramanadhan (*Joint Secretary and Treasurer*)
9. „ P. M. Thillanayagam
10. „ P. Srinivasa Rao.

Proceedings of the meeting held on the 29th January 1942 were read and recorded as correct.

Resolved that (a) with a view to revive the activities of the Association, this meeting is of opinion that professional gatherings be held periodically in Madras and other mofussil centres of the Presidency, with an annual Conference.

(b) Considering the large volume of arrears in the subscription, the Committee recommends to the General Body that the arrears till the end of 1941 be written off.

(c) In order to enable all the members of the profession to join the Association, the Committee recommends that the subscription be reduced from Rs. 2/- to Re. 1/- per annum.

(d) A Conference be held in Madras in December 1942 and that steps be taken towards that end.

(e) Resolved that the Executive Committee do meet at least once a month.

RAO SAHIB K. KYLASAMIER,
President.

May I, therefore, earnestly appeal for a more liberal and generous contribution from the members of the profession, especially the past students of the late Mr Panikkar?

Subscriptions may be sent to the undersigned.

R. SWAMINATHAN,
Lecturer,
Madras Veterinary College.

Subscriptions received for the Panikkar Memorial Fund up to 1st September 1942 are given below :—

	Rs. A. P.		Rs. A. P.
1 Sri R. Veeramani Ayyar	10 0 0	41 Sri K. S. Gopalakrishnan	2 0 0
2 „ V. Janakirama Ayyar	3 0 0	42 „ M. C. Chellam	3 0 0
3 „ P. M. Thillanayagam	3 0 0	43 „ V. Venkataraman	1 0 0
4 „ D. A. Ramanathan	3 0 0	44 „ S. Shunmugam	1 0 0
5 „ K. S. Venkataraman	3 0 0	45 „ S. Vanchiswaran	1 0 0
6 „ G. A. Sastry	1 0 0	46 „ G. B. Radhakrishnan	2 0 0
7 „ V. Gurumurthy	1 0 0	47 „ R. Krishnamurti	1 0 0
8 „ E. R. Nagarajan	2 0 0	48 „ V. Krishnaswami	1 0 0
9 „ K. P. Doraiswamy	2 0 0	49 „ P. S. Kuppuswami Ayyar	5 0 0
10 „ S. Venkatarama Ayyar	2 0 0	50 „ V. V. Venkatachala Ayyar	2 0 0
11 „ A. S. Mahadeva Ayyar	2 0 0	51 Mr Md Ismail Sahib	2 0 0
12 „ P. V. Venkatachala Ayyar	1 0 0	52 Sri B. S. V. Rao	5 0 0
13 „ T. Raghavan	5 0 0	53 „ Samirasimha Rao	5 0 0
14 „ L. N. Subramanyam	2 1 0	54 „ P. Subramanyam	1 0 0
15 „ Narayanaswamy Pillai	2 0 0	55 „ P. S. Ramachandran	1 0 0
16 „ M. Umapathi Rao	2 0 0	56 „ K. Ramasubramanian	1 0 0
17 „ K. Govinda Sastry	2 0 0	57 „ Mallikarjuna Rao	3 0 0
18 „ K. S. Nair	10 0 0	58 „ Sivaramakrishnan	3 0 0
19 „ P. Satyendra Rao	1 0 0	59 „ P. V. Kunhiraman	3 0 0
20 „ K. N. Govindan Nair	1 0 0	60 „ K. R. L. Ayyar	1 0 0
21 „ M. Y. Mangrulkar	10 0 0	61 „ G. Avudanayagam	1 0 0
22 „ R. Venkataraman	2 0 0	62 „ S. Rami Reddi	1 0 0
23 „ G. R. Viswanathan	5 0 0	63 „ H. Viswanath	5 0 0
24 „ K. S. Shunmugasundaram	1 0 0	64 „ P. V. Govinda Rao	2 0 0
25 „ K. Achanna Shetty	2 0 0	65 „ K. P. Chandrasekhara Nair	1 0 0
26 „ Ramanarayanan	5 0 0	66 „ Sivarama Subramanyam	2 0 0
27 „ Margabhandu Mudaliyar	5 0 0	67 Srimathi P. Madhavi Amma	
28 „ T. J. Hurley	20 0 0	(Mother of the late	
29 Mr K. Aboobacker	2 0 0	Mr Panikkar)	100 0 0
30 Sri Rao Sahib M. Ponnayya	5 0 0	68 Mr Md Rahimuddin Sahib	
31 „ Kadambavanasundaram	2 0 0	Bahadur	5 0 0
32 „ V. Muthayya	1 0 0	69 Sri I. Vijaya Raju	2 0 0
33 Mr Md. Barkathulla Sahib	1 0 0	70 „ K. G. Krishnan	2 0 0
34 Sri C. Seetharaman	3 0 0	71 „ L. Balakrishnan	2 0 0
35 „ M. T. Ryan	1 0 0	72 Md Monsur Huq Sahib	2 0 0
36 Mr Abdul Khader Sahib	2 0 0	73 Sri Kanakarajan	2 0 0
37 Sri K. V. Raghavachari	2 0 0	74 „ V. Parameswara Menon	2 0 0
38 „ S. N. Vaidyanathan	1 0 0	75 „ R. Narasinga Rao	10 0 0
39 „ J. Seetharaman	1 0 0	76 Rao Sahib M. Anant	
40 „ L. A. Sarma	5 0 0	Narayan Rao	10 0 0
Total ...		327	1 0

