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THE
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PUBLISHED BI-MONTHLY

(THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION)

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Vol. XXVII

JANUARY, 1951

No. 4

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[THE JOURNAL OF THE ALL-INDIA VETERINARY ASSOCIATION]

PUBLISHED ON ALTERNATE MONTHS



A BI-MONTHLY
RECORD OF
VETERINARY
SCIENCE.

DEVOTED TO THE
CAUSE OF THE
VETERINARY
PROFESSION.

(ESTD. 1924)

EDITOR

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

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



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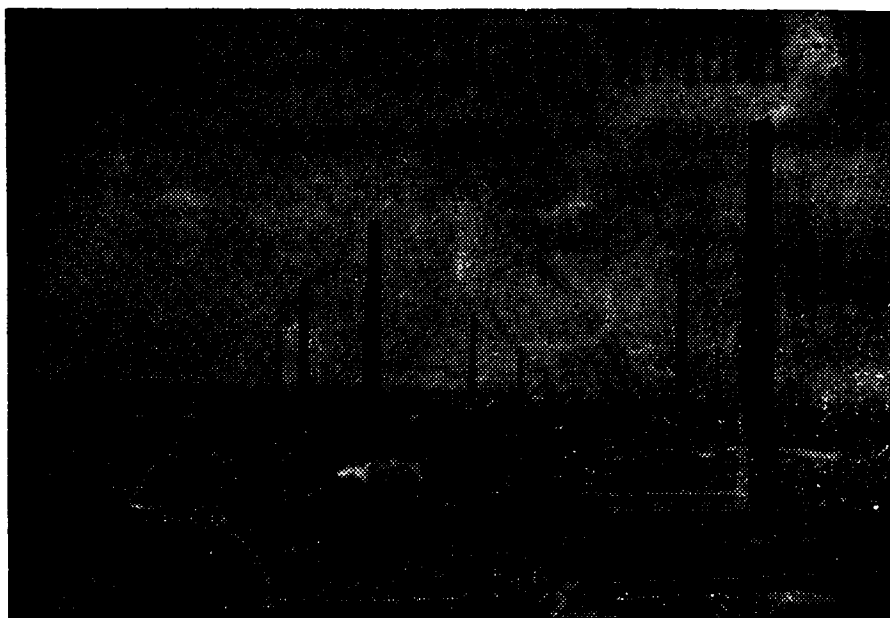
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The Indian Veterinary Journal

(The Journal of the All-India Veterinary Association)

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JANUARY 1951

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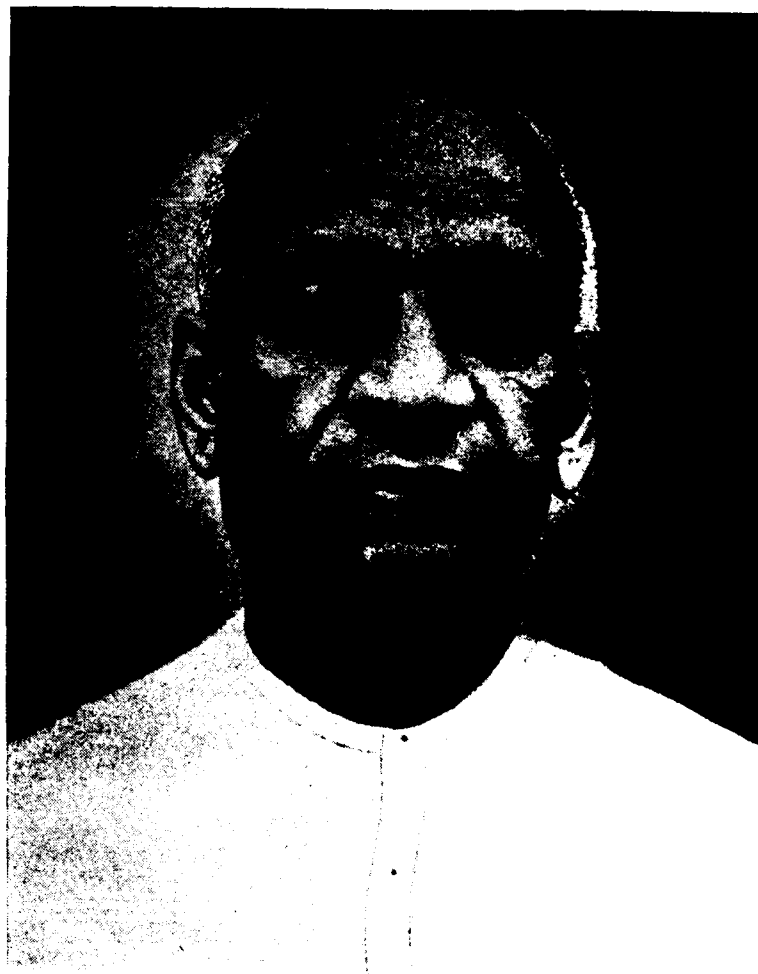
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*Deputy Prime Minister, India
who died on 15th December, 1950.*

THE Indian Veterinary Journal

(The Journal of The All-India Veterinary Association)

Vol. XXVII

JANUARY, 1951

No. 4

General Articles

BUNOSTOMUM BHAVANAGARENSIS N. Sp.*

By

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AND

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Madras Veterinary College.

79567

In the literature available, the only mention of the occurrence of Bunostomes in Cervidae is *B. trigonocephalum* in a Scottish red deer by Monnig (1947). The other report about Bunostomes in a near relative of Cervidae is from a Water-buck (*Cobus ellipsiprymnus*—Bovidae) by Maplestone (1931) from Calcutta. He has named it as *B. cobi*. Baylis (1936) considers *B. dentatum* described by Monnig (1931) in South Africa from the Water-buck as a synonym of *B. cobi*, since the differences between the two according to him are only in their relative measurements. However, the presence of a gubernaculum in *B. dentatum* should be taken as an important difference to consider it as a new species. An opportunity is taken to record the infestation in a cross-bred deer in Madras with Bunostomes which on scrutiny proved to be a new species.

The material for study was obtained from a cross-bred deer [Black buck (*Antelope cervicapra*) × Fallow Deer (England) (*Cervus dama*) = Albino Bucks] belonging to the Madras Zoo got from Bhavanagar which died of verminosis. A rich collection of Bunostomes and Trichostrongyles was made. The Bunostomes were found in greater numbers in the duodenum and jejunum with their anterior ends securely attached to the mucosa. The large intestines were devoid of these worms. The mucosa of the small intestines showed numerous petechiae.

* Read at the Annual Conference of the Madras Veterinary Assistant Surgeons' Service Association held in October '50.

BUNOSTOMUM BHAVANAGARENSIS N. Sp.

FIG. 5



FIG. 6

in three dissimilar digitations. On the inner aspect of the right dorsal, just about its middle is a papilliform protruberance. The lateral rays originate from a very thick lateral stem which divides about midway down the length of the lateral lobe. Ventral rays lie close together, the branches being much longer than the stem. The spicules are equal, slightly twisted, brownish and measure 0.36 m.m. long. They have broad striated alae, extending right upto the tips which are pointed and simple. No gubernaculum is seen. Genital cone is tridigitate (Figs. 4 and 6).

Discussion:—No Bunostome has so far been described from Cervidae in India. Occurrence of *B. trigonocephalum* in a Scottish red deer has been referred to by Monnig. As has already been mentioned, *B. cobi* and *B. dentatum* have been described from Water-bucks which although included in Bovidae are the nearest allies to the deer. From a comparison of the morphological characters of Bunostomes described so far, (vide table) we find that the worms under study show certain distinct characters sufficient to class them as a new species. They resemble *B. trigonocephalum* in having the dorsal border of the dorsal tooth longer than the distance from its tip to the oral opening. In other Bunostomes this length is shorter. Further, all the other Bunostomes have distinct sub-ventral lancets which are wanting in these. The absence of caudal papillae in the tail of the female is another difference to be noted. In the male of this species, the left externo-dorsal ray is a branch of the left dorsal whereas in others it arises at about the bifurcation of the dorsal ray. The distinct papilliform process on the internal aspect of the right dorsal noticed in these specimens has not been described in others. In *B. dentatum* a gubernaculum is described which is absent in all other species including the one under description. The various measurements of this species also differ from those given for others. Hence these worms are considered to be new and it is proposed to name them *Bunostomum bhavanagarensis* n. sp.

B. bhavanagarensis n.sp. deviates from the common generic characters of Bunostomes in the absence of sub-ventral lancets. Other important deviations in that genus are the presence of a gubernaculum in *B. dentatum* and a single spicule in *B. brevispeculum*. Hence it is suggested that the characters of the genus *Bunostomum* should be widened to include all these deviations.

Diagnosis:—The important morphological differences of this new species are:—

1. Absence of sub-ventral lancets.
2. The origin of the left externo-dorsal ray.
3. The presence of a papilliform process on the internal aspect of the right dorsal ray.

Description:—The worms are red in colour when fresh, long and slender, the females being longer and thicker. The cuticle shows coarse transverse striations. The anterior end of the worm is bent dorsad, (Fig. 1) possessing a strong and well developed buccal capsule of the generic type (Fig. 2). Encircling the oral opening are two pairs of sub-median and one pair of lateral papillae, the former being thicker and the latter thinner and having slender prolongations on to the dorsal plate.

The buccal capsule is deep and lined with chitin of varying thickness which is usually striated at the base of the dorsal tooth. The length of the buccal capsule is 0.12 m.m. while the transverse and dorso-ventral diameters are 0.11 and 0.09 m.m. respectively. The mouth is guarded by two very well developed roughly triangular ventral semilunes connected laterally to the fairly developed dorsal plates. There is a strong and long dorsal tooth extending almost to the oral opening. Running through this is seen the duct of the dorsal oesophageal gland opening at the tip by a pore. The dorsal border of the tooth is longer than the distance from its tip to the oral opening. No subventral lancets are noticed (Fig. 2, and 3). In a few worms, at the base of the dorsal tooth on its ventral margin, a small rounded thickening is noticed (Fig. 5). This may at times be mistaken for a vestigial ventral lancet if the worm is not properly orientated. The buccal capsule leads to a well developed oesophageal funnel having chitinised linings.

The oesophagus is club-shaped and measures 0.61 m.m. The nerve ring is situated at 0.2 m.m. from the oral end. Cervical papillae are well developed, thick, blunt and 0.26 m.m. from the oral end. (Fig. 1). Just posterior to the cervical papillae is the excretory pore.

Females:—These measure on an average 20 m.m. in length and 0.25 m.m. in thickness. About 6.3 m.m. from the anterior end is the vulval opening. Vulva is just slit-like and not prominently situated. The vagina is short but highly muscular. The length of the combined pars prostratrix is 0.18 m.m. The uteri are amphidelphous containing a large number of eggs. Eggs are oval and thin shelled, measuring 0.03×0.02 as found in the uterus. The tail is short and blunt, the length being 0.18 m.m. Caudal papillae are absent. Anal glands are well developed.

Males:—These measure 14 m.m. in length and 0.28 m.m. in thickness on an average. The bursa is well developed with very prominent lateral lobes and a small asymmetrical dorsal lobe. The right externo-dorsal ray arises higher up in the dorsal stem, whereas the left externo-dorsal arises on the left dorsal ray and not at the bifurcation of the dorsal ray. The right externo-dorsal is slender and long and runs into the right lateral lobe. The left externo-dorsal is shorter and thicker. Each dorsal ray terminates

BUNOSTOMUM BHAVANAGARENSIS N. Sp.

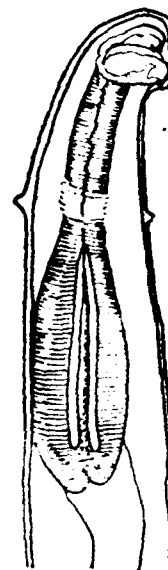


FIG. 1

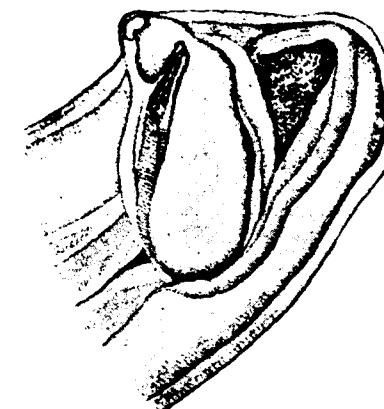


FIG. 2

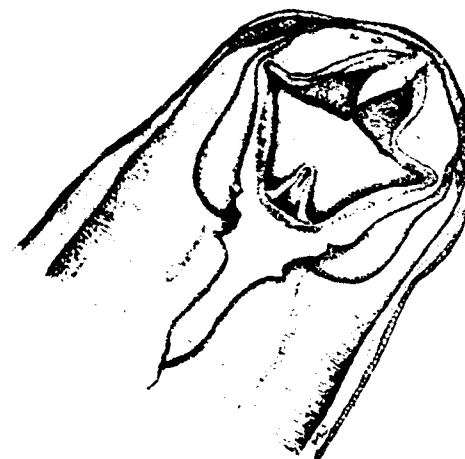


FIG. 3



FIG. 4

Camera Lucida Drawings

Ventral View

BUNOSTOMES of various animals

Name of species	Length of worm m.m.	Thickness of worm m.m.	Dorsal border of the dorsal tooth	Subventral lancets	Length of oesophagus m.m.	Distance of papillae from oral end m.m.	Distance of nerve ring m.m.	No. of spicules	Length of spicules m.m.	Gubernaculum	Length of tail m.m.	Measurement of eggs m.m.
<i>B. trigonocephalum</i>	M 11-17	4										
Sheep & goats and Scottish Deer	F 14-26	.45-.75	longer	single pair	.8-1.45	.6-.75	.45	Two	.6-.75	absent	.4-.5	.055 x .04
<i>B. phlebotomum</i>	M 10-12	.5	shorter	two pairs	1.25-1.5	Ante third		Two	3.5-4	absent	.25-.4	.075 x .035
Cattle	F 16-20	.55										
<i>B. bovis</i>	M 15-16	.5	shorter	single pair and long				Two	4.5	absent	.34	(0.072-0.075) x (0.011-0.016)
Cattle	F											
<i>B. brevispiculum</i>	M 12.1	.673	shorter	single pair	1.02		.52	single	.224	absent		
Elephant	F											
<i>B. hamatum</i>	M 8.7	.486					.5	Two	.67			
Elephant	F				1.08							
<i>B. foliatum</i>	M 13								1.46			
Elephant	F 15.2											
<i>B. cobi</i>	M 8.8-11.4	.20-.32	shorter	single pair broad and rounded	.18-.2			Two	.55-.68	not mentioned	.37-.46	0.054-0.080 x 0.018
Water buck	F 15-16	.45-.5										
<i>B. dentatum</i>	M 12.4-12.7	.27	shorter	single pair	.87-.95	.67	.56	Two	.637	present		
Water buck	F 10-20	.18		single pair	1.2-1.3	.65-.75	.60				.48-.58	.055 x .039
<i>B. bhavanagarensis</i>	M 14	.28	longer				.20	Two	.36	absent	.18	.03 x .02
Deer	F 20	.35			.61	.36						

Host — Deer
 Location — Small intestine.
 Locality — Madras (1950) (Imported from Bhavanagar).
 Type specimens — Kept in the Department of Parasitology, Madras Veterinary College.

Acknowledgments

Our thanks are due to Dr. G. Balasubramaniam, B.V.Sc., Assistant to the Research Officer, Helminthology, for his valuable help. Our thanks are also to Dr. C. I. John, G.M.V.C., Veterinary Assistant Surgeon in-charge Madras Zoo, for the help rendered, and to Sri M. R. Jambulingam, the College Artist, for the drawings and photographs.

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HYDROPHOBIA IN INDIA*

By

M. L. AHUJA, M.D., D.P.H.,
 Lieutenant-Colonel.

and

A. G. BROOKS, D.T.M.,
 Assistant Surgeon,

(From the Central Research Institute, Kasauli)

History:—The earliest reference that we have been able to find in Hindu mythology with regard to dogs and their association with death is in the Vedic period. In Atharva Veda, Yama, the God of Death, is described as being attended by dogs, his constant companions and emissaries of death: 'Broad-nosed and brown, the messengers of Yama greedy of lives, wander among the people' (Macdonell, 1825).

*Reprinted from the *Indian Medical Gazette* October, 1950

Strangely enough there does not appear to be any mention of a rabies-like disease in the Bible, though it seems probable that the two she-bears which killed 42 children who taunted the prophet Elisha, because of his baldness, were rabid (2nd Kings, 11, 24, 25.)

The following historical details have been gleaned from a most erudite study of the subject in a book on rabies by G. Fleming, published in 1872 by Hall and Chapman: Rabies and hydrophobia were well known to the ancient Greeks and Romans. Plutarch asserts that hydrophobia was first observed in mankind in the days of Asclepiadæ, the descendants of the god of medicine Æsculapius, by his sons Podalirius and Machaon, who spread through Greece and Asia Minor as an order of priests, prophets and physicians, preserving the results of the medical experience acquired in the temples as a hereditary secret. The mythical story of Actæon, who was torn to pieces by his hounds because he had surprised Diana and her attendants bathing, probably had its origin in the circumstance that a famous hunter was destroyed by his own pack of dogs which became rabid. In the Iliad, Homer is thought to refer to rabies when he mentions the dog-star, or Orion's dog, as exerting a malignant influence upon the health of mankind. Aristotle, in the fourth century B. C., states 'Dogs suffer from "lytta" which produces madness, and they infect every creature which they bite, except man'. Celsus, although probably not even a medical man, in about A. D. 30, appears to have made a special, and a remarkably accurate study of rabies and to have fully recognised that the virus was present in the saliva. Celsus strongly recommended cauterization, burning, cupping and also sucking the wounds of those bitten by rabid animals, making special mention of the fact that it was essential for the safety of the operator to have no sores or abrasions on his lips or in his mouth. He recommended the actual cautery and said that if the wounds were so situated that they could not be burnt then medicines which violently corrode should be used. Celsus described hydrophobia as 'a most wretched disease, in which the sick person is tormented at the same time by thirst and the fear of water and in which there is but little hope'.

There is nothing specially noteworthy in the history of rabies subsequent to these early reports, for knowledge of the subject remained more or less stationary till the classical work of Pasteur which led to the introduction of antirabic vaccines.

Incubation period:—There is no other acute infectious disease that we know of in which the incubation period is so variable, or dependent on so many different factors. The virulence of the particular strain of virus; the quantity of saliva deposited on the wounded surface, or inoculated into the bite; the tissue bitten, whether rich in nerve supply or not, the species of biting animal; the distance of the site of the bite from the brain; non-specific treatment with cauterizing agents; specific treatment with vaccines and sera; all these play

a part in regard to the incubation period and may modify it. In particular we draw attention to the incubation period in bites of the head and face. The short incubation period in these cases is attributed to the nearness of the wound to the brain and, in general, we agree with this obvious explanation, but it must also be borne in mind that such bites are likely to be inflicted by particularly ferocious, large and powerful animals, which either knock the patient down and inflict grave injuries, or leap up to bite, thus causing lacerated wounds on bare skin and on tissues which are richly supplied with nerve filaments. These bites are, therefore, more likely to cause infection and in a shorter period of time than bites on the leg and other less enervated tissues such as the trunk.

The disease generally manifests itself between the first and second month after the bite. Of 1,321 cases of hydrophobia treated at Kasauli and its centres, only 78 cases, distributed as follows, had an incubation period of less than 21 days:—

Number of cases of hydrophobia with an incubation period of less than 21 days.

Total number of cases of hydrophobia analysed in this series.	Incubation period (days):									
	11	12	13	14	15	16	17	18	19	20
1321	2	0	3	3	5	14	11	16	12	12

An incubation period of less than 15 days is most exceptional but there is no reason to doubt that cases with such a short incubation period do occur. At the same time it must be borne in mind that the doctor is wholly dependent on patients for histories recorded, and that these are not always reliable. For example, in our own experience, we know of a case of hydrophobia in an ignorant village woman, who stated that she had been bitten only 10 days before. Asked if the dog had attacked any one else she replied that she and two others had been bitten by it at the same time and that both the others had died of hydrophobia. Closer interrogation showed that she had been bitten quite 2 months earlier than she had stated in the first place. The longest authenticated incubation period on record was reported by Iyengar (1935). This was in a child aged 10½ years who developed hydrophobia 3 years, 2 months and 21 days (1,176 days) after having been bitten by a street dog on the hand and chest. The child had been treated with 5 c.c. of 1 per cent carbolized vaccine for 14 days. Cases of hydrophobia developing more than a year after exposure to infection are rare, and such incubation periods must be viewed with a certain degree of suspicion, always keeping in mind the possibility of a subsequent infection which may have been responsible for the disease. In the case reported by Iyengar, however, this possibility was carefully considered and ruled out.

An analysis of a series of 323 cases of hydrophobia shows that the average incubation period for head, neck and face bites is 34 days, for bites on the upper extremity 46 days and for bites on the lower extremity 78 days. In this series the incubation period was a month or less in 33 per cent, between 1 and 3 months in 49 per cent, between 3 and 6 months in 13 per cent, between 6 and 12 months in 3.5 per cent and over 12 months in 0.5 per cent of cases. The incubation period is somewhat shorter in infants and children than in adults. Thus, in the above series it was 52 days for those 15 years of age and under, and 67 days for those over 15 years of age. This is, in part, due to the fact that children are likely to be more severely bitten than adults and to be more frequently bitten on the face.

Prognosis:—Mortality in treated cases in India, in those actually bitten, is in the neighbourhood of 0.3 per cent. Of untreated persons (bitten by rabid animals but not given specific treatment) the chances are that about 80 to 90 per cent would escape infection. In untreated cases we may say that if the patient survives 2 months after exposure his chances are good; if he survives 3 months he is unlikely to develop hydrophobia, and beyond this period he may be regarded as almost free from danger, though no guarantee can be given until at least a year has elapsed from the date of bite. In treated cases the incubation period, as previously pointed out, may be prolonged as evidenced by our own experience and the case reported by Iyengar. This is also borne out by experimental evidence in animals in which those treated but succumbing to the disease generally have a longer incubation period than untreated controls.

Symptoms:—The classical symptoms of hydrophobia are too well known to require detailed description, and may be found in most textbooks. We, therefore, do not intend to describe them but draw attention to one or two points of practical importance. One should not ask a person suffering from hydrophobia to drink water. The patient is well aware that water is being given to him for the sake of deliberately evoking a spasm, and he naturally—and rightly—resents such behaviour on the part of a doctor. One should offer him 'medicine' which may consist of water coloured with a little tincture of cardamom compound or similar substance. Under the impression that he is being treated the patient will accept this and one may take the glass from him the instant the characteristic spasm clinches the diagnosis. Watch the patient carefully when he attempts to drink: it will be seen that his hand trembles as he is about to seize the glass and this trembling increases as he raises it to his mouth so that some fluid is usually spilt as he commences to drink. At the same time the head may be jerked back, and the patient seems to be trying to drink in too great a hurry. The muscles of the throat contract, and, as he removes the glass from his mouth, he struggles to swallow and to breathe.

In hysterical conditions, in which the patient believes that he is suffering from hydrophobia, the picture is very different. There is usually a much

exaggerated fear of water and the patient may refuse to attempt to drink. When persuaded to do so his hand does not tremble as he seizes and raises the glass. He may then throw the water away instantly, or if he takes a mouthful, he usually spits it out immediately without making any attempt to swallow it.

The symptoms of hydrophobia are modified by the temperament of the patient. Most patients are able to control themselves fairly well, but we have known a professional wrestler who broke down the wooden door of the room in which he was confined, with the leg of his bed. Brandishing this weapon, he entered a ward and would undoubtedly have done some one an injury had it not been for the presence of mind of a colleague who threw a glass of water on his face and quickly disarmed him while he was struggling in the throes of the spasm brought on by the drenching. On the other hand we have seen a little Sikh lad, 6 years of age, who had such self-control that, to oblige the doctors under training who had not previously seen a case of hydrophobia, he took several spoonfuls of water; when praised by them for his bravery, of his own accord he asked for more water and again took several sips of it. This child was excessively talkative and almost gave the impression of showing off. He was bright, evinced no sign of anxiety and sucked glucose sweets readily; and the attendant doctors were much inclined to question the correctness of our diagnosis till the patient died 4 hours later. This, and many other cases of hydrophobia in children which we have seen, leads us to believe that the disease is not as agonizing a one as it appears to be in adults, who are aware of the fatal issue. It is this certain knowledge of impending death that so terrifies and adds to the physical distress of adults, but the child mercifully unaware that he is about to die, seems to suffer no more than he would in many other acute diseases.

A point worth remembering, and seldom mentioned in books, is that the symptom of 'hydrophobia' frequently passes off in patients who survive for more than three days. We have known this to occur in four cases and draw attention to the disappearance of this, the most characteristic symptom of the disease, which is apt to lead the inexperienced medical attendant to believe that the patient is recovering, or to doubt the correctness of his diagnosis in the first instance.

Hydrophobia-phobia, a neurosis in which an exaggerated fear of hydrophobia is manifested, is not uncommon and we have seen several cases. The following is an example of this type of neurosis: An educated well-to-do gentleman, aged 35 years, recently came to Kasauli, after having put through five long-distance telephone calls within two days, to ask if he should be treated because a dog in the street had brushed against him; saliva may have been left on his trousers, he may have contaminated his hand with the saliva; and shortly after the dog had touched him he sucked a lozenge without

having first washed his hands. There was no particular reason to suspect that the dog was rabid; it had not attempted to bite him or any one else on the road at the time, yet this patient worried so much that a doctor (not at Kasauli) was induced to give him anti-rabic treatment. A few weeks later the patient came back to the Institute at Kasauli demanding further treatment because, according to him, the doctor may have used the same iodine swab on him as was used on another person getting prophylactic injections and he feared that this other person may have been developing hydrophobia.

Most of these cases of hydrophobia-phobia have already undergone a course of treatment but their fears lead them to demand more treatment. Their misgivings can generally be allayed by one who does not hesitate to claim expert knowledge and who impresses the patient with his own self confidence. In dealing with such a case it is best to tell the patient that he is suffering from a phobia; explain that such phobia are not uncommon; state that you have known of several others in like condition; assure him that hydrophobia is not an easily acquired disease and that the treatment already given has been more than ample, emphatically declare that his fears are groundless and resolutely refuse to give him more treatment. In spite of this, some patients will stubbornly cling to their pet phobia and these should be referred to a psychiatrist. Often the phobia is deliberately fostered as a substitute for other cause of worry. We recall the case of Mrs. X., a young woman who wrote lengthy letters daily to the Doctor of a Pasteur Institute, sent him numerous telegrams and put through telephone calls to his office and residence at all hours of the day and night. She worried over such absurd possibilities as acquiring hydrophobia by stepping on a banana skin which, according to her, may have been thrown away by some one who had hydrophobia or which may have been contaminated by a stray dog. Investigation showed that this lady had been recently divorced, that she had been deprived of the custody of her child and that she was leading an immoral life; and hence her phobia which was adopted as an escape from her real woes.

Prophylaxis and treatment:—All bites from animals, particularly if unprovoked, should be regarded as dangerous and the following local treatment should be carried out immediately. Wash the wound with soap and water. Any soft soap will do, provided it is used freely and reaches the depths of all pockets of wounds. Soap not only helps to wash away infective materials but will neutralize the virus of rabies in tissues with which it comes in contact. It is also advisable to use a strong jet of water from the tap while washing with soap as the mere mechanical action of the stream may remove the virus.

After the wound has been thoroughly washed, the patient should go to the nearest dispensary where the wound should be cauterized with pure carbolic acid. In the case of a deep penetrating wound a probe dipped in carbolic acid should be used to ensure that the wound is cauterized to its entire depth.

Immediately after the application of carbolic acid, the wound should be swabbed with a pledget of cotton-wool dipped in absolute alcohol, rectified spirit, or methylated spirit in order to prevent excessive cauterization of the tissues by carbolic acid. Some authorities prefer fuming nitric acid to carbolic acid. We do not recommend it as it is no more effective than phenol and causes considerable pain.

Recent work in experimental animals, suggests that the application of Tincture of iodine is as effective as cauterization and this of course would have the advantage of not causing scarring. For face bites, involving the eyelids, nose and mouth, iodine is therefore recommended.

In cases where there is no reason to suspect that the biting animal was rabid, and when the animal is under observation, commencement of specific prophylactic treatment with antirabic vaccine should be left to the discretion of the medical officer in charge of the antirabic centre. If the animal remains alive and well for the conventional ten days period, it can be taken for granted that the saliva was not infective at the time of biting and antirabic vaccine treatment is not necessary in such cases. In bites of the head, face and neck, it would be advisable to commence treatment immediately, and to take no risk. Every day that the biting animal remains alive and well, lessens the chances of its having been in an infective stage when it inflicted the bites. Treatment may, therefore, be discontinued after the first three injections, provided of course that the animal shows no signs whatever of sickness during this period. Treatment should of course be recommended on the first signs of illness of the animal within 10 days period of observation. If the animal develops rabies it is almost sure to die within two or three days of the onset of noticeable symptoms.

In all other cases where the biting animal is not traceable or when there is reason to suspect that it is rabid the patient should be sent immediately to the nearest antirabic centre for treatment.

In the present stage of our knowledge the actual treatment of hydrophobia literally amounts to euthanasia. Scores of drugs have been tried, including indigenous 'sovereign remedies' the latest antibiotics including aureomycin and chloromycetin, various sulpha compounds and their combinations, and one and all have proved equally worthless in the treatment of hydrophobia.

In the absence of a cure the doctor today views a case of hydrophobia with utter despair, and resorts to large doses of sedatives, such as morphia, to bring the disease to a speedy termination. This attitude should not be encouraged. Recently, Sulman (1950) recorded two cases of 'abortive' hydrophobia one of which occurred in 1921 and the other in 1948. The second case was in a boy, 9 years of age, who developed hydrophobia six weeks after

he was bitten by a rabid cat. The claim that this was a genuine recovery from hydrophobia must be accepted with reserve, for proof of the diagnosis could only be established by the successful passage of his saliva (which unfortunately, but understandably enough, was not done during the acute stage of the disease). Nevertheless, the characteristic symptoms described by an experienced worker on rabies are highly suggestive of hydrophobia and hysterical simulation of hydrophobia would be unlikely in so young a patient; besides, the incubation period of six weeks is against a probability of hysteria. If then this recovery is genuine it shows that hydrophobia may be curable. If the patient can be treated in a well equipped hospital, we suggest that hyper-immune serum, curare or tubercine, and an iron lung may be of use. Furthermore, judging by histological findings in the brains of animals which have died of rabies, damage to brain tissue does not appear to be greater than say in tetanus or cobra-venom poisoning, from both of which recovery may be complete. Accordingly, should it ever be possible to cure hydrophobia, there is no reason to adopt the pessimistic belief that this would leave the patient with a permanent disability due to brain injury.

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TWO INSTANCES OF PROVED RABIES IN THE TIGER*

BY

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Since all mammals and most vertebrates are susceptible to rabies, the tiger should be no exception, but although there are records in the statistics of Pasteur Institutes of instances of individuals mauled by leopards, etc., being treated with anti-rabic vaccine, the writer is not aware of proved rabies recorded in the Bengal tiger.

During the last few years there were two instances, at this Institute, of a positive microscopic finding in the brain of the Bengal tiger, the first in 1943 and the second during the current year. The brains were received at the Institute in a fixative—formol saline and methylated spirit, respectively.

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The biological test was therefore not possible, but with Neri stain, the routine stain employed at this Institute, well-developed and well-differentiated Negri bodies were seen microscopically in numbers, leaving no room for any doubt whatsoever. The existence of rabies, even in the King of the Jungle, emphasizes the enormity of the problem of eradication of rabies from this country, with so much of it stalking in wild life.

The first brain (in formol saline) was received in January 1943 from Dr. Hugh H. Smith, Chief Medical Officer, Nowgong Medical Association, Salana, Nowgong District, with the history that the tiger had 'severely' mauled eighteen people in just over twenty-four hours but made no attempt to eat any of the victims'. He also stated that he had started anti-rabic treatment of the survivors, as he suspected rabies in the tiger. Because of the extreme interest of the case, I tried to obtain from Dr. Smith further details of the ravages of the animal, but failed. The following paragraph regarding the incident is extracted from my Annual Report of the Institute for 1943.*

'Among the specimens of brain tissue examined for evidence of rabies (*vide* table V) was that of a Bengal tiger, which was positive for Negri bodies. This is perhaps the first instance of a positive brain recorded in this species. The history is as follows: The animal severely mauled eighteen people in just over twenty-four hours "but made no attempt to eat any of the victims". It was later killed by shots in the shoulder in daylight near a railway station and the medical officer of the tea estate, who had already started anti-rabic treatment among the surviving victims, sent the brain up for examination. This particular instance raises the issue as to the extent rabies is responsible for the man-eating propensity of tigers and, for the matter of that, for the unnatural and destructive behaviour displayed at times by other species such as the elephant. In such instances it is not only necessary to start anti-rabic treatment in the victims but also to submit the brain, where available, for examination at the Institute'.

The second instance of rabies in the same species occurred in April last, near Saikowaghat in the north-east frontier of Assam. The brain was sent by the assistant surgeon, fixed in spirit. At my request, the following information has been supplied by Dr. J. N. Palit, Civil Surgeon, north-east frontier, to whom I render thanks. The tiger was first seen at dusk on 13th April, 1950, in Garaimari village, 12 miles from Saikowaghat. On the night of 13th to 14th, between dusk and dawn, the animal had traversed at least 12 miles, terrorized the inhabitants of five or six villages and had attacked 14 persons, at least five heads of cattle and a dog, of whom one person and the dog were killed on the spot and two other persons died in hospital on the following day. The last person that was attacked in his house at Saikowaghat

*Annual Report of the Pasteur Institute and Medical Research Institute, Shillong, for the year 1943—Assam Government Press.

at 5 in the morning, managed to escape from the beast, shutting the door of the room behind him. The imprisoned animal was shot by a shikari an hour after, and measured 9 feet 4 inches.

[In this connection a reference to the article entitled 'Rabies in the Mongoose', *I.M.G.*, Vol. 68, 1932, p. 451, may be of interest. The following is the summary of the article :—

Three new cases of mongoose bite have been described. One positive mongoose's brain has been reported. *Attention is drawn to a death presumably from mongoose bite in an untreated case. All mongoose bite cases treated and mongoose brains examined at Kasauli during the last 10 years, from 1922 to 1931, are tabulated.

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

The suggestion is made to the effect that a mongoose bite should be treated as a serious bite.—EDITOR, *I.M.G.*]

THE ENDOCRINOLOGY OF THE MALE GONAD*

By

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PART II

The testes of mammals and birds have two important functions. The first is to produce the specialized cells of reproduction known as spermatozoa. The second is the endocrine function, namely to secrete the male hormone which influences the secretion of the secondary sex glands, the growth of the comb and wattles of birds, and the sex urge associated with reproduction.

The source of the germinal cells in the seminiferous tubules of the testis has been recognised for many years. In the preceding chapter a study of the normal development of the testes in White Plymouth Rock has been reported. Emphasis was given to the stages in the development of spermatogenesis with advancing age although the interstitial tissue changes were also described.

While it has been believed for a number of years that the endocrine activity of the testis is localised in the interstitial tissue area of the testis and more specifically that the male hormone was secreted by the cells of Leydig, direct proof of this assumption has been difficult of attainment. Within the past few years a new technique for the localization of the secretory zone of steroid hormones and their precursors in certain endocrine glands has been developed.

*Condensation of a Dissertation presented to the Graduate Faculty at Missouri University, U. S. A. by the author, in partial fulfilment of the requirements for the Degree of Doctor of Philosophy, Jan. 1949. Part I of the condensed thesis appeared in the *I. V. J.* Vol. XXVI, No. 5, March 1950.

Discussions

A number of testes from fetal chicks 12 and 18 days old were examined. They showed birefringence in the interstitial tissue area. While it was at first thought that this might indicate precocious male hormone secretion, it more probably indicates the presence of cholesterol or related compounds which are being modified in preparation for later secretory activity. Since the secretion of male hormone by the Leydig cells is dependent upon the pituitary ICSH, the question at what stage this hormone begins to be secreted by the fetal pituitary would be of interest.

Payne (1942) has studied the cells of the pituitary in White Leghorn cockerels, basophilic cells which appear functional were reported at 10 days of age. On the basis of these observations and those of Breneman (1937) it was suggested that the male hormone was being secreted between the 10th and 15th days of age. In Plymouth Rock, the basophiles began to appear at about 20 days of age. Yet Breneman (1941) found very little or no indication of male hormone secretion at 20 days of age.

In contrast to these observations Jaap and Thompson (1944) have reported that strains of chickens having a larger natal testis weight grew more rapidly in the post-natal period up to 8 weeks. This suggests that some strains of chickens may actually begin to secrete gonadotrophic hormone before hatching time and that the precocious secretion of male hormone explains the more rapid growth rate observed.

In the post-hatching period the testicular tissues displayed birefringent materials in the area covered by the cells of Leydig and the region of the seminiferous tubules were all negative. This test locates the area of the testicular tissue which contains biologically active substances. It is possible that the positive areas contain additional substances such as aldehydes which add to the intensity of reaction. However it seems that one can safely say that the non-reactive areas, in this case the seminiferous tubules do not contain the hormones in significant amounts.

PART III

The present section presents the results of certain studies designed to determine the role of the male hormone in the spermatogenesis of White Plymouth Rock cockerels. The method of approach to the problem was to determine the dosage of estrogen required to prevent the normal secretion of the gonadotrophic hormones rather than attempt to perform hypophysectomy. Since the hormones of the anterior hypophysis unaffected by estrogen would continue secretion, it was hoped that more nearly normal birds would be available for study of replacement therapy.

The depressing effect of the sex hormones upon the testes and secretions of the secondard glands of mammals has been widely observed. Moore and Price (1932) suggested that these observations could be explained as being due to an inhibition of gonadotrophic hormone secretion.

These experiments are interpreted as indicating that the administration of natural and synthetic estrogens depress the secretion of FSH by the anterior pituitary to variable degrees. When FSH is completely suppressed only the spermatogonial cells of the tubules remain intact. Since these cells persist after hypophysectomy (Hill & Parkes, 1934; Chu, 1940), it would appear that the growth of spermatogenic cells of the tubules is not dependent upon the gonadotrophic hormone, FSH.

Since comb growth is stimulated only by the male hormone and the male hormone is believed to be secreted by the interstitial cells of Leydig in the testes which are believed to be stimulated by the gonadotrophic hormone called LH or ICSH, it is believed that the primary effect of estrogen is to suppress the secretion of ICSH.

The overall effect of estrogen administration in sufficient amount to male birds is to totally depress the secretion of both gonadotrophic hormones. In such animals, the effect upon the testis is the same as the involution following the hypophysectomy.

Effect of the feeding of Dianisylhexene on testis development:—The objects of the following series of experiments was to determine the oral dosage of the synthetic estrogen dianisylhexene required to prevent the secretion of the gonadotrophic hormones in cockerels of various ages as indicated by the testis weight and histology and the comb weight. The influence, direct or indirect, of male hormone upon spermatogenesis was the second objective.

The growth of the comb of the dianisylhexene-fed group was greatly but not completely retarded. It would appear that the estrogen almost completely suppressed ICSH secretion by the anterior pituitary and the secretion of male hormone by the interstitial cells of Leydig.

The group fed on dianisylhexene and cow manure containing male hormone showed testis growth only slightly better than the group fed estrogen alone. Since spermatogenesis did not progress beyond the spermatogonial stage even in the 14 and 16 week old birds, it is evident that under the conditions of this experiment, spermatogenesis was not stimulated directly by the male hormone.

Since the male hormone in the cow manure was ineffective in stimulating spermatogenesis when the dianisylhexene was fed continuously from hatching time, the next experiment was designed to determine the effect of estrogen upon 12-week old cockerels already beginning to show spermatids. Would the male hormone in cow manure be able to maintain or stimulate spermatogenesis in the absence of FSH secretion?

The testes of the birds returned to normal feed were large weighing an average of 9.138 gm. which is normal for this age. Examination of the testes showed an average diameter of the tubules of 0.126 m.m. and spermatids were present in 100% of the tubules. It thus appears that recovery from the depressing effects of estrogen upon FSH production and spermatogenesis is very rapid in the bird.

This experiment appeared to indicate that the amount of male hormone present in the cow manure was depressing the secretion of FSH in the pituitary did not, at the level present, stimulate locally the spermatogenic process.

The next experiment had as its object the determination of the effect of smaller amounts of estrogen with large amounts of male hormone. The cockerels were started all 11 weeks and continued on experiment for 3 weeks. It will be noted that the feeding of 2 gm. dianisylhexene per 100 lbs. of feed depressed both testis and comb weight.

Examination of the histological development of the testes indicated that spermatids were beginning to form in the control group. The feeding of dianisylhexene alone reduced spermatogenesis to the primary spermatocyte stage. The addition of the testosterone increased spermatogenesis only slightly, a few birds' testes showed secondary spermatocytes.

The most striking effect upon the testes of dianisylhexene-fed cockerels was the spermatid sustaining effect of sulfamethazine. Spermatids were observed in about 74% of the tubules which is a close approach to the normal condition. However, the average testes weight, while more than twice that of estrogen-fed groups, was still far below that of the control testes weight. This was probably due in part to reduced action on the interstitial tissue since the comb size was also below normal. It would appear from these data that sulfamethazine either stimulates the secretion of the gonadotrophic hormones by the pituitary in spite of the depressing effect of dianisylhexene or it possesses gonadotrophic hormone-like properties. Since the average pituitary weight is considerably increased in this group, the writer prefers to believe that the favourable effects were due to the stimulation of the pituitary by this compound. Other experiments with certain sulfonamides will be reported in another paper.

Discussion

The present experiments confirm the earlier observations concerning the effect of estrogen upon the secretion of the gonadotrophic hormones of the anterior pituitary. It was observed that the incorporation of 4 gm. of the dimethyl ether of diethylstilbestrol (dianisylhexene) per 100 lbs. of feed fed to white Plymouth Rock cockerels from 8 to 14 weeks of age caused a rapid regression of the spermatogenic cells to the spermatogonial stage. Since the

spermatogonial cells are not dependent upon the gonadotrophic hormone FSH, it is believed that this dosage of estrogen very largely depresses the secretion of FSH.

At the same time the evidence for the marked inhibition of the secretion of the second gonadotrophic hormone, ICSH, by this estrogen is rather complete. The very slight growth of the comb of dianisylhexene-fed cockerels is believed to indicate the cessation of secretion of the male hormone by the interstitial cells of Leydig.

By the simple technique of feeding dianisylhexene at the 4 gm. level in the feed, it is possible to almost completely inhibit the secretion of the two gonadotrophic hormones by the pituitary and thus produce in the testes a condition quite comparable to that resulting from Hypophysectomy. At the same time the secretion of the other pituitary hormones may be influenced to some extent but not seriously. Of these the adrenotrophic hormone may be stimulated to the greatest extent.

The possibility of either maintaining or stimulating spermatogenesis by means of the hormone in cow manure or testosterone at the level administered when dianisylhexene was fed was entirely negative. Since this problem involved both a time of administration of male hormone in relation to the stage of spermatogenesis and the level of hormone which might stimulate spermatogenesis directly and at the same time would not depress the secretion of the gonadotrophic hormones, it was decided to next study the influence of crystalline testosterone alone upon spermatogenesis.

PART IV Summary

A study is reported of the normal growth in weight of the testes of White Plymouth Rock cockerels from four to twenty weeks of age. These testes were studied histologically. The progressive development of the component parts, the seminiferous tubules and the interstitial cells of Leydig were observed.

Four stages of spermatogenesis were observed. During the first 5 weeks the tubules were organised with multiplication of the basal layer of cells, the spermatogonia. This is associated with gradual increase in the diameter of the tubules.

The primary spermatocytes appeared at about the sixth week. During the next two or three weeks growth of the layer of primary spermatocytes took precedence over the further multiplication of the spermatogonial layer.

The secondary spermatocytes appeared at about 10 weeks of age. Spermatids appeared in the tubules of 12 weeks old birds. By the 20th week spermatids were present in all the seminiferous tubules.

The great increase in the testes weight after sexual maturity represented marked growth in seminiferous tubule length with interstitial tissue cells growth and associated male hormone secretion. This was a period of increasing capacity of cockerels to produce semen.

The testicular tissues of both fetal and post-hatching cockerels of various age intervals revealed the presence of birefringent crystals in the area covered by the cells of Leydig. These materials were more illuminating with increasing maturity.

In a study with synthetic estrogen, it was observed that the incorporation of 4 gm. of dianisylhexene per 100 lbs. of feed to cockerels from 8 to 14 weeks of age caused rapid regression of the germinal cells to the spermatogonial stage. The growth of the combs were depressed. By feeding estrogen at this level it was possible to almost completely inhibit the secretion of the two gonadotrophic hormones by the pituitary and produce a condition quite comparable to that resulting from hypophysectomy.

The maintenance or stimulation of spermatogenesis by means of the male hormone at the level administered when estrogen was fed proved entirely negative. The administration of estrogen indicated that the growth and metabolism of the spermatogonial cells were autonomous and that they did not require the gonadotrophic hormone at that stage. But the pituitary gonadotrophic hormone, FSH, was essential for the growth of the primary and secondary spermatocytes. This was shown by the involution of these cells when estrogen administration depressed the pituitary secretion of the gonadotrophic hormone.

In a study with crystalline testosterone, it was observed that the administration of large amounts, namely 20, 40 and 60 mg/kg. of feed depressed the secretion of FSH. Without the support of this hormone the secondary and primary spermatocytes involuted and only the spermatogonia was left in the seminiferous tubules.

With smaller dosage levels of testosterone, namely, 1.25, 2.50 and 5.00 mg./kg. of feed, there was depression of the testes weight of cockerels from 6 to 10 weeks of age. But the same dosage levels administered to cockerels after the 10th week resulted in a remarkable and dramatic increase in the size of the testes as well as in the comb growth. This study suggests that the levels of male hormone which will not depress the secretion of FSH are not effective in the eight-week old cockerels due to the absence of secondary spermatocytes. When the secondary spermatocytes were developed in the 10th week, then the male hormone was most effective in the doses indicated below.

It was further observed that the administration of male hormone in large amounts had a very beneficial effect on the body growth of the cockerels.

This study indicates that the spermatogonial cells are autonomous; the primary and secondary spermatocytes development depends upon the pituitary gonadotrophic hormone, FSH, and finally the male hormone plays a role in the transformation of the secondary spermatocytes into spermatids. By feeding small amounts of testosterone to cockerels which had reached the stage of secondary spermatocytes, spermatid production was greatly stimulated.

In a study of the administration of thiouracil to cockerels, it was observed that the secretion of FSH by the pituitary was not seriously depressed as indicated by the continued progress of spermatogenesis. While all stages of spermatogenesis occurred, the tubules were abnormal in the sense that the spermatids were precociously shedding off from the sertoli cells and the testis had a somewhat myxedematous appearance. The cells of Leydig were very adversely affected. Under the polarizing microscope very few birefringent crystals were observed in the area occupied by the cells of Leydig. The small growth of the combs which is an indication of the lack of male hormone secretion further confirms the adverse effect of thiouracil acts by depressing the production of ICSH by the pituitary.

In a study on the administration of thyroprotein, it was observed that a dosage level of 0.04% in the feed, produced a mild hyperthyroid condition which stimulated the secretion of FSH which in turn influenced the rate of spermatogenesis. The superior comb growth in the cockerels fed thyroprotein also indicated an increased stimulation of the production of ICSH by the pituitary which in turn stimulated the production of more male hormone by the cells of Leydig.

These studies emphasize the importance of the various hormones in male reproductive physiology and their role in the problems of fertility of domestic animals which is of vital importance to all animal breeders.

RUPTURE OF LIVER IN HORSES DURING HYPERIMMUNISATION

By

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While the writer was attached to a Pharmaceutical firm and entrusted with the work of immunisation of horses for the manufacture of different Antitoxic & Antibacterial Sera, several cases of sudden death in horses undergoing immunisation were observed. On autopsy, rupture of the liver and extensive internal haemorrhage were found in them.

RUPTURE OF LIVER IN HORSES



FIG. 1



FIG. 2

Previously sudden deaths of similar nature were put down to delayed Anaphylaxis due to repeated inoculation of toxin or bacterial antigen, and no postmortems were conducted. About 40% of the total deaths in horses that occurred during the process of immunisation was found to be due to this sudden rupture of the liver and haemorrhage and, therefore, the following report may be found interesting.

The process of immunisation and subsequent bleeding was as follows:—Healthy young horses, bay or brown, aged about 4 to 6 years, were generally selected. They were immunised and hyperimmunised by injecting toxin or bacterial antigen in increasing doses. It took about 2 to 4 months for the first bleeding. Subsequently, two successive bleedings at an interval of one day were done every third or fourth week after injecting 2 or 3 stimulating doses of toxin. Approximately, one pound of blood for every 80 pounds of body-weight was taken during each bleeding. The process was continued until the animal became either weak and unserviceable or reimmunised for other sera.

Symptoms:—In those animals that died of rupture of liver, there was ordinarily, nothing to indicate the existence of any disease; the animals were apparently in good health, fed well and was capable of work, notwithstanding so serious a change taking place in this important viscus. Only in two cases, there were symptoms of jaundice, fever and haemaglobinurea about three weeks before the rupture of the liver. N. P. Varing with the intensity of the rupture, the following symptoms were observed. The animal suddenly became dull, went off-feed and was unwilling to move; the pulse rate became accelerated, weak and irregular. There was often colicky pain and the animal looked round to his right side; stood obstinately, but later became unsteady; peripheral parts of the body became cold and the animal broke out into patchy sweats; there was a rapidly increasing palor of the mucous membrane and running-down pulse. Soon after, muscular tremors and staggering followed. The muscles of the limbs quivered and failed to support the body; and, finally, the animal fell down, struggled for a while and died in the course of an hour or two from the commencement of the symptoms.

Post-mortem findings:—The abdominal cavity was flooded with blood. The capsule of the liver was found ruptured at several places and, in those areas, the liver substance was broken into stringy fragments interspersed with blood clots. The gland substance was very soft and friable and could be handled only with difficulty. In most of the cases, the whole liver was a mass of blood clot and the gland substance could not be differentiated. Changes in other organs were not evident.

Microscopical and Histological findings:—Microscopical examination of the heart blood film and impression smears from the affected portion

Case report

Case No.	Description of the animal.	Immunised against.	No of bleed-ing	P. M. findings.	Remarks.
23	Aust., Bay, Gelding, weighing about 750 lbs. aged about 11 years at death.	Tetanus Dysentery.	31 } 46 }	Abdominal cavity full of blood : liver ruptured.	The animal was first immunised against tetanus and subsequently against dysentery.
25	Aust., Bay, Gelding, weighing about 700 lbs. aged about 9 years at death.	Diphtheria Pneumonia	32 } 7 }	Abdominal cavity full of blood : liver ruptured.	The animal was first immunised against Diphtheria, then against Pneumonia.
36	Aust., Bay, Gelding, weighing about 700 lbs. aged about 11 years at death.	Strepto B. Coli.	41 } 24 }	Abdominal cavity flooded with blood, liver ruptured.	—
42	Aust. Brown, Gelding, weighing about 800 lbs. aged about 10 years.	Strepto	36	Liver ruptured.	—
53	Bay, I. B. Gelding, weighing about 600 lbs. aged about 7 years.	Diphtheria	31	Middle lobe of the liver degenerated and contained blood clot.	The animal was destroyed.
54	Bay, I. B., entire, weighing about 700 lbs. aged about 9 years.	Diphtheria	42	Liver ruptured.	—
55	Bay, I. B., Gelding, weighing about 700 lbs.	Diphtheria	33	Do.	—
63	Bay, I. B. Gelding.	Dysentery	16	Do.	—
62	Bay, I. B. Gelding,	Meningo Strepto	22 } 7 }	Do.	—
74	Bay, I. B. Entire weighing about 600 lbs. aged about 8 years.	Cholera Strepto-coccus	24 } 14 }	Do.	—
76	Bay, I. B. Entire weighing about, 600 lbs. aged about 7 years.	Meningo-coccus Cholera	14 } 11 }	Do.	Manifested symptoms of jaundice, irregular temp. haemoglobinuria about 3 weeks before death.
83	Bay, I. B. Gelding.	Dysentery	10	Do.	—
84	Bay, I. B., Gelding, weighing about 600 lbs. aged about 7 years	Meningo	24	Do.	—
86	Bay, I. B. Gelding, weighing about 650 lbs. aged about 6 years	Gas gangrene	10	Do.	—
89	Bay, I. B. Gelding, aged about 6 years weighing about 600 lbs.	Meningo-coccus	26	Do.	—
98	Bay, I. B. Gelding, aged about 7 years weighing about 650 lbs.	Strepto-coccus	34	Do.	Manifested symptoms of jaundice two weeks before death.
67	Bay, I. B. Gelding, weighing about 600 lbs. aged about 8 years at death.	Dysentery	48	Do.	—

SARCOSPORIDIOSIS IN CATTLE IN BENGAL

of the liver revealed no parasitic or bacterial infection. Section from the affected liver was found to contain a dense clump of red corpuscles surrounded by amyloid material in all cases. Methyl violet in 1% solution and 2% Acetic acid were used for the detection of amyloid material. Lugol's solution of Iodine was also used and the tissue stained reddish brown. Amyloid degeneration of the gland from the repeated inoculation of toxin or bacterial suspension seems to be the predisposing factor.

Case reports:—It is interesting to note from the above case reports that rupture of liver was not noticed amongst the animals used for the production of Antitetanus serum, although about 35% of the animals of this firm were used for that purpose. The liver was found quite normal in horses destroyed or died after they were used for 5 or 6 years, and bled over 100 times for Antitetanus serum. It appears that the tetanus toxin has no deleterious effect on liver tissue.

SARCOSPORIDIOSIS IN CATTLE IN BENGAL

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Sarcosporidiosis amongst animals has not received much attention though the disease is widely distributed and affects man, cattle and other animals. The parasite is said to give rise to symptoms of anaemia, emaciation, general unthriftiness and sometimes difficult breathing, but in most cases, no symptoms whatsoever are exhibited.

Available literature does not offer any information on the fatal course taken by the presence of the parasite in bovines in natural infection. Death due to heavy infection by the parasite in sheep and in experimental mice is, however, on record. Lindemann (1868) discovered masses of Sarcocystic infection in heart muscle of a man who died from hydropsy. Kartulis (1893) and Manifold (1824) also recorded the infection in human heart. Sergeant (1921) has found the spore in blood film made from a cattle after pricking the skin. Watson (1920) has also recorded the occurrence of spore in blood film. Cone (1922) has found Sarcosporidial infection in bone lesion in a child.

Little attempt has so far been made to work out the life history of the parasite. Edmonn (1910, 1910a & 1914) has studied the development of the parasite in experimental mice. Negri (1910) and Darling (1910a) showed that the guineapig could be infected with parasite by feeding and that the form in the guinea-pigs was similar to those encountered in man. Arai (1925) claimed to have infected mice by feeding spores and, on one

occasion, spore was detected in the blood taken from the tail five hours after, and on two occasions in the heart blood six hours after feeding. Very little is known about the development of the parasite in other animals and the data concerning other points of protozoological interest are also incomplete. Therefore, no attempt can be made at this moment to study the nature and development of the parasite in bovines. The object of this paper is only to record the presence of Sarcocystis Spore in heart-blood films from cattle detected in the course of routine microscopical examination of pathological specimens and the symptoms noticed in those animals, and also to draw the attention of other workers to its presence and pathogenicity.

In January 1947, the writer attended on an aged bullock, about 8 years old, reported to be seriously ill at a place near Jhargram in the district of Midnapore. On arrival at the spot at about 4 p.m., the animal was found dead. The tongue was sticking out and there was evidence of profuse discharge of fluid material from the mouth and nostrils. The condition of the animal was apparently good. From the history of the case, it was learnt that the animal was first noticed to be ill in the grazing field at about 10 a.m. when it stopped grazing and stood still, later on manifested symptoms of restlessness, shivering, sweating and, subsequently, difficult breathing accompanied with a rattling sound. These symptoms gradually aggravated, particularly the dyspnoea, and the animal died at 3 p.m. The attendant could not say anything about any rise of temperature and there was no report of any such attack or death in the vicinity. Autopsy was, however, conducted carefully in a ditch and the carcass buried, as there was a possibility of the death being due to some infective disease. No noticeable change was found in any organ excepting the presence of about half an ounce of fluid in the pericardium. Blood smears from different organs were taken and afterwards examined microscopically. Large number of sickle-shaped bodies were discovered in heart-blood film only and a prolonged search for any other pathogenic organism yielded negative result. The locality was kept under observation for about 6 months but no such attack or any death was reported.

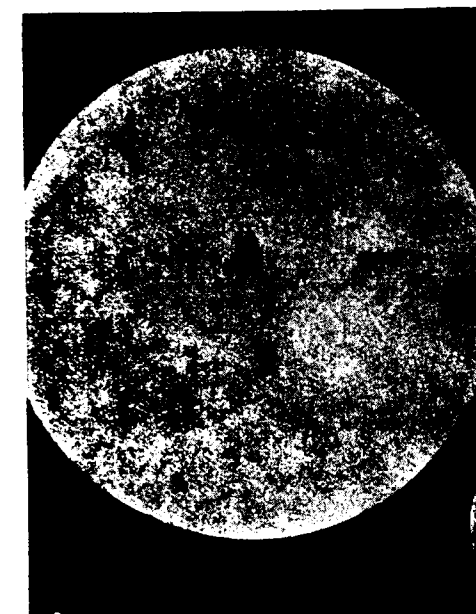
Previously, on another occasion, similar sickle-shaped bodies were also observed in heart-blood film from a stud bull found dead in the morning in the shed. No unusual or alarming symptom was noticed when the animal was tied in the shed during the previous night. The animal was reported taking less food, becoming gradually emaciated and manifested swelling at the limbs and submaxillary space, for about two months prior to death.

In November 1948, during routine microscopical examination of pathological specimens received from the field staff at the B. V. R. I. laboratory, Sarcocystis spores were again detected in large numbers in

SARCOSPORIDIUM IN CATTLE IN BENGAL



SARCOCYSTIS SPORES
From heart blood of cattle.



Microphoto of Sarcocystis spore in heart blood of cattle (decomposed)

the heart blood smear of a bullock suspected to have died of H. S. A thorough search for bipolar or any other pathogenic organism yielded negative results but the specimen showed numerous sickle-shaped bodies as mentioned above.

The above slide and also the specimen collected and preserved in January 1947 were shown to the then Dy. Director of this Institute, the late Mr. Menon, who was of opinion that death of these animals might be due to Sarcosporidial infection and according to his instruction, subsequent similar findings had been recorded in the contagious disease statement of this province, a copy of which is regularly sent to the I.C.A.R. A few specimens were also shown to Dr. S. C. A. Datta, Director, I.V.R.I. and Major J. M. Lahiri, Principal Bengal Veterinary College in March 1950, who also confirmed the findings.

So far, the presence of Sarcocystis spore in large numbers have been identified in films of heart-blood from 12 cattle and 1 goat where no other pathogenic organisms could be detected. Out of these 12 cattle, nine were reported to have died suddenly and the disease in each case was suspected for H.S. by the different field staff but none of them reported more than one or two deaths in one locality. The remaining 3 animals manifested symptoms of progressive anaemia, emaciation, occasional diarrhoea and more or less dropsical swelling of the limbs. In addition to the above cases, the presence of sarcocystis spores, in small numbers, has also been observed in the heart-blood film from 8 positive cases of Haemorrhagic Septicaemia.

Discussion:—From the sporadic nature of the deaths i.e. not more than one or two deaths in one vicinity, and from the microscopical findings of large number of Sarcocystis spores in heart-blood film, together with the absence of any other pathogenic organism, it appears evident that the deaths of the 12 cattle mentioned above were probably due to the attack and invasion of heart-muscle by the Sarcocystis spores. Since the clinical symptoms are not diagnostic, and as the literature describing the course and fatal termination from Sarcosporidial infection is scanty, its presence has obviously been overlooked so long. The disease described above was originally suspected for H.S. in most cases.

The Sarcosporidial infection in cattle seems to be more common in Bengal than hitherto believed. Microscopical examination of heart-blood film, if pursued carefully, may reveal the existence of the disease to a greater extent and may account for otherwise negative P.M. findings. It is not clearly known how the infection in cattle takes place, but probably, it occurs through ingestion of spores from infected pasture. It is also suspected by some that biting flies may play some part in the transmission of the infection.

Summary:—Large number of *Sarcocystis* spores were discovered in heart-blood smears of 12 cattle and 1 goat in which no other pathogenic organism could be detected even on careful microscopical examination. Sarcoporiidial infection seems to be the cause of death in these animals.

Small number of *Sarcocystis* spores were also detected in heart blood films of 8 positive cases of H.S.

The infection in cattle seems to be more common in Bengal than hitherto believed.

Attention of other workers is invited to the presence and importance of the disease in this country.

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SOME OBSERVATIONS ON SARCOSPORIDIOSIS OF DOMESTIC ANIMALS IN MADRAS

BY

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Workers of different countries have observed this affection of the striated and occasionally unstriated muscles of cattle, buffaloes, sheep, goats, camels, horses, dogs, cats, pigs, human beings, birds etc. The usual sites of predilection are oesophagus, tongue, diaphragm, skeletal muscles, heart and brain. The frequency of sarcosporidiosis was found in Sweden by Bergman, to be 88% in adult cattle, 67% in horses, 28% in sheep and 48.5% in pigs. In Augsburg, Stroh found 96% of cattle infected. Viljoen, in South Africa has found 85% of horses and 100% of cattle and sheep affected. (Hutyra, Marek and Manning, 1946). However, there is no

authentic record of the incidence of this disease in Madras State in spite of its frequent occurrence. Hence an attempt is made in this short note to record the same.

Perusal of the records of the Madras Veterinary College gives one, an idea about the prevalence of this disease in domestic animals in this state. Statistics collected for the past 10 years is hereunder shown.

Kind of animal	Muscles of oesophagus and tongue	Myocardium	Heart blood smears
Cattle	Nil	7	10
Buffaloes	17		Nil
Sheep	Nil	Nil	6

A study of the statement brings out the following notable features:—

1. Gross infection of Oesophagus and tongue are mostly in buffaloes.
2. Sarcocysts in myocardium occur mostly in cattle.
3. Heart blood smears of sheep and cattle alone reveal Rainey's Corpuscles.

Buffaloes which showed gross oesophageal cysts revealed no sarcosporidia in their heart blood, though the heart muscle of one such buffalo had numerous sarcocysts. On the contrary, those cattle in which either sarcosporidia in the heart blood or/and Meischer's tubes in the heart muscle were present, did not reveal any other sites of infection. The cysts in the oesophagus and tongue are situated on the surface of the organs and visible to the naked eye, measuring about 2-3 cms. in length. But the cysts of the heart muscle are microscopic and deeply embedded in the substance of the muscle. In the sections of the cysts of the myocardium, the trabeculae are not clearly seen. In those sheep in which heart blood smears revealed the spores, myocardium was not examined for sarcocystic infection. The heart blood smears were also not specifically examined in cases which showed heart muscle infection. As such, it is not possible to correlate the presence of Rainey's Corpuscles in heart blood with the occurrence of sarcocysts in heart muscle. So far, we have noticed not even a single case of sarcosporidia in peripheral circulation.

An enquiry about the incidence of this disease was made in the City slaughter house. It was reported that about 10% of the buffaloes showed gross oesophageal and tongue affection and occasionally skeletal muscle infection also, while only about 1% of cattle had the same. The infection in sheep and goats has not been observed in this slaughter house.

Discussion

Information regarding the incidence of sarcosporidiosis is meagre because of the fact that people knowing its supposed non-pathogenic nature did not see any reason to record it, though its occurrence is common. Hence it is impossible to come to a correct understanding of this condition particularly with regard to its incidence, sites of infection, probable methods of dissemination etc.

According to Martin (1905) and Watson (1909) the crescent shaped bodies found in the blood of cattle and mistaken for forms of trypanosomes by Holmes (1904) Lingard (1907), Hunt and Raymond, were actually Rainey's Corpuscles (Watson, 1909). Wenyon (1926, '36) considered the spores observed in the peripheral smears by Sargent Ed. (1921) and Hall (1936) to be only contamination by liberated spores from Meischer's tubes found underneath the skin. In the year 1939, the presence of Rainey's Corpuscles in the heart blood smears of a bullock was recorded in this institution though the occurrence of sarcocysts in oesophagus and tongue muscles were noted quite early. Since then, 15 cases of heart blood infection have been recorded. These smears were both from cattle and sheep. They were received from suspected cases of acute infectious diseases. But, of the six smears from sheep, four showed a combined heavy infection of *Theileria sp.* Three of the ten smears from cattle, revealed *Trypanosoma evansi* also. The cause of death of the other 9 cases could not be established to any other factor but perhaps sarcosporidiosis. In this connection, it is revealing to note that according to Pfeiffer (1890), Kasperek (1895), Lavern and Mesnil (1899) Rievel and Behrens (1904) and Teichmann (1910)—(Wenyon, 1926) the extract of the sarcocysts—*Sarcosystin*, is fatal to laboratory animals in a very short time. Could it be possible that the cysts which on rupture release along with the spores, a certain amount of this toxin, bringing about the death of the host? A similar type of fatal termination has been described in a helminthic condition i.e. Hydatid infection. The possibility of blockage of cerebral capillaries by the Rainey's corpuscles, as suggested in acute trypanosomiasis, and coronary thrombosis leading to fatal termination, should also be borne in mind, in further investigations.

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SARCOSPORIDIUM IN DOMESTIC ANIMALS



FIG. 1 × 1000

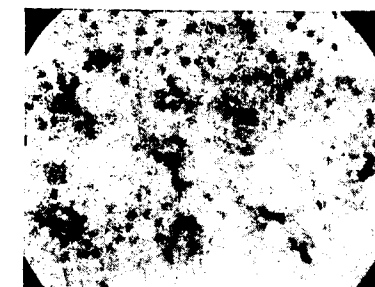


FIG. 2 × 600

Heart blood smear showing Sarco-Spores

Fig. 1. Bullock

Fig. 2. Sheep



FIG. 3 × 60



FIG. 4 × 600

Section of myocardium showing the Sarcocyst

Photo Micrographs

AMPHISTOMIASIS AMONG CATTLE



FIG. 1—Animal having throat swelling due to amphistomiasis but otherwise appearing normal. Look at the sprightly expression of the animal with pricked up ears and alert look with the absence of discharges either from the eyes, mouth or nostrils.



FIG. 2—Animal suffering from amphistomiasis, swelling noticed in the morning.



FIG. 3—Same animal taken in the evening—Note the difference in the size of the swelling

TAYLOR COWS OF PATNA



Taylor Cow



Taylor Bull



Taylor Calf

[To face page 272]

AN OUTBREAK OF ACUTE AMPHISTOMIASIS AMONG CATTLE IN NELLORE DISTRICT

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(Received for publication on 12-1-1950)

Information regarding the incidence of Amphistomiasis in cattle, in South India particularly in the Madras State is rather meagre though the disease is reported to be common in central and northern India. It is difficult to say whether the disease is really rare in Madras as compared to other States or its existence has not been properly probed and brought to light. Viswanathan (un-published) seems to have noticed the disease in an epidemic form in one village in Nellore District during 1937. In the literature review made by Alwar (1949), mention is made about the recording of Amphistomiasis in a calf received for postmortem at the Madras Veterinary College in 1947. D'Souza (1948) speaks about the occurrence of the disease in 'Sopati' village of Hosur Taluk, Salem District, while describing an outbreak of the disease among sheep at the Livestock Research Station, Hosur, but has not given a complete detail of the outbreak. Besides these, we have not heard of any definite outbreaks among cattle, involving large number of animals with complete details such as epizootology, symptoms, postmortem lesions &c. It is just to fill this gap that this paper is published.

During March 1949, while the author was touring in Nellore District, his attention was drawn by the Touring Veterinary Assistant Surgeon, Kovur, to a "disease simulating Rinderpest" prevailing at Buchireddipalayam of Kovur Taluk. On visiting the area and studying the outbreak in detail, it turned out to be one of Amphistomiasis.

Epizootology:—The locality i.e. Rebalakottam, where this condition was investigated is a low-lying swampy area with no proper facility for drainage. During summer season, there is no other source of water supply for animals than the stagnant ponds and roadside ditches. At the time of the outbreak, the ponds and ditches were partially drying up and swarming with weeds and snails—mostly of the *Indoplanorbis* and *Vivipara* species. Animals were kept in two groups by the same owner—All the cows and young stock were in the above mentioned area. The work bullocks were at a distance of about a mile. That place was better drained and there was almost a perennial supply of running canal water. The disease was confined only to Rebalakottam, whereas the animals at the other locality were completely free.

The disease started by the 11th of March 1949 and continued for a month. It was purely confined to cattle and no buffaloes were mentioned. Out of a total stock of 100, thirty animals were attacked and 15 died. Ten were

adult cows and 5 were calves between 1½ to 2 years. The duration of illness may be about 10 to 14 days. From the enquiries conducted, it was seen that no animal had died with less than a week's illness.

Symptoms:—When the author visited the scene on the 25th. March, six animals had already died and fourteen were ailing and were in different stages of the disease. The first symptom was the staring coat and slight dullness, which very often escaped notice. Slowly a watery oedema developed at the jowl which descended along the dewlap to the sternum or even a little beyond. The oedema was soft to the touch and pendulous, and can be distinguished from the hard and tough swelling of Haemorrhagic Septicaemia. In great majority of the cases, thermal reaction was absent. Appetite and feeding were almost normal till about two or three days prior to death. There was no watery discharge either from the eyes or nostrils. In short, for all outward appearances, the animal looked almost normal. It moved with the rest of the herd and also grazed. Day by day the oedema developed, increasing towards the evening and decreasing in the morning. In three or four days after the appearance of the swelling, the dung became loose and eventually watery and shooting. It was dark green in colour and foul smelling. In the later stages, the frequency of the motions increased and the animal passed watery stools almost every hour. With the advancement of the diarrhoea, visible mucous membranes became paler and paler and almost white and bloodless. In the last stages, feeding also got affected and the animal exhibited extreme weakness and emaciation. It generally lagged behind the herd or preferred to lie down. In this condition it lived for one or utmost two days and died of exhaustion and weakness.

Thermal Reaction:—Temperature was recorded in a batch of twelve animals in the different stages of the disease Viz. Oedema or the initial stage, oedema and diarrhoea or the middle stage, and the advanced or the last stage.

Of the five animals in the initial stage, having only oedema of the throat only two showed 105° and 104° as the peak temperature. Of the other five animals that had simultaneously oedema and diarrhoea, two animals showed 104.2° as the highest temperature. The above readings were only evening temperatures. In the remaining two advanced cases, the temperature went to subnormal just before death. From the above it can be inferred that in the majority of cases, thermal reaction is absent.

Microscopical Examination:—Smears and faeces were collected from eight sick animals and examined. All the smears were negative. Ova of Strongyles species were found in two of the faecal samples.

Postmortem appearances:—A total of six postmortem examinations was conducted—Four by the author and two by the local staff. Four were cows over four years and two were calves aged two years each. Examination

of the smears from auricular vein was negative for Anthrax. Immature forms of amphistomes were seen in four out of six cases. The other appearances present were more or less similar in all the cases. The following were the chief lesions:—No bloody or other discharges were seen in the natural orifices, excepting the presence of liquid faeces at the anus, perineal region and tail. Visible mucous membranes were extremely pale and anaemic. On opening the carcase, blood was found to be very watery. The oedema of the jowl and dewlap, on being incised, contained clear watery effusion and could be easily distinguished from the sero-gelatinous exudate met with in cases of Haemorrhagic Septicaemia. The peritoneal, thoracic and pericardial cavities contained clear watery effusions to their fullest capacity. The effusion was as clear as ascitic fluid and was free from any deposit. All the internal organs and serous membranes presented the appearance of extreme palidity. The liver was free from any flukes and almost normal in size and consistancy. No change in size or consistancy was noticed in the spleen or the kidneys. Gall bladder was invariably found distended with thin watery greenish bile. Mucous membrane was bile tinged. Omentum and mesentery were infiltrated with the oedematous fluid.

The first three compartments of the stomach were normal. Rumen contained a large number of Amphistomes. In some cases the worms were also in the initial stages of development. On opening the abomasum and intestines, the pyloric orifice showed patchy congestion with the presence of innumerable number of immature amphistomes embedded in the mucous membranes. Patechial haemorrhages were also noticed. In some cases mucous membrane showed catarrhal thickening and pinpoint depressions. The folds of the Abomasum were also infiltrated with the oedematous fluid. The parasites were of the size of a sago grain having the colour of the pomegranate seed and were arranged in a patch round the pyloric orifice. The duodenum showed similar inflammatory changes and also the parasites up to a varying length. While in the majority of the cases, it was noticed up to 1½ to 2 feet, in one case, Cow No. 2, it was like a continuous marching line of ants up to a distance of seven feet from the pyloric orifice. The other portions of the intestines did not reveal anything unusual. The mesenteric lymph glands were swollen and oedematous. No abnormality was noticed in the thoracic organs excepting slight oedema of the lungs.

Smears from the heart, liver and spleen did not reveal any pathogenic organisms. Cultures from the heart also were negative. One rabbit and a buffalo calf were subjected to biological test for Haemorrhagic Septicaemia with negative results.

Snails from the locality, Amphistome worms both mature and immature forms, pieces of abomasum and small intestines were collected and sent to the Principal, Madras Veterinary College, and the results are as follows:—

- (1) Immature amphistomes from calf No. 4—probably *Gastrothylax crumenifer*.
- (2) Mature amphistomes from calf No. 4. and cows 2, 3 & 6—*Gastrothylax crumenifer*.
- (3) Mature amphistomes from cow No. 5.—*Fischoederius* Species.
- (4) Immature amphistomes from Cow No. 5—Immature forms probably *Fischoederius* Species.
- (5) Snails—*Indo-planorbis* and *Vivipara* species.

Treatment:—A batch of twelve affected animals and seventyfive incontacts were treated with copper and ferri sulphate—one drachm each in eight ounces of water for the adults and half the dose for calves. For want of Carbon Tetrachloride or Tetrachlorethylene (I. C. I.) the above drugs had to be used. All the animals were given a dose in the morning and food and water were withheld for about eight hours. Then they were allowed some conjee water. Next day the incontacts were given their usual feed and sent for grazing in a different direction with strict instructions to cattle men not to water them in the pond. The sick animals were kept indoors and were carefully nursed with conjee water and salt and soft green grass. The worm dose was repeated for these animals on the fourth day. Most of the sick animals were in the initial stages of the disease, excepting two in the advanced stage and these two animals died while the remaining ten recovered. In the recovered animals the period of convalescence was rather prolonged. In one cow and a calf the oedema persisted for over a month. The owner was advised to change the pasture and give only well water to the animals. Instructions were given for the removal of the snails and weeds from the pond and burning them. The above precautions were enough to control the disease and there were no further attacks or deaths.

Discussion

Le Roux (1930) reported outbreaks among cattle and sheep in Orange Free State due to *Cotylophoran cotylophorum*. Moghe (1945) recorded a high percentage of infection among cattle with *C. cotylophorum* and *Gastrothylax crumenifer* in Central Provinces and Bihar. Paramphistomum infection also appeared to be heavy in Central Provinces but somewhat mild in Bihar according to him. Srivastava (1945) recorded *C. cotylophorum* 3%, *Paramphistomum cervi* 38%, *P. explanatum* 3% in the various samples collected and examined by him from cattle from the Punjab, Northwest Frontier Province and Sind. D'souza (1949) has recorded only *C. cotylophorum* in a cow obtained from Sopati village near Hosur Cattle Farm. Thus, it is seen that from the survey conducted by the above workers *C. cotylophorum* seems to be the common cause of the above condition, while *Paramphistomum cervi* and

explanatum and *Gastrothylax crumenifer* come next in order. None of the above workers appear to have come across with *Fischoederium cabballi* in cattle in the investigations conducted so far by them.

In the present outbreak, specimens of worms were collected and sent from five animals—mature and immature forms from two, and mature forms alone from three. From calf No. 4 and cow No. 5 wherefrom both mature and immature forms were sent *Gastrothylax crumenifer* and *Fischoederius cabballi* respectively have been identified. From cows 2, 3 and 6 where from only mature forms were sent, *Gastrothylax crumenifer* has been identified.

Conclusions

(1) The total absence of *C. cotylophorum* which was almost a constant finding in other places, and the presence of *Fischoederius* which does not appear to have been noticed by other workers so far can be taken as an interesting finding in the above outbreak.

(2) Timely adoption of preventive and curative measures such as change of pasture, and source of water supply, administration of anthelmintics to both affected and incontacts, careful nursing and feeding of the sick seem to have controlled the outbreak, though the above measures have not been of much value in the advanced cases.

(3) Absence of thermal reaction in the majority of cases deserves to be noted.

Summary

An outbreak of Amphistomiasis among old and young cattle at Buchi-reddipaliaym of Nellore District is described. The locality is a low-lying swampy area. The infection was 30% and mortality 72% among the untreated and 16% among the treated animals. Oedema of the throat and greenish diarrhoea were the chief symptoms. Thermal reaction was absent in the majority of the cases. The extreme pallidity of all the organs with watery effusion in the body cavities were constant postmortem lesions. Immature Amphistomes were found in the abomasum and duodenum in four out of six postmortems conducted. The parasites were identified as *Gastrothylax crumenifer* and *Fischoederius cabballi* and the snails from the locality as *Indoplanorbis* and *Vivipara* species. The absence of *Cotylophoran cotylophorum* which is common in other places and the presence of *Fischoederius*, which has not been recorded by other workers are the interesting findings of this outbreak.

Acknowledgments

I am thankful to Sri G. R. Viswanathan G.M.V.C., P.G. (Edin.) Superintendent, Veterinary Biological and Research Institute, Ranipet (Madras) for the valuable information given by him on the previous occurrence of the disease

in Nellore District. Sri M. V. Chellapathi Rao, Touring Veterinary Assistant Surgeon, Kovur (Nellore Dt.) has rendered valuable assistance and I acknowledge with thanks his valuable help.

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TAYLOR COWS OF PATNA

By

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The origin of what are known as Taylor breed of cows dates as far back as 1856, when one William Taylor, the Commissioner of Patna Division, started an Industrial Institution by raising funds from the public. There was to be a breeding establishment of cattle, sheep and pigs as a section of this Institution. With this idea in view, this gentleman obtained four English bulls, each of which cost him as much as Rs. 600/-. The animals were very magnificent. There is no definite information as to the exact history or breed of these bulls. A close study, however, of the physical conformation of their progeny leads one to surmise that they were probably of either Jersey or Guernsey origin, as the features of these animals are more akin to them than to any other English breeds. It is said that these imported animals were the progenitor of the existing herd of the cross-bred cattle found in Patna. The Industrial Institution, however, could not survive through the troublous time of 1857. Taylor, however, retained the bulls with himself, and, after settling in Patna, started a small cattle farm at Lohanipur (a mohalla of Patna). He used these bulls for breeding purposes and hired their service to the local people on a stud fee of Rs. 20/- per service. The local *goalas* did not appreciate the value of the service of so costly a sire in the beginning, but later on when a number

of cross-bred cows with high-yield passed into their hands, they promptly recognised the benefit of maintaining such animals. They have been since then continuing this cross-bred strain without any aid or guidance from any quarters. In about 1900, the Patna District Board imported two bulls of high milk strain from Australia in order to revive the degenerating stock. These bulls, however, did not perform any service and died after only a few days of their arrival. The *goalas*, nevertheless, continued to maintain the strain through the degenerated bulls of the local and other cross-bred stock. The Patna District Board again purchased a few Montgomery bulls and stationed them in the Veterinary Hospital for breeding purposes. These bulls along with other non-descript bulls further contributed to the inter-mixing of varied characters leading to the production of mongrel stock of the present time.

The main results of this cross-breeding has been the breeding out of the hump which is one of the characteristics of the Indian Zebu, and improvement in milk producing capacity in the cows, whose yield ranged from 16 to 28 lbs. of milk per day. The male stocks, however, are delicate and cannot stand the heat or hard labour in deep water and mud on the paddy fields, although they are often used on good roads in bullock carts. The main drawback of this stock, however, lies in its increased susceptibility to tropical diseases like rinderpest and foot and mouth disease.

A brief description of the breed

The breed, for a number of years, had been localised within the Patna town area and its suburbs. It has, however, now gradually penetrated in the neighbouring villages and in certain cases even in the remotest part of the country side. The animals do not seem to thrive well outside Patna. It is perhaps due to extreme care and attention paid to them by the vendors in Patna.

The cows are mostly adopted to stall-feeding, because the town provides no facility for grazing. But on account of their high milk-yield, cows have been very much popular with the milk traders, who carry on trade in milk supply. Therefore, majority of the cows are reared and maintained by them. A fraction of the total strength of cow is, however, also maintained by private individuals for their domestic needs.

General conformation:—Due to considerable mixing of various breeds, it is not possible to define the breed, because wide variations are noticed both in performance and physical features. However, there are certain common features which are narrated below. They are of medium size, the average female in milk weighing 750 lbs. and the male 900 lbs. The body is disproportionate, the head being comparatively narrow and small in comparison to the body. The look is impressive, the gait light, easy and slow. The animals are mostly docile in temperament.

The main characteristics of the breed are the absence of hump and dew-lap. The horns are short and thin and are directed forward, upward and then inward.

The colour is extremely variable, ranging from grey to various shades including spots and Zebra marks. The more common is, however, complete red, black or mottled white and red.

The head is small, narrow and tapering.

The forehead is narrow and almost flat or concave with a very shallow gradual depression in the centre. It is widest just above the eyes and narrow between the roots of the horns. The crest is absent and crest line is straight between the roots of the horns.

Face is broad above and tapering below with hollow temples. The muzzle is narrow with well developed nostrils. The bridge between the nostrils is straight or very slightly dished.

Eyes are small and give a peculiar sleepy expression. The muscular folds above eye-lids are prominent.

Ears are small, almost rounded with a blunt tip and alert.

Horns are thin, small and directed forward, upward and inward. The same thickness continues throughout the whole length with very slight or absolutely no tapering. The end is blunt.

The neck is short, thin and in a straight line with the body.

Dewlap is rudimentary, thin and free from any muscular fold but slightly more developed in bulls.

The chest is narrow above, but deep and capacious below.

The legs are well proportioned and muscular with shoulders merging well into the body. Upper arm fairly long and elbow subdued. Knee well developed and round. The shanks straight and the fetlock joints strong. The pastern is short and the digits set apart. The hoof is black and of medium size.

Barrel is deep, short and rounded. In females the front portion is narrow and light, and the rear portion wide, heavy and bulging. In males the rear portion is comparatively light and narrow.

The back is straight and long, merging in level with the withers.

The ribs are strong, well set and more curved in the lower two-third.

The navel-flap is absent in females or rudimentary. The sheath in male is not pendulous.

The hindquarters are practically in line with the forequarters in both the sexes.

The loins are broad and straight and hips flat and wide.

The rump broad and sloping, the pin-bones well apart in females.

The flanks are broad and deep.

Thighs are muscular, flat and wide. Buttocks well developed and muscular. The twist is strong and very less arched.

The tail is rather long, the switch is black and reaches upto lower-third of the shank.

The hocks are strong and are curved in females than in males.

The udder is well developed but not pendulous. Teats are of medium size and are set apart. The milk vein is prominent.

The skin is of medium thickness and elastic. Hairs are fine and of varied colour. The escutcheon is comparatively broad.

The breed is genetically heterogeneous containing blood of English, Sahiwal, Hariana and local breeds. The characteristics described above are on the basis of survey and study of only such animals which apparently show more features of the English breeds.

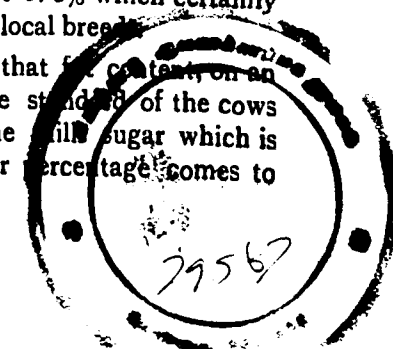
Present position :—Due to the absence of any breeding policy and absence of suitable male stock for upgrading, the breed is gradually deteriorating. The breeding is most indiscriminate and haphazard. A large number of cross-bred bulls of this heterogeneous stock are maintained by private persons for breeding purposes, who allow service on a fee of Rs. 2 to 5 per cow. The majority of these individuals belong to a class or caste of people known as *Nats*—a wandering tribe. A few of the *Gowals* and *Gaushalas* are also maintaining such bulls resulting in further mixing and deterioration. The *Nats* make a good living out of these bulls earning as much as Rs. 10 to 16 per day from each bull. As the male stocks are unsuitable for hard and laborious work, they are available at comparatively much cheaper rates and hence the *Nats* find it easy and financially convenient to purchase and maintain them.

The cows receive better treatment for their high milk yield. The average daily yield varies from 6 to 8 seers of milk, though individual performance even now goes upto 14 seers.

It has been a common notion that the milk of this breed is inferior in quality specially in respect of its fat content. The analysis of a representative number of samples, however, utterly contradicts this notion. It has been found on the basis of analysis of nearly 19 samples of milk, collected from different cows at various stages of lactation that the minimum fat percentage has in no case gone below 3.2 the maximum being 12%, the average for 19 samples worked out at 5.3% which certainly compares well with the fat percentage of any of the local breeds.

From the analysis records, it is apparent that fat content, on an average, is rather a little higher than the average standard of the cows milk, and so are the other constituent except the milk sugar which is slightly less than the standard average. The water percentage comes to

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86.86 which is less than the standard; this is because the total solids percentage has gone a bit higher than the standard. In short, on the basis of these findings, the milk of this breed cannot be said to be of inferior quality in respect of any of its constituents.

*N.B.:—Lactose, Protein, and Ash have been calculated by formulae and they are only approximate and not exact.)

Scope of improvement:—Though the breed has degenerated much, still it has a great potentiality for milk production. There is ample scope to exploit this breed by judicious breeding and improving their milk producing potentiality. Though complete data are not available about the total strength of this breed as no census appears to have been ever taken, yet from the enquiry it appears that there are nearly 1500 cattle in Patna town alone, excluding approximately 1000 in the neighbouring villages. Selected cows out of this lot, containing more of the original blood, can very well form a nucleus of a dairy herd, suited mostly for the town, if breeding is done by introducing some fresh blood of the original strain and carried out under expert hands. The males should be castrated and scrupulously prevented from procreating till they come to a stage containing nearly 15/16th of blood of the original strain. If controlled breeding under proper guidance is undertaken, there is no reason why the milk producing capacity of this breed cannot be improved. The improved milk production will solve the problem of milk demand of Patna town, which is a chronic sufferer in respect of proper milk supply.

In order to improve this breed, the Animal Husbandry Department, Bihar, proposes to take up the following course of action:

(1) About half a dozen English bulls, preferably of Jersey breed, would be imported and maintained by the Government in different parts of the town. The services of these bulls would be free but allowed only to approved cows, which have been previously marked for identification and admitted for breeding. This out-crossing would have to be continued till the progeny comes to contain 15/16th blood of the sires used. After this stage is reached, it would not be necessary to continue out-crossing, but breeding will have to be done very cautiously as throwing of undesirable characters may happen and if not controlled by expert hands, degeneration may begin to set in.

(2) The use of Tharparkar bulls or their semen by artificial insemination method to cows of this breed would be forthwith stopped.

(3) Pending arrival of fresh English bulls, the breeding would be allowed through the best available Taylor bulls only.

(4) All the stray and nondescript private bulls would be castrated or withdrawn from the town.

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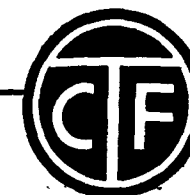
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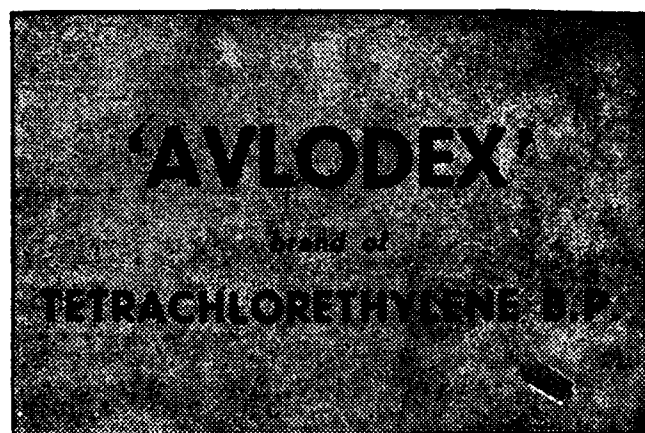
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Editorial

THE NEW YEAR

'Let us make this New Year a turning point in our National life; let us make a fresh start and light again that old flame in our hearts which warmed us when the struggle was fiercest. Let us above all co-operate all together in the services of India'. This exhortation and appeal of our Prime Minister Nehru to the men and women of India 'on the eve of the New Year and a new half century' must readily evoke a quick and willing response from one and all in the country. The first three years of our Independence have been full of unprecedented calamities and cataclysms for our country, and people have been subjected to untold suffering and distress, mainly from an unkind nature in the form of earthquakes, floods and failure of monsoons. Our food problem has continued to be one of great anxiety. All the same, as our Prime Minister has said in his inimitable way, 'we will survive the test, for something of the old courage and determination is in us still, and whether danger threatens us from within or from without, we shall face it calmly and unflinchingly, remembering always the great master who led us.' With this optimism, we enter on our duties during the beginning of the second half of this century and, in wishing all our readers a very prosperous and happy New Year, we earnestly appeal to all of them to give us their unstinted co-operation in the discharge of our work in the service of our land.

As we have been repeatedly stressing in these pages, the role of Veterinarians in the body politic and in the solving of our

food problem is extremely vital and of great potentialities. The import of foodstuffs and milk powders from foreign countries is a standing discredit to all of us possessed as we are in this country with plenty of land and livestock. True, these have remained neglected for a long time but that is no reason why they should not be developed in the shortest time possible. We have the greatest advantage of our scientific equipment and attainments. And, therefore, with earnestness, zeal and cooperation all round, the work becomes a pleasure and, remembering the example of our revered Prime Minister and his team of hard-working earnest enthusiasts, we all should strive our utmost to get over our present gloom and light again 'the old flame' in us.

'A GIANT AMONGST MEN'

The death of Sardar Vallabhai Patel, the Deputy Prime Minister of India, on the 15th December 1950, has plunged the country into a profound gloom and has removed from our midst a magnificent personality of strong will and great wisdom who had wrought a wonderful piece of work in unifying and building up this great country. He was very well known as the right hand man of Mahatma Gandhi and that what Gandhiji willed, the Sardar carried out. A person of indomitable courage and great resourcefulness he was 'the principal pillar of the edifice of which Gandhiji was the architect and Pandit Nehru is the corner stone'. Behind the stern and firm-set features, which gave Sardar the title of Iron man, lay a very genuine warm heart full of human kindness and generosity. He distinguished himself as an outstanding administrator of our Republic and the services had a great champion in him. Hailing from the rural parts of Gujarat, he had a firm grasp of the economy of the country. Speaking on the occasion of the opening of the Goshala Exhibition at Haripura Congress in 1938, he spoke feelingly about the condition of our cows and their improvement and said 'We have undertaken this work (of preserving cows) when the cow is on the verge of destruction and this will have a great value in the near future'.

The death of such a great soul at this time is an irreparable loss to our country. As our Prime Minister Nehru very poignantly and with great feeling expressed, 'Many calamities have fallen on us, bringing distress to our people. But the greatest of these calamities and sorrows has been the passing away from amongst us of a giant amongst men'. He added further that the burden which his broad shoulders carried so lightly has now to be shared by all of us. The one way in which every one of us can share that burden, which has now to a great extent fallen on our Prime Minister, is for every man and woman to do his duty truly and well. That is the greatest tribute one can pay to our dear departed leader.

Clinical Articles

CAESARIAN SECTION IN A COW

BY

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Subject:—A white local bred cow, aged 5 years.

History:—On 8-11-50 afternoon, the owner of the cow in question brought it to the dispensary for treatment with the history that the cow was in labour pain three days back and that no delivery had taken place.

Symptoms:—On examination the cow was found to be dull and depressed. There was foetid discharge from the vagina, the vulval lips were swollen and oedematous with denuded patches while the vaginal mucous membrane was congested and began to bleed even on the slightest handling. The calf was dead and decomposed, and was found in anterior presentation with lateral deviation of the head. Evidently the cow had been badly handled by the **Gaikis* before she was brought to the dispensary for treatment.

I tried my best to take out the dead foetus by manipulation but all in vain. The owner was informed of the grave prognosis of the case and with his consent, I decided to perform caesarian section.

**Gaiki*, is the term locally used for the herdman of the village who generally looks after the cows of the villagers,

Technique:—As a preliminary precaution, Tetanus Antitoxin 25 c.c. and Soluseptasine (M&B) 20% solution 80 c.c. were given hypodermically on both sides of the neck of the cow. It was then given one ounce of Chloral Hydras as a drench in rice gruel and was secured on its left side. The right flank was shaved and thoroughly cleaned with hot water and soap and then with alcohol.

A clean straight incision about 10" long was made from a point equi-distant from the external angle of ileum and the last rib and carried forwards and downwards in the direction of the internal abdominal oblique muscles. Firstly the incision was made through the skin and then through the muscles. The peritoneum was carefully incised and opened to the extent of the external wound. The uterus was brought out and was opened very carefully to prevent the uterine discharges getting into the abdominal cavity. The cut edges of the uterus were sutured to the external wound through the muscles and skin. Wide sterilised towels were spread around the wound and finally the foetus was taken out along with the membranes. Mopping of the uterus was done with Tr. Benzoin Co., Sulphonamide powder was dusted and smeared over the uterine wall and the wound was sutured with Lembert's sutures using catgut. The edges of the external wound were sutured by interrupted sutures, one for abdominal muscles with catgut and the other for the skin with silk ligature. Sulphonamide powder was dusted on the skin and muscle sutures.

Post-operative treatment:—The cow got up within three hours. Then country Arrack was administered as a stimulant drench.

9-11-50. The genitalia were douched with Potas Permanganus lotion 1 in 500.

(2) Lugol's solution of Iodine 20 c.c. was given intravenously.

(3) Sutures were painted with Tr. Iodine.

(4) Sulphonamide—4 drams was given mixed with soft jaggery twice daily. Only rice gruel and bran were given as feed.

10-11-50. to 16-11-50. The above treatment was repeated with the exception of Lugol's solution of Iodine injections, which were given thrice on alternate days.

17-11-50. Signs of suppuration under the skin were noticed. Therefore, some of the dependent sutures on the skin were removed and the part treated antiseptically with dressing oils. The abdominal sutures were intact and there was already union of the abdominal muscles.

18-11-50 to 21-11-50.—Treated the wound antiseptically with dressing oils.

22-11-50. The cow was discharged cured.

The photo of the cow after her discharge from dispensary could not be taken as there was no means of taking the photo.

The case is recorded only to show that caesarian section in cows can be undertaken with safety, provided a careful attention to surgical technique is observed. I had occasion to perform five caesarian sections in cows up till now. Out of these I was unsuccessful in three operations.

I am grateful to the staff working under me for their careful co-operation and for their keen interest in this operation.

SALMONELLOSIS IN CHICKENS

(A field and Laboratory study of an outbreak)

By

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This is a short account of an outbreak amongst chickens due to an organism belonging to Salmonella group that caused heavy losses on a farm near Poona. The diagnosis of salmonellosis was based upon the constant isolation of salmonella organisms. Out of a number of blood smears from the heart and from internal organs examined throughout the outbreak, at no time was it possible to demonstrate salmonella organisms in them, although it was possible to isolate them in cultures prepared from these organs.

Significant facts in the history of the outbreak:—In November 1949, duck's eggs that were kept for hatching failed to hatch in spite of the fact that embryos had developed to size. Attempts to isolate salmonella organisms from these failed. In the same month another brood of 18 ducklings, that hatched out, died during the first week of their lives. Subsequently the percentage of 'dead-in-shell' in chicken eggs started getting high (probably due to infection acquired in the incubators which were not properly disinfected) and during the month of December '49, January, February and March 1950, a number of chickens that were hatched out alright died between 0 to 12 days. Thus the source of infection, though could not be proved conclusively, appeared to me to be the duck's eggs.

Almost every hatch from November to February had a high percentage of dead-in-shell, nearly about 50. Amongst the chickens that were hatched out,

over 50% died during the first week; deaths usually continued up to 12th day hatching, whereafter there was no mortality whatsoever from salmonellosis. Thorough disinfection of incubators with formaldehyde vapour helped to minimise the percentage of dead-in-shell, but mortality in the brooder houses continued very nearly till the close of the hatching season.

Clinical picture:—There were hardly any symptoms shown by the suffering chickens. The chickens dozed off for a few hours (up to 24 hours some times) and then died. Diarrhoea, with dried pasty material sticking to vent, was marked in a few cases. Post-mortem lesions were more or less constant and included paleness of internal organs, serous exudate under the skin, small white necrotic spots on the liver. Yolk sac was of considerable size (walnut size) and sometimes presented greenish discolouration. Gall bladder was distended in almost all cases. The mortality was always over 50%.

Treatment:—The treatment consisted mainly in sanitary measures, disinfection of incubators and brooder houses. The last named, however, could not be disinfected satisfactorily. The feed was changed to butter-milk but this had very little effect on mortality which continued in brooder houses till the hatching season came to an end.

Isolation of organisms from Dead-in-shell:—A good number of dead-in-shell were broken open and cultures were prepared from yolk sac, heart blood and emulsion of liver and spleen of the dead chickens.

The following organisms were isolated:—

(1) *B. coli* (2) *B. aerogenes* (3) *B. alcaligenes* (4) *Pseudomonas pyocyanea*. With the exception of the last named organism which is occasionally responsible for meningitis in man, none of the others is normally pathogenic. It is difficult to say if the occurrence of these, particularly the last named, has any significance when they occur in eggs.

Isolation of organisms from chickens:—Out of 127 chickens post-mortemed during the course of the outbreak, isolation of salmonella was attempted in about 30 cases. Out of these it was possible to isolate salmonella organisms from 16 cases. Material from 20 chickens was sent to Indian Veterinary Research Institute, Mukteswar, where organisms of salmonella group were isolated from 9 cases. When the isolated strains were put to biochemical and serological tests, all were found to be belonging to group E of the Kauffmann-White Scheme for grouping salmonellas. According to the work done in collaboration with the Army Pathological Laboratory, Poona, the organisms were identified as *Salmonella anatum*. Isolation of strains of salmonella organisms was possible from spleen, liver and yolk from yolk sac. It appeared that yolk sac is a valuable organ for isolation of salmonella organisms.

Experimental infection:—All the 5 isolated strains were put to pathogenicity test by injecting culture washings. Ten-day-old cultures were used for the purpose. The culture washing was prepared by taking a loopful of organisms and diluting them in 5 c.c. of double distilled water. Chickens were specially hatched out for the experiment away from the scene of outbreak. One-day-old chickens were injected subcutaneously with culture washings, the dose being 2 c.c. Four chickens were injected with each of the isolated strain. All the 5 strains proved highly pathogenic and all the injected chickens (with the exception of controls) died within 22 hours of inoculation. Adult birds injected with these strains however failed to show any illness at all.

Summary

(1) Outbreaks due to salmonella infections do occur amongst chickens, but very few are on record in India as caused by the specific organism *Salmonella anatum*.

(2) Salmonella organisms could be isolated on many occasions from liver, spleen and yolk sac. The last named rarely failed to reveal the organisms.

(3) Pathogenicity test with the isolated strains revealed the high pathogenicity of these organisms for one-day-old chickens, though adults failed to show any illness.

(4) Treatment with butter-milk as substitution for feed was not of much use, though disinfection of incubators was of some use in minimising the percentage of dead-in-shell.

Work of testing the layers on the farm with antigen prepared from the isolated strain is in progress.

AN UNUSUAL OUTBREAK OF HAEMORRHAGIC SEPTICAEMIA IN CATTLE AND BUFFALOES

By

H. V. KULKARNI, G.B.V.C.,

Disease Investigation Officer, Bombay State, Poona

Introduction:—During the month of December 1949, a report about sudden deaths of cattle and buffaloes in one of the Rabari colonies in the Gujrat was received. A visit was, therefore, paid to the place to investigate the disease. On the day of my visit to the colony, one cow was detected to be ill exhibiting the following symptoms:—

Symptoms and Diagnosis:—Temperature 106° F, respiration laboured, sterterous breathing, frothy saliva, swelling in the region of the throat and dewlap—hot, painful and doughy in the beginning but afterwards tense—mucoid secretions from the nose and lachrymation. Dung was a little loose and coated with mucus. Microscopical examination of the blood of the said cow revealed the presence of organisms indistinguishable from *Pasteurella bovisseptica*.

Treatment:—The cow was injected intravenously with 250 c.c. of H. S. serum but without any effect and the animal succumbed to the infection after an illness of about 18 hours.

Post-mortem lesions:—Postmortem was conducted and the following lesions were noticed.

Sero-gelatinous exudation under the skin of the throat, abomasum and some portion of the intestines deeply congested, lungs hyperaemic, pin-head haemorrhages on the heart muscles; liver and spleen normal. Smears prepared from the internal organs such as heart, liver, spleen, as well as from peritoneal fluid were found positive for the presence of bipolar organisms.

Biological and cultural test:—A little quantity of blood of the cow was drawn and injected intravenously into two rabbits and both the rabbits died within 12 to 15 hours. On post-mortem examination, the diagnostic symptom of haemorrhagic trachitis was observed. The blood and tissue, on microscopical examination, were found teeming with bipolar organisms.

Heart blood of the rabbits as well as the blood of the affected cow was sown on agar slants and after 24 hours, surface colonies appeared on agar as small translucent dew drops. Films prepared from the growths were examined with positive results for the presence of bipolar organisms.

Material collected from this case as well as smears prepared from the growth on agar slants were forwarded to the Indian Veterinary Research Institute and the diagnosis was confirmed.

All the animals of the colony were immediately protected against H. S., with H. S. Serum and the outbreak was brought under control.

Out of 382 cattle and 40 buffaloes maintained at the colony, there were 35 attacks (23 cattle and 12 buffaloes) and 35 deaths (100% mortality) within a period of 4 days.

Discussion:—The special feature of this outbreak of H. S. is that it occurred in winter (December) which is quite an odd season for this disease. As is well known, outbreaks of H. S. occur immediately after the summer rains. There are two views regarding the pathogenicity and source of infection of Haemorrhagic Septicaemia. One is that the pathogenic organisms vegetate in the open, especially in the damp soil, and, when they gain access to the

bodies of animals with reduced resistance give rise to the septicaemic condition and that the bacilli, which have become more virulent by animal passage, now infect animals whose resistance is normal.

Another view is that, in the bodies of healthy animals, pasteurilla live as harmless saprophytes in a non-virulent form, particularly in the upper air passage and become virulent occasionally. In this outbreak, it is to be inferred that the first cases occurred in carrier animals whose resistance and vitality had become reduced under unhygienic and insanitary environments and also due to the incidence of other contagious diseases such as Foot and Mouth and Rinderpest which were prevalent in the locality prior to the occurrence of this outbreak.

Conclusion:—Occurrence of Haemorrhagic Septicaemia amongst animals in the winter season is therefore a possibility when the resistance of animals is lowered from an attack of contagious diseases like Foot and Mouth or Rinderpest.

UNUSUAL INCIDENCE OF HAEMORRHAGIC SEPTICAEMIA

By

M. G. BHONSLE, G.B.V.C.,

Veterinary Assistant Surgeon, Mahuva, Surat, Bombay

Outbreaks of Haemorrhagic Septicaemia are, usually, reported in the monsoons, i.e. from July to October. I had not come across outbreaks of the disease as early as March. Recently, however, I received a report from a village, Sekhpor, 2 miles away from my headquarters. The report stated that there were 3 deaths among the cattle of a Parsee gentleman. I visited the place and inquired about the deaths. I was informed that three buffalo-calves of about 1½ to 2 years had died within 2 days. There were no attacks among the other cattle of the village. The symptoms as given out by the owner were that the buffalo-calves became sick suddenly, and that they were found grazing well the day before their sickness. They were found off-feed with a little tympany. There was profuse salivation, the throat was swollen and the animals had difficulty in breathing. The animals died within 24 hours with their tongues protruding out. The symptoms were suggestive of Haemorrhagic Septicaemia and I immediately arranged for a supply of H. S. Vaccine. Before I commenced the vaccination, there was another death in a buffalo-calf. I visited the place at once and conducted a postmortem.

P. M. appearances:—The carcass was of a buffalo-calf, about two years old. It was bloated, the tongue was protruding out and the throat was swollen. Before opening the carcass, I ascertained that there were no signs of Anthrax. On opening the carcass, some frothy discharge was found in the larynx. The lungs had some reddish patches. Liver and spleen were normal.

Nothing extra-ordinary was found in the stomach and intestines. I took smears of subcutaneous haemorrhage and of blood from heart and liver. Specimens of liver, spleen and lungs were also collected.

The whole material was forwarded to the Principal, Bombay Veterinary College, for microscopical examination. In the meantime, all the animals were vaccinated. I was informed later by the Principal, Bombay Veterinary College that the material was positive for Haemorrhagic Septicaemia. Thus it was ascertained that it was an unusual outbreak of H. S. in summer and hence is thought worth recording in the pages of this *Journal*.

PENICILLIN IN PERICARDITIS IN A BULLOCK

By

B. M. LAHIRI,

Lecturer, Bihar Agricultural College, Sabour.

The following article describes a case of pericarditis of non-traumatic origin which is of rare occurrence in cattle.

Subject:—A Sitamarhi bullock in good condition, aged about 6 years belonging to the farm of this Institute.

History:—The animal was taken for work in the Botanical section on 21-4-49, where it had an exposure to chilly weather all throughout the day, and it was returned in the evening.

Symptoms and treatment:—On the morning of 22-4-49, the bullock was found to be dull and depressed. It was then not allowed to go out for work. Temp. was 105°F., pulse was rapid but regular, shivering was present, respiration was slightly hard and no dung was passed. It was taken for a case of hyperpyrexia due to exposure to chill. Prescribed:—

R _x		
	M&B. 693	10 tablets
	Calcium Lactate	3 IV
	Sodi. Bicarb.	3 IV
	Glucose.	oz i

Mft pulv, one to be given thrice daily.

Next morning i.e. on 23-4-49, the temperature and other symptoms remained unchanged and the medicines were repeated. By the afternoon, the bullock appeared to be very dull and weak and was standing still with head hanging low and with an anxious expression. Temp was 105.6°F. While examining the chest, the heart beat was found irregular and violent, with a to and fro rasping sound with each beat of the heart. There was also a grunting sound emitted by the bullock when pressure was applied over the heart region. The bowels were not functioning at all and the animal was not taking any food except

some little water. Shivering was also present. Blood smears proved negative for bacterial and protozoal infection. A tentative diagnosis of pericarditis of non-traumatic origin was made and the following treatment was adopted.

1. Adrenalin chloride sol. 4 c.c. subcutaneously morning and evening.

R_x

2.	Pot. citras	...	2 drams
	Pot. iodide	...	1 dram
	Ext. punarnava liq	...	one oz.
	Tr. digitalis	...	2 drams
	Spt. aetheris nitrosi	...	half oz.
	Liq. ammonia acetatis	...	"
	Aqua	ad	8 oz.

Mft mist, to be given twice daily.

3. Penicillin-50000 units every 6 hours intramuscularly.

4. Fomentation over the heart region and application of Lin. Ammonia after fomentation.

Diet:—Glucose in drinking water, 2 lbs of fresh milk morning and evening with 5 lbs of rice and barley gruel. Fresh green grass was also kept within the reach of the animal.

24-4-49:—Temperature began coming down and by the afternoon it was 103°F. Heart sound getting regular though the rasping sound was present. 26-4-49 and 27-4-49. Marked improvement was noticed and the animal started eating grass placed before him although feeble friction sound was audible on the cardiac region. Same treatment was continued. In all 600,000 units of penicillin were given.

28-4-49:—The bullock started ruminating, taking food, passing dung and urine. The following medicines were further prescribed:—Pot. Iodide and Pot. Nitrates each one ounce, divided into four powders and one given twice daily in drinking water. Also Ferri Sulph 2 ozs. and Pulvis Gentian 4 ozs. divided into eight powders and one powder given once a day in feed.

On 4-5-49:—The bullock developed gastro-intestinal catarrh, passed large quantities of liquid dung with mucus and developed catarrh of the eyes and nose. It had lost much of its condition too. Pot. iodide powder was discontinued. Dung on examination was found negative for coccidia or worms. Prescribed Sulphaguanidine 10 tablets and Kaolin one ounce twice daily.

Diet:—Rice and barley gruel with soft green grass. When the diarrhoea stopped in two days he was given Ginger, Soda bi-carb and Pepper each 4 drams twice daily in food.

It had another relapse of dysentery on 15.5.49 when the following was prescribed.

R

Ext. Kurchi Liq.	...	4 dr.
Liq Ammon Bismuth citrus	...	4 dr.
Kaolin	...	4 dr.
Tr. Cardco	...	4 dr.
Aqua	...	8 oz.

Mft. mist to be given twice daily. Sulphaguanidine ten tablets twice daily.

When the dysentery was cured, the bullock was put on tonic powder. He has had no further trouble.

Notes and News

On December 12, 1950, Parliament considered Pandit Thakurdas Bhargawa's Bill for the preservation of useful cattle in the centrally administered areas.

Pandit Bhargawa said that it was of utmost importance that immediate steps should be taken to improve the breed of cattle, to increase the milk yield of cows and buffaloes, to ban the slaughter of useful cattle and unauthorised slaughter of cattle.

Mr. Thirumal Rao, Deputy Minister, said that Government were contemplating to introduce at the earliest opportunity a comprehensive bill to give effect to the main recommendations of the cattle Preservation and Development Committee. Among other things the bill would deal with all matters germane to cow protection.

The Committee had estimated that looking after unprotected and useless cattle would involve a non-recurring expenditure of over Rs. 24 crores and an annual recurring expenditure of 12 crores. The bill would provide for collection of funds for the purpose, asking for accounts of the lakhs and crores of rupees collected by charitable institutions in the name of Goshalas and management of the Goshalas which would have to be of a standard type. Pandit Bhargawa's bill on the other hand contained no constructive suggestion" and as the Bill now under preparation was proposed to be sent to a Select Committee, he would ask Pandit Bhargawa not to press his Bill.

Pandit Bhargawa said he had seen the provisions of the proposed bill and felt it would not satisfy the House.

Pandit Bhargawa's bill was supported by Babu Ramanarain Singh (Bihar).

On an assurance given by the Prime Minister, Mr. Jawharlal Nehru, that the Government would appoint a Committee to go into the question of adulteration of ghee, Pandit Thakurdas Bhargawa did not move his motion for a

reference to the Select Committee of the Bill to prohibit the manufacture of hydrogenated oils.

* * *

The Advisory Board of the Indian Council of Agricultural Research at its meetings held in New Delhi during January discussed various schemes of Agricultural and Animal Husbandry Research.

Some of the important schemes approved on animal husbandry were the continuation of the work on the evolving of a dual purpose cow which will give a fair quantity of milk and at the same time produce good bullocks to meet the needs of the country. This work has made good progress in the Punjab and Madras States with the Haryana and Kangayam breeds of cattle.

Another important scheme approved by the Board is to make India self-sufficient in her requirements of comparatively finer types of wool which are at present imported. Under this plan, rapid development in the production of finer wool is envisaged both by cross-breeding with imported Rambouillet rams from the U.S.A. and by selective breeding to be carried out in the sub-Himalayan hill ranges extending from Kashmir to Uttar Pradesh, and Rajasthan, Saurashtra and the Deccan plateau covering Bombay State with sub-stations in Mysore and the Nilgiris. This scheme is likely to cost about Rs. 4 lakhs spread over a period of five years.

To eradicate rinderpest, a pilot scheme was sanctioned for a large scale field trial in various States of a new vaccine obtained from rabbits. Another scheme approved was for the testing of cattle in Bihar against tuberculosis to find out the incidence of the disease and enable the adoption of control measures.

The annual general meeting of the Council adopted to-day the annual report and audited accounts for 1949-50.

"Hindu" 7-1-51.

* * *

'Bombay Ducks' flown to U.S.A.—The Bombay Duck is in the news. From the poor folk's kitchen it has been lifted into a fancied dollar-earner. But how many will identify it as a marine product? And how and by what canons of nomenclature this uglylooking, hideous-mouthed translucent denizen of the deep got itself confounded with its winged namesake is an unsolved mystery.

But writers in Bombay from the earliest times appear to have taken particular interest in it. Boswell in his 'Tour of the Hebrides' makes the following reference: "They make speldings in the East Indies, particularly in Bombay, and they call them Bumbaloes". Earlier still, Fryer writing about "Masse Goung" (Mazagaon) described it as "a fishing town particularly noted for a fish called Bumbalo, the sustenance of the poorer sort who live on them and "Batty (rice)".

The vernacular name for this fish is Bombil, Bumla, Bomli or Bomelo. Its scientific name is "Harpodon Nehereus". It is found in the sea from Zanzibar to China. In Bombay its season is from June to September. Though shunned by the upper classes, it is regarded by the poorer people as a delicacy. When dried, it looks like a small unappetising stick but fry it, and what palate could not invite more of this delicious savoury!

This popular variety of fish has earned the fancy of Americans and has become a source of earning Dollars. Recently the State Government of Bombay flew 17,000 "Bombay Ducks" to America after they had been cured and specially treated.

"Evening News of India" Nov. 24, 1950.

* * *

Shark Liver Oil in demand abroad.—Three thousand five hundred gallons of shark liver oil, which is in great demand abroad, was exported to U.S.A., the United Kingdom and Australia by the Bombay Government last year, according to information available in Bombay. The total value of the vitamin oil was about Rs. 86,000.

Another consignment of 1200 gallons of this commodity will be shipped to Iceland shortly.

Although the present annual production of the state-owned shark liver oil manufacturing laboratory is about 4,000 gallons, it is stated that the plant is capable of producing about 12,000 gallons per year and after meeting national requirements the State Government will be able to export 9,000 gallons to America and other Dollar countries.

"Evening News of India" Novr. 24, 1950.

* * *

Shark Liver Oil Capsules:—India's first plant for encapsulating Shark Liver Oil in gelatin pearls will be housed in a building which is nearing completion at Sasoan Dock, Bombay. The opening ceremony of the attractive one-storeyed building, which when completed will have taken about six months to build and cost the Government of Bombay nearly Rs. 90,000 was performed by Raja Maharaj Singh, the Governor of Bombay on Wednesday last.

The new building is an annexe to the existing squat unimpressive structure in which functions the Fisheries Technological Laboratory since 1946. The idea for the establishment of a laboratory stemmed out of the need for a search of a substitute to cod liver oil which during the last war had suddenly gone out of the market.

Elaborate and exhaustive tests had conclusively established that the vitamin content of shark liver oil was far greater than that of oil obtained from the cod. Recognition of its nutritional value and its dire need to the under-

nourished populace of this country induced the Government of Bombay to undertake the manufacture of shark liver oil on a commercial basis in 1944.

The Laboratory is responsible for a marked improvement in the quality of the oil extracted and its increased output. The output today is 5,000 gallons a year as compared to 2,000 gallons in 1944-45. Besides its contribution to the well-being of the undernourished in India, the Laboratory has also helped in earning valuable foreign currency. During 1948/49, the Department exported 3,500 gallons of neat shark liver oil to the United Kingdom, the U.S.A. and Australia and a consignment of 1,200 gallons is awaiting shipment to Iceland.

An outstanding achievement of the Laboratory is the introduction of Indian shark liver oil in gelatin capsules under the trade name of "Elasmin Pearls"—a pioneer enterprise in the country.

The department has so far sold 8,45,000 pearls besides large quantities of bottled and tinned shark liver oil under the trade mark of "Bombay Brand" and "Elasmin Liquid." Specially prepared oil is also being supplied to various farms in the State and commercial concerns.

Other activities of the Laboratory comprise the manufacture of fish meal, gelatin from fish maws and glue for photo-process work. The manufacture of process glue and gelatin, however, are still in the experimental stage but hold a promise of substantial income. Research is also being conducted at the Laboratory on curing and tinning of dry Bombay Ducks for export to the U.S.A.

The encapsulating plant, purchased from the U.S.A. at a cost of Rs. 30,000 has already arrived in Bombay.

"Sunday Standard", Novr. 26, 1950.

* * *

The supply of grass to stable owners in the suburbs of Bombay continues to be scarce, according to the Evening News of India. Normally the supply improves, says the paper, with the arrival of the new crop at the beginning of November each year. But according to the stable owners and grass dealers, an artificial scarcity in grass has been created by the 'short-sighted policy' of the Civil Supplies Department in connivance with the Milk Commissioner. This situation, it is said, will not be changed till the 'stock-piling' in Arey Colony—the Government sponsored Milk Colony—is completed. The affected persons are stated to be approaching the High Court which is the only appeal left or resort to satyagraha. It is hoped that on humanitarian considerations, if on nothing else, the sufferings of the dumb animals due to scarcity of fodder will be removed very soon without resort to legal or direct action.

* * *

Shaw Vs. Mynah:—Bernard Shaw's visit to Bombay in the winter of 1933 is recalled by a correspondent, Mr. D. S. Laud, at that time Superintendent of the Victoria Gardens.

A keen interest in the *mynah* or Indian starling took Mr. and Mrs. Shaw to the Victoria Gardens in the company of Mr. Chunilal V. Mehta. At that time the aviary housed two pairs of *mynahs* of which one male was a talking bird and used to repeat: "*Mynah, mynah; Allah, Allah*".

Whether the *mynah* was bold enough to make conversation with Mr. Shaw is not recorded but the two kept admiring each other for nearly half an hour. Mr. Shaw left the Gardens wiser in the knowledge of the habits of the *mynah* and Mr. Laud returned home after an exciting evening richer by Shaw's autograph in a copy of the catalogue of Plants for Sale in the Victoria Gardens.

* * *

The Veterinary Record for 2nd December 1950 mentions that Sir Frank Ware, C.I.E., F.R.C.V.S., has been offered and has accepted the post of Consultant Veterinarian to the Canadian Government and that he entered upon his duties at Canada House on Monday of last week. Our readers will remember that Sir Frank Ware was till lately the Animal Husbandry Commissioner with the Government of India.

* * *

News comes from Malaya, that Mr. R. S. Narayanan has been appointed to the substantive post of Deputy State Veterinary Surgeon, Kedah, with effect from 17-9-48 and that he is acting as State Veterinary Surgeon, Kedah/Perlis with effect from 8-2-49.

* * *

Jan. 17th, London.

Vaccination against Small-Pox.—Dr. C. Killick Millard, medical officer for Leicester from 1901 to 1935 says that vaccination has a definite tendency to spread small-pox and what is most important, small-pox often of a virulent type.

"It does this because, after its full protective effect is worn off, it mitigates an attack. It is thus very apt to mark the true nature of the disease. The modern methods of controlling small-pox, chiefly isolation and close surveillance of contacts, depend entirely for their efficacy upon prompt recognition of each case.

Writing in *the Lancet*, Dr. Millard argues against universal vaccination of the general population U.P.I.

"The Hindu", Jan. 19, 1951.

College News

MADRAS VETERINARY COLLEGE

The following candidates have passed the Final Examination of the Veterinary and Livestock Inspectors' Course held in November 1950 (Supplementary) at the Madras Veterinary College:—

- | | |
|------------------------|-------------------------------|
| 1. Abdul Gaffoor, A. | 8. Muthukrishnan, S. M. V. A. |
| 2. Arunachalam, P. N. | 9. Nagasubramanian, A. |
| 3. Chandrasekharan, S. | 10. Ramakrishnan, M. C. |
| 4. Krishna Singh, A. | 11. Ramaswamy, R. |
| 5. Kuriachan, P. T. | 12. Sankaranarayana Rao, N. |
| 6. Muhammad Sikandar. | 13. Srinivasan, T. P. |
| 7. Murugesan, C. | 14. Varakot Ramachandran. |

Madras
15th Novr., 1950. }

DR. I. M. AZIZUDDIN,
B.A., G.M.V.C., B.V.Sc., Ph. D. (Edin),
Principal.

Correspondence

RECRUITMENT OF VETERINARY OFFICERS

The Editor,
The Indian Veterinary Journal.

Dear Sir,

1. *Veterinary officers in RVFC*—The terms and conditions for the grant of permanent regular commission in the Veterinary Wing of RVF Corps are laid down in Army Instruction No. 219150. The main features are.—

A. *Eligibility*—A candidate must be.—

- (a) a citizen of India, or
- (b) a Gurkha, or
- (c) a person in whose favour a certificate of eligibility has been given by the Government of India.

Qualifications—A candidate must have passed a B.V.Sc. degree of an Indian University.

Age limits—A candidate must have passed his 20th birthday but not his 28th birthday.

- (a) on the date of submission of application in the case of civilians, and
- (b) on the date of grant of emergency or short service regular commission in the case of serving officers.

Medical Standard—Candidates must be a Medical Category 'A' i.e. fit for service in any part of the world.

Method of Selection—Candidates who in the opinion of Director, Remount, Veterinary and Farms are prima facie suitable for such appointments will be invited to appear before a Service Selection Board. Only those candidates who are graded acceptable for Permanent Regular Commission by this board will be considered for the grant of P.R.C. subject to the number of vacancies.

Rates of Pay—Lieut. on appointment.

Lieut. Rs. 350/— p.m.

Capt. Rs. 450/— p.m.

Major Rs. 700/— p.m.

B. Whenever the recruitment of veterinary officers is contemplated an appropriate notice of recruitment with full particulars will appear in the leading newspapers.

2. **Veterinary Assistant Surgeon**—V. A. Surgeons are at present recruited on temporary basis but V.A.Ss. thus engaged will be eligible for permanent engagement when the same is contemplated. The age limit and qualifications prescribed for the same are as under :—

Age limits—A candidate should not be more than 25 years of age.

Ex-service men are also eligible provided their age is 25 years after deducting the period of war service from their present age.

Qualifications—Veterinary degree or diploma obtained at the recognised Veterinary Colleges in India.

Full details of terms and conditions of service together with application form can be obtained by the applicants on demand from the Officer-in-Charge, RVFC Records, Meerut Cantt.

Army Headquarters,
Quartermaster General's Branch,
Simla
21-1-51

Yours faithfully,
LT. COL. K. P. NAIR,
for Director Rem, Veterinary and Farms.

Association News

Proceedings of the 17th Annual General meeting of the Uttar Pradesh Veterinary Association held at Lucknow on 26th, 27th and 28th June, 1950.

Over 200 delegates—Veterinary Assistant Surgeons, Veterinary Inspectors and District Livestock Officers—from all over the state attended the conference. Besides, the Deputy Directors of Animal Husbandry, the Veterinary Investigation Officer and others also participated.

The conference commenced at 5-30 p.m. on Monday, the 26th June, 1950 in the premises of the Biological Products Section, Badshahbagh, Lucknow, under the presidentship of Dr. R. L. Kaura, D.V.M., M.R.C.V.S., Director of Animal Husbandry, Uttar Pradesh. After the recital of the National Anthem, Shri. K.G. Rau, Chairman of the Reception Committee, extended a cordial and hearty welcome to the Hon'ble Shri N. A. Sherwani, President Dr. Kaura, colleagues and visitors and spoke as follows :

At such a galaxy of professionals, guides and wellwishers it is necessary to review some of the problems confronting us.

Biological Product:—This section where we have assembled is at the moment engaged in mass manufacture of only two immunising prophylactic biologicals viz., Desiccated Rinderpest Goat Tissue Vaccine and H.S. Composite and/or Agar-wash Vaccine against two of the major cattle epidemics of the State as also of All-India importance. It is needless to say that this concern has been of immense saving to the province in that not only three epidemic local strains have been incorporated in this vaccine but also has been manufactured at a cost of little over Rs. 40,000 as against Rs. 1,70,000 which we should have had to pay in case of imports from other similar institutions. Shortly, when the additional rooms for laboratory which are nearing completion are made available, we should be able to prepare other products. I beg leave of the Hon'ble Minister to say that this section is capable of further developments if at least the accepted scheme is given effect to by the Peoples' Government which, temporarily I presume, is withheld for want of funds. The scheme of distribution of Rinderpest Vaccine by a carrier system has not been wholly satisfactory due to certain disabilities to the vaccine distributor and also the recipient leading to accusations and counter accusations. Now that the Government has been pleased to sanction his travel in a higher class conducive to transaction of business it is hoped the scheme would now be a cent per cent success. The provision of cold storage facilities so kindly approved by Government is not complete due to financial stringency and as many as 18 districts hospitals

are still to be provided with refrigerators. How well-planned and concentrated efforts would produce results of far reaching dimensions may be gauged from the activities of the department in the Mahewa tahsil where intense development work is going on in that no outbreak of H.S. and R.P. is reported from there.

Surra:—Bovine Surra, a counterpart of Rinderpest in so far as Protozoan infection is concerned, is on the increase and has to be tackled.

Veterinarian and Public Health:—It is common knowledge that milk, and to a great extent meat, are very essential factors for the nutrition of humans, specially the former, in a predominantly vegetarian country like ours. It is important to safeguard the quality of both these articles. All our slaughter houses are to be manned by veterinarians and thorough examination must be carried out as in other civilised countries. Every milk producing concern must be wholly controlled by veterinarians suitably qualified and there should be no dearth of them. Animals must be periodically tested against Tuberculosis and other communicable diseases.

Livestock management.—Breeding, feeding and management of livestock is the primary concern of the veterinarians and this department. There is no need to dwell on the existing poor state of the stock and the necessity to better their quality in good numbers. The cry of "Grow More Food" is a cry in the wilderness if we have no means of growing more good cattle, as without cattle the average kisan is at sixes and sevens and his agricultural operations with small holdings are at a standstill. Also 'drink more milk' slogan is of no significance if per capita production of the cattle is not increased appreciably by scientific means early. All this leads to better fodder, housing, higher plane of nutrition, better pastures and effective preventable disease control.

Grazing.—Since the report of Royal Commission on Agriculture in 1926, advances have been made in many subjects but this cannot be said of grazing. The provision of better grazing facilities is a necessary adjunct to any campaign for improving cattle in the country and is a vital one. It would not be out of place to quote J. A. Myers of Ohio who had said "Veterinarian of today is among the best educated citizens of his country. They are the best public health workers. No board of health in village, municipality, country, State or nation should be without one or more vets on its staff. Some of the world's greatest studies in public health have been made by vets. Still wherever I go I am distressed that few people know about them. I hope the veterinary and medical profession enter into a just effort to inform the world of this. There is a pleasure in the pathless woods. There is a rapture in the lonely shore. There is society where none intrudes". So is my feeling for this profession for the service of dumb creatures,

Gentleman, I am afraid I have taken much of your time when you are all anxious to hear the Hon'ble Minister. I thank you for the patient hearing and crave your pardon if I have said anything wrong or not very agreeable, but I can assure you this much that it was all for the profession and for its development to greater heights. Once again thanking you all, I now request the Hon'ble Minister for Animal Husbandry and Agriculture to inaugurate the Conference. Jai Hind.

The Hon'ble Minister for Animal Husbandry and Agriculture, Shri N. A. Sherwani, then declared the Conference open. He stressed the vital necessity of healthy livestock for any country, specially for a country like India, which was predominantly Agricultural. He felt sure that with the corporate endeavour of the technical men gathered here determined to work with enthusiasm the State will march ahead in improving its cattle.

The Minister recalled Pandit Nehru's apt remark that a country's real wealth was not its agricultural or mechanical output but the output of its men—human effort—and said that if they worked with sincerity and with the correct approach, they will soon succeed in doing well by their country.

He felt sorry that this country's cattle were the leanest in the world. "It is strange", the Minister remarked, "that it is so in a country that almost worships the cow". In the end, the Minister wished all those concerned and the delegates success and promised his whole-hearted co-operation.

After the inaugural speech, the President, Dr. R. L. Kaura, addressed as follows:—

Hon'ble Minister, professional brethren and friends,

It is my great privilege to extend a cordial and hearty welcome to all the delegates attending the 17th Annual Conference of the Uttar Pradesh Veterinary Association which I have the honour to preside and which aspires to make this meeting a bigger and better event than we had ever before. Such a conference quite apart from the social contacts with other professional brethren from all parts of the state provides means for the exchange of views and information on scientific subjects. Almost daily contributions are added to the fund of knowledge on various aspects of Animal Husbandry and the rapidly developing methods of disease control which necessitates the dissemination of such knowledge amongst field workers at frequent intervals. I hope the young veterinarians who have responded to the invitation issued by the Association in larger numbers will take more active part in the programme and discussions and exchange the results of their recent education and training with the mature view-point and judgment of the older members. I am sure their combined efforts will

help the department to achieve its objective viz., to suppress disease and to improve upon the health and productivity of livestock in the State and thereby ensure better nutrition for the people and better return from the land.

The Animal Husbandry has a much wider field of activity—on one side it makes a direct contribution to human health by providing milk, meat, fish, and eggs to the dietary of the human population and on the other it supports the agricultural production of the country by supplying animal labour which is the main motive power behind all agricultural operations and also farm-yard manure which has all along been the only source of fertiliser in most parts of the country. Even at the 14th International Veterinary Conference held in London last August, the theme of the Conference was "The world food situation" and it was emphasized that human food is a critical item and that it is worthy of serious consideration of the Veterinarians who protect the source of the health-protecting foods of animal origin. But, unfortunately, in our country, all animal husbandry schemes have been excluded by the Government of India from the purview of the Grow More Food campaign which cannot succeed without healthy and productive livestock. We hope that this serious omission will be set right before long and larger funds commensurate with the vastness and importance of our livestock wealth will be provided by the Government for its development. While America and Canada spend annually Rs. 77-9-11 and Rs. 20-14-5 per head on Agriculture and Animal Husbandry, India spends only Rs. 0-11-0 per head.

Gentlemen, there is a formidable task ahead of us as a profession. Uttar Pradesh possesses about 3 crores of cattle and buffaloes yet the per capita daily milk consumption is only about 5 ounces as against 35 ozs. in U.S.A., 39 ozs. in Great Britain, 49 ozs. in Switzerland and 56 ozs. in New Zealand. This is far below the nutritional standard. The bullocks are generally weak and inefficient especially in the eastern districts. The same is true of sheep. In the production of horses and mules too we have to achieve a great deal more now as the best horse and mule breeding areas have been left in Pakistan and our Army requirements in this respect have to be met. As regards goats, poultry, and pigs we are probably better off than most of the other States but still there is a lot more to be achieved. The outbreaks of contagious diseases continue to take a heavy toll of animal life every year. The losses among young animals are also far too heavy. If we don't save the young stock produced at considerable cost the farmer cannot make any money on them. In spite of the existence of fairly reliable vaccines and sera, losses from not a single contagious disease have so far been completely eliminated. Even diseases like Rabies and Glanders which are incurable and are communicable from animals to human beings have not so far been eradicated in this country. It is a pity that the control

of Rabies in India is mostly directed towards the treatment of human beings bitten by rabid dogs, although the more effective and economical method of its control as adopted in other civilised countries consists primary in the control and mass vaccination of dogs through whose bites the disease generally spreads to human beings and domestic animals. Therefore what we need is a single dose antirabic vaccine for dogs which should be immunised annually instead of giving series of injections to human beings in innumerable cases at the various Centres in the country. Practically the same is true of contagious diseases communicable from animals to human beings such as Tuberculosis, Brucellosis, Anthrax, Foot-and-Mouth disease etc. The country cannot afford to neglect these diseases for ever and the Veterinarian will have to play the important role in controlling them effectively in animals so as to eliminate the danger of their spread to human beings.

For the improvement of the quality of livestock, you have to replace in the largest possible numbers the ordinary scrub sires of various species of domestic animals by pedigree sires produced at the Government Livestock Farms in the State and popularise improved animal husbandry practices amongst the farmers to whom we should particularly bring home the economic advantage of inclusion of fodder crops, especially leguminous crops, in their crop rotation programme. You have also to make use of the latest advances made in the foreign countries in respect of animal husbandry so that we may develop the livestock wealth of our country more efficiently and expeditiously. For instance, we have to take up the use of lapinized and avinized virus against Rinderpest, Penicillin and latest Chemotherapeutic agents against bacterial and parasitic diseases, artificial insemination and transplantation of fertilised ova from valuable females to useless scrub females utilising them as host mothers. You have also to apply the latest knowledge of milk hygiene and animal pathology to improve our system of milk and meat inspection in the State. Indigenous system of veterinary medicine has also to be fully explored as it is more economical and suited for our rural conditions. Sheep breeding has to be based on results of wool analysis particularly in respect to rams if any useful results are to be achieved.

For the efficient and expeditious execution of our livestock development plans and disease protection service, an army of qualified veterinarians is required, but, unfortunately the Department has all along been running understaffed, so much so that in certain districts there is only one Veterinary Assistant Surgeon for two *tehsils* although our minimum requirement is one Veterinary Assistant Surgeon for each *Pargana*. Consequently, the Government started the U.P. College of Veterinary Science and Animal Husbandry at Mathura where there is a 4 years' course based on I.Sc., i.e. the candidates have to spend six years after matriculation to obtain the University degree of B.V.Sc. and Animal Husbandry unlike their other colleagues who obtained

G.B.V.C. after 3 years' course based on matriculation or their contemporaries in the Dairy and Agriculture Sections who obtain their diploma or degree after 2 and 4 years' training respectively based on matriculation but are getting the same scale of pay i.e. Rs. 120-250. The non-revision of the scale of pay for the B.V.Sc. and A. H. has adversely effected the admissions to the college which have declined from 55 in 1947-48 to about 45 and 37 in 1948-49 and 1949-50 respectively. It is therefore but fair that their scales of pay should at least be equivalent to group I, i.e. Rs. 200-350 though the scales of pay for Veterinary Assistant Surgeons in the Punjab who are also B.V.Sc.s go upto Rs. 450/- p.m. Promotion of Veterinary diplomats to Group I based on individual merit, special training and experience should however continue. The Uttar Pradesh is now the leading State in the Indian Union and should not therefore lag behind in this respect if proper use of the newly established College is to be made and proper development of our livestock wealth is to be achieved. Due to little scope for private practice available to Veterinary Graduates unlike their medical colleagues the proposed increase in the scale of pay becomes all the more necessary. Arrangements are being made by the Principal of our Mathura College with the Agra University to enable such Veterinary diplomats who possess the prescribed basic educational qualifications, viz., I.Sc. to obtain the degree of B.V.Sc. and A.H. after one year's further training at the College. I do hope that those fulfilling this condition would take full advantage of this facility in due course. With the dawn of independence our veterinary degrees have now better recognition and status in the world. The Royal College of Veterinary Surgeons in Great Britain also recognise our Veterinary degrees for exemption from the first three years' of the 5 years M.R.C.V.S. Course under Bye-Law 95 which was previously open to the graduates from the British Dominions only. I do not see any reason why for purposes of appointment we should not accept our Indian Veterinary Degree equivalent to similar degrees granted in other countries, but it is to the country's advantage if some of our Veterinary graduates obtain foreign training and experience as well so that our service may have the advantage of all that is best in the world, as is being done by other independent countries. While on the subject of veterinary education I would like to emphasize on my professional brethren that for the last five years or so of all the people sent abroad from U. P. for training in animal husbandry subjects only one is a Veterinarian and another Veterinarian got training at his own expense in sheep husbandry and wool development in Australia. At the Indian Veterinary Research Institute three out of six Sections have non-veterinarian sectional Heads and most of the other important posts in these sections are also held by non-veterinarians and the same is true of our own Livestock Research Station in U. P. I have nothing to say against our non-veterinarian colleagues for whom I have great admiration but obviously they had to be appointed because of the non-availability of veterinarians with proper specialisation who would every time be much more suited to successfully tackle and investigate livestock

problems whether these are genetical, parasitic or nutritional, etc. It is upto those of you who possess a degree in basic sciences along with the veterinary diploma or those possessing the veterinary degree to specialise in branches like veterinary helminthology, entomology, protozoology, physiology, nutrition, genetics, poultry sciences etc. so as to fill this gap and provide more efficient service to the country. Without an intimate knowledge of comparative anatomy, physiology and pathology of the various species of animals non-veterinarians feel greatly handicapped and cannot discharge their duties and responsibilities in the field of animal husbandry as efficiently as one would expect. It is therefore upto the veterinarians to equip themselves to take hold such of opportunities.

I shall be failing in my duty if I do not express my deep sense of appreciation of your loyal devotion to duty inspite of several odds with which you are confronted in the field including inadequate and untimely supply of medicine, but I would like to remind you that with the attainment of freedom the responsibility of every Indian has increased. If you want to save the country from the present food crisis and retain her hard-earned freedom you have to exhibit the same unity, efficiency, devotion to duty, discipline and individual effort and initiative as is exhibited by the nationals of other independent countries. This will also ultimately give you and your coming generations better living, greater happiness, and respect in the eyes of the world. There is no reason why we should not be able to achieve in the field of livestock production and their maintenance in health as has been achieved by veterinarians in other countries. I would also like to suggest that you should keep your professional knowledge upto date by reading current literature, write articles on anything that may come across in course of your technical duties, and take greater advantage of the Circle Laboratories. I would also like to suggest that you should keep your professional knowledge upto date by reading current literature. In this connection you might approach the local board concerned to subscribe to the Indian Veterinary Journal, Indian Farming, and Indian Journal of Veterinary Science and Animal Husbandry so that the Veterinary and Animal Husbandry service in the districts may be rendered more efficiently.

I do not wish to inflict a long speech on you especially when more interesting programme awaits you but before I conclude my speech I must express my hearty thanks to the members of the Association for asking me to preside over their 17th Annual Conference, my deep sense of gratitude to the Hon'ble Minister for kindly agreeing to inaugurate the Conference inspite of his multifarious preoccupations. I am also grateful to the various distinguished guests who have so kindly found time to honour us by their presence this evening. My thanks are also due to the delegates who have come from all corners of the State at great inconvenience and expense to themselves and I can assure them that a busy and instructive two day's

professional programme of lectures, discussions and demonstrations on various technical subjects by the various experts has been specially arranged by the Association for their benefit. I wish the Conference every success.

The house then adjourned to meet again next day, with a vote of thanks by Shri M. L. Verma, President of the U. P. Veterinary Association to the Hon'ble Minister, chief guests, visitors and delegates in the following words:—

Hon'ble Minister, Dr. Kaura, and gentlemen, I indulge in no form of convention when I tell you how grateful, elated and honoured the U. P. Veterinary Association feels over your presence in our midst today. Your association with us today has raised in us great expectations. We are really grateful to you all, gentlemen, for so kindly responding to our invitation and thus honouring us immensely.

The Hon'ble Minister and others were then taken round the various stalls demonstrating the activities of the different sections of the department, which had been nicely set up under the kind guidance of the Director—Dr. Kaura. Later all were entertained with cold drinks and light refreshments arranged by the Association.

The day's business came to an end after the display of the Technical films on mastitis and Dairy Hygiene arranged by Shri P. N. Nagar, Field Extension and Publicity Officer, Uttar Pradesh.

Tuesday the 27th June, 1950.

The second day's proceedings commenced at 7-30 a.m. with Shri M. L. Verma, President of the Association in the chair. The following lectures were delivered by the persons mentioned against each and they were followed by lively discussions in which all the members took great interest.

Artificial Insemination by Dr. R. B. Singh.

Parasitic Infestation in animals by Shri R. N. Mohan, Veterinary Investigation Officer, U. P.

Wool analysis and wool utilization by Shri Balbir Singh, Superintendent, Govt. Sheep Farm, Orai, Distt. Jalaun.

Poultry diseases by Shri N. B. Miechal, Disease Control Officer (Poultry), U. P.

Balanitis in bullocks by Shri P. G. Mukerji, Veterinary Assistant Surgeon, Garhwal.

In the afternoon, demonstrations were held on the following:

Poultry vaccination by Shri N. R. Michael.

Wool analysis by Shri Balbir Singh.

Flaying and curing of hides and skin by Shri Noorul Haq.

Poultry keeping by Shri M. A. Qureshi.

A group photograph was taken and after the display of the technical films on sterility the house adjourned to meet next day.

Wednesday the 28th June, 1950.

The conference met at 8 a.m. In the absence of Shri M. L. Verma, the President, the Vice-President Mr. K. A. Raza was in the chair. All the members, as on the previous day, participated in the discussion that followed after the following lectures.

1. Lecture by Shri R. L. Panday, Poultry Development Officer on Importance of Poultry Keeping.
2. Lecture by Shri K. G. Rau, Officer-Incharge, Biological Products Section on Rinderpest and its control.

The house then passed unanimously all standing the resolution of condolence on the sudden and sad demise of the following:

1. Mr. Hira Lal Gupta : District Livestock Officer.
2. Mr. Sher Ahmad Khan : Veterinary Assistant Surgeon.

The minutes of the last meeting were then read and passed unanimously. The General Secretary, Shri L. M. Dwevedi, read out his annual report including the report of the Financial Secretary and the Auditor for 1949-50.

The Chief Editor of the U. P. Veterinary Magazine also read out his report.

The following farewell address was presented to one of the oldest members of the Association, Sardar Bahadur Udam Singh, Deputy Director of Animal Husbandry, U. P. on the eve of his retirement:—

"We the members of the U.P. Veterinary Association have assembled here today to bid you farewell on the eve of your retirement with feelings of respect, love and separation.

You being one of the oldest members of the Association have associated yourself with its activities for about 16 years inspite of heavy burden of duties. Ever since you joined the department you have served the profession with devotion and conscience. Since 1916 when you joined the department you have served in various capacities and several enterprises like serum simultaneous method of inoculation, establishment of G.T.V. section in 1935, were undertaken at your own initiative. Special problems like eradication of liver fluke infestation, schistosomiasis, and surra were tackled by you,

You have been true to the Department, the profession and above all to the Almighty. For the successful discharge of duty even in the most tiring circumstances, yours is an example and a matter of pride for all of us. It is the result of your highest devotion to duty that this coveted post of Deputy Director of Animal Husbandry, U.P. was offered to you.

You have always backed the Association and its members with unflinching support. You have taken things in their true perspective and lead the Association to the right path.

We are grieved that you will be leaving the department soon, but we hope and request that you will even now try to serve the profession with your sound advice based on vast experience and mature judgement. We can assure you that you have praise and respect from each member of the Association and will ever be remembered by all of us and wish you too to remember us.

It is our earnest desire that you should enjoy for many years to come the well-earned rest in retirement happily amidst your kith and kin, free from worries of service and officialdom.

In conclusion we pray to the Almighty to bless you with happy and prosperous life for many years in the best of your health".

After a reply from the Sardar Bahadur the members dispersed for lunch to reassemble in the afternoon.

The conference met again at 3 P.M. The house discussed the resolutions and passed them unanimously.

Resolutions

1. Resolved that the departmental authorities be requested to move the Government to see that Hackney Carriage animals be periodically inspected at the time of issue of licenses, by the technical staff of our department and not by Tahsil authorities etc. as is being done in some of the districts.
2. Resolved that the Director of Animal Husbandry be moved to see that the selection for any further training or promotion be made on the ground of technical and not on basis of academic qualifications and that seniority be counted as the primary factor for selection unless the candidate is debarred from departmental promotions.
3. Resolved that the U.P. Government be moved to see that the menial staff of the Veterinary dispensaries be brought under the control of the department from the Municipal and District Boards.
4. Resolved that the Government of U. P. be moved to provide adequate veterinary representation in the State Council under the present constitution.
5. Resolved that the U.P. Government be moved to make the pay and prospects of Veterinary graduates more attractive to attract better brains in adequate numbers and as such their pay may be fixed at least on 200-450 scale (Medical P.M.S. II) in view of the fact that they have to spend 6 years or so after matriculation to obtain the necessary qualifications and that too without any prospect of private practice as is privileged in the sister department (Medical).

6. Resolved that the U.P. Government be moved that all the administrative posts in Class II services in the Animal Husbandry Department should go to the Subordinates of the department by promotion.
7. Resolved that the U.P. Government be moved to start a Condensed course of a year in the U.P. College of Veterinary Science and Animal Husbandry to provide facilities for the diploma holders to obtain the Degree as is done in the sister department.
8. Resolved that the Government be moved to reserve 25% of the Class I posts to be filled exclusively by promotion at present and then the percentage may be increased to 50% and 75% in the course of time when vacancies occur.
9. Resolved that the Director of Animal Husbandry be moved that there should be no examination for crossing the efficiency bar and that there should be only one efficiency bar in the scale of pay of the subordinate Veterinary service at Rs. 210.
10. Resolved that the accounts and funds pertaining to the U.P. Veterinary magazine be transferred to the Chief Editor, who should maintain them and must submit details to the Financial Secretary and General Secretary at the end of the each quarter of the year. The Chief Editor may further be authorized to open an account of the magazine fund in any bank.

The election of the office bearers, members of the Executive body, Editor etc. for the year 1950-51 took place with Major G. C. Juneja in the chair. The following were elected to the various posts:

<i>President</i>	...	Shri R. P. Sinha,
<i>Vice-President</i>	...	„ Shanti Chander Kaushak,
<i>General Secretary</i>	...	„ K. A. Raza,
<i>Joint Secretary</i>	...	„ B. M. Dixit.
<i>Financial Secretary</i>	...	„ J. S. Srivastava,
<i>Auditor</i>	...	„ Vidya Parkash,
<i>Chief Editor</i>	...	„ H. P. Kapur.
<i>Joint Editor</i>	...	„ R. V. Nair.

Members of the Executive body:

<i>Meerut:</i>	...	Shri Kadam Singh,
	...	„ C. D. Ray.
	...	„ H. E. Charles.
<i>Allahabad:</i>	...	„ M. P. Dwevedi.
	...	„ G. P. Srivastava.
	...	„ S. B. L. Kakrania,
<i>Bareilly.</i>	...	„ H. M. Badola.
	...	„ R. B. L. Srivastava,
	...	„ M. S. Bhatnagar,
<i>Lucknow.</i>	...	„ P. C. Mukerji.
	...	„ R. S. Misra.
	...	„ Brij Raj Singh.

The newly elected office bearers took their seats and the conference came to an end with a vote of thanks to the President and the delegates.

R. SINHA,
President.

Abstracts

Incidence of living twins in equines.—It is usually stated in the literature that twins, where both survive, are rare in equines. I attach herewith photographs of two sets of living twins born two consecutive years at Renala Estate Ltd., situated in Montgomery District, Pakistan. All