College News

GOVERNMENT OF BENGAL BENGAL VETERINARY COLLEGE

The undermentioned students of the Bengal Veterinary College have passed the Diploma Examination in the Supplementary examination held from the 13th to the 15th July 1942 inclusive in accordance with the Government of Bengal Agriculture and Industries Department Order No. 2064, dated the 3rd June 1942 :—

Sl. No.	Name	Place of origin
1	Phanindra Lal Mazumder	Bengal
2	Nirmal Kanti Dutt	Bengal
3	Harendra Nath Deka	Assam
4	Hafiz Seraj Din	Punjab
5	Ganga Dhar Sarkar	Bengal
6	Ranendra Kishore Roy	Assam
7	Narendra Nath Sarkar	Bengal
8	Umapada Saha	Bengal
9	Guru Das Banerjee	Bengal
10	Bhabendra Nath Thakuria	Assam
11	Mostaque Ahmed Chowdhury	Bengal
12	Azahar Ali Faruqui	United Provinces
13	Abdul Rouf Khan Chowdhury	Bengal
14	Md. Maqboolur Rahman	Cooch Behar
15	Bimal Kumar Das	Bengal
16	Md. Nural Islam II	Bengal
17	Md. Abul Quasem	Bengal
18	Jadav Chandra Das	Bengal
19	Shamsul Karim	Bengal
20	Sakhosenuo Angani Sasiekuo	Assam
21	Md. Jamal Uddin	Bengal
22	Md. Azizur Rahman	Assam
23	Jamini Ranjan Chakma	Bengal

Belgachia, }
15th July 1942 }

A. D. MACGREGOR, F.R.C.V.S., F.Z.S., I.V.S.,
Principal, Bengal Veterinary College.

Review

Annual Report of the Civil Veterinary Department, Barwani State, for the year 1939-40.

There was only one Veterinary Hospital and one touring Dispensary as in the previous year.

The staff consisted of a Veterinary Assistant Surgeon, a Salutry, a Compounder, two Vaccinators and a Peon. The State Surgeon was the controlling authority. In the absence of permanent Veterinary Assistant Surgeon, on leave or otherwise, the Salutry was in charge of the Hospital as Officiating Veterinary Assistant Surgeon.

The Veterinary section continued to be a branch of the State Medical Department.

27,631 cases were treated including 102 in-patients (in the Hospital and on tour) as against 12,805 in the previous year. 216 castrations and 209 surgical operations were performed as against 448 and 214 respectively in the previous year. Reports received from the interior of the State were 48 (Rinderpest 5, Anthrax 1, H. S. I. and Foot and Mouth 41). 1,375 animals were inoculated against Fowl Cholera, Rinderpest, Anthrax, Redwater and Tetanus during the year.

A few Durbar distinguished guests visited this institution. The Hon'ble Lt.-Col. G. T. Fisher, C.I.E., Resident for Central India, and Capt. P. A. M. Batty, Assistant Political Agent in Malwa, wrote the following:—

“Like the other institutions in Barwani the Veterinary Hospital is not only obviously well kept and fully equipped, but it is also doing very great work in the State. Sir Hari Lal Gosalia is considering the possibilities of extending the scope of the benefits of this institution by use of a touring van and I shall be most interested to hear of its success, which I know will follow this as all other beneficent projects of the President and the Council.”

Dated 12th March, 1940.

(Sd.) G. T. FISHER.

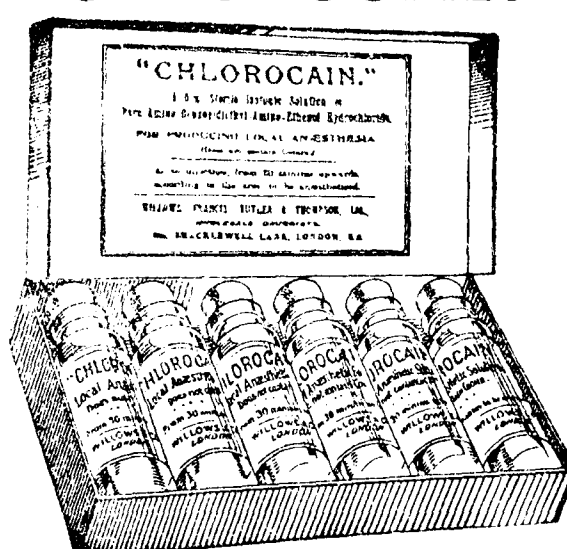
“The Veterinary Hospital like all the other state institutions is filling an urgent need of the people particularly the Zemindars. It is at present the only Hospital in the State, but the Superintendent and his Assistants tour considerably and thus bring relief to outlying villages. The buildings and equipment are the best and the daily attendances show how badly such a Hospital is needed.”

Dated 28th March, 1940.

(Sd.) P. A. M. BATTY.

20 good breeding bulls were let loose in 20 villages at the cost of Barwani Durbar for the improvement of the indigenous stock.

CHLOROCAIN



Manufactured by:
WILLOWS, FRANCIS, BUTLER & THOMPSON, LTD.
LONDON, ENGLAND

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

The Local Anaesthetic of the Century

The Madras Agricultural Journal

THE PREMIER MONTHLY AGRICULTURAL
JOURNAL IN INDIA

Published at the Agricultural College
and Research Institute, Coimbatore

Subscription Rs. 4/- per annum. Single Number As. 6.

Specimen copy Free on request

Apply to

THE MANAGER,

Madras Agricultural Journal,

Lawley Road, P.O., Coimbatore.

When writing to advertisers, please mention this Journal.

THE JOURNAL OF THE ROYAL ARMY VETERINARY CORPS

The Journal of the Royal Army Veterinary Corps is a Quarterly Periodical, which will appear on February 1st, May 1st, August 1st, and November 1st of each year. It is published at the Royal Army Veterinary School, Aldershot.

The Journal is sold at the price of 3s. per copy or 10s. 6d. per annum, post paid to any part of the world. Reduced rates are available to the undermentioned :-

Serving other ranks, R.V.A.C., Annual subscription 7s. 6d.
Single copy 2s. each

Personnel of the Indian Army Veterinary Corps, Annual Subscription Rs. 5. Single copy, Re. 1-4.

A discount of 10 per cent is admissible in respect of accredited commercial agencies.

All communications and enquiries should be addressed to :

THE EDITOR,

The Journal of the Royal Army Veterinary Corps,
ROYAL ARMY VETERINARY SCHOOL,
Thornhill, ALDERSHOT.

THE JOURNAL OF THE SOUTH AFRICAN VETERINARY MEDICAL ASSOCIATION

— PUBLISHED QUARTERLY —

This Journal is owned and published by the South African Veterinary Association of which it is the official organ.

It is devoted to matters of Veterinary Interest, generally and usually contains Original Articles by Research Workers at the Onderstepoort Veterinary Research Institute as well as by Field Veterinarians and Private Practitioners. Authoritative Reviews on important subjects appear from time to time, and there are sections for Clinical Notes and Abstracts of Selected Current Veterinary Literature.

Subscription : 10/6 (South African) Post Free

All correspondence should be addressed to :

The Managing Editor,
The Journal of the S. A. V. M. A.,
ONDERSTEEPOORT, Pretoria, South Africa.

When writing to advertisers, please mention this Journal.

DIMOLINE

An antiseptic solution of Dimol
which sterilises wounds and
immediately stops bleeding.

THIS POWERFUL GERMICIDE prepared and standardized to an exceptionally high bactericidal efficiency, with its special properties of safety and convenience, (being free from causticity, and harmful chemicals or drugs) may be applied pure or in any concentration to the most delicate flesh or skin.

The solution applied as directed to a wound will immediately stop bleeding, without the usual smarting associated with many antiseptic lotions of a spirituous nature, such as Iodine, Friars Balsam etc. The flesh and skin are not cauterised or burned by the application, but a healthy healing is rapidly promoted.

DIRECTIONS FOR USE

BLEEDING WOUNDS. Apply solution freely on cotton wool, dress with lint and bandage.

FOR WASHING WOUNDS, CUTS, ABRASIONS ETC. Dilute with four times its volume of water, use freely.

ANTISEPTIC LOTION. For general use two table-spoonsful to a quart of water will give a lotion with five times the germicidal properties of carbolic lotion.

Should be kept in every dispensary

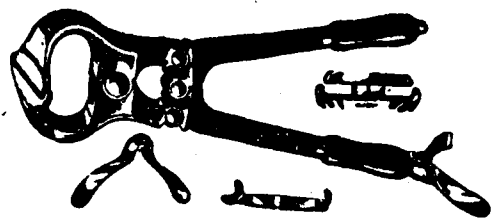
Bottles of 1 oz. As. 8, 4 oz. Rs. 1-4 & 16 oz. Rs. 4/-.

The Anglo-French Drug Co. (Estn) Ltd.,
P. O. Box 460
BOMBAY

When writing to advertisers, please mention this Journal.

BURDIZZO
With Patent Cord-stop at Jaws
and Patent Knee-Rest

Beware of Imitations — Do not be misled by spurious make-



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

The Burdizzo Hand Book of Bloodless Castrator should be in the possession of every Veterinary Surgeon. It is a mine of valuable information and shows the remarkable advantage possessed by the Burdizzo Method of Castration.

Illustrated Booklet free on request from
Dr. Pangal's Veterinary Institute
Representatives & Distributors
26, Wallajah Road, Mount Road P.O.,
Madras, S. India.

[illegible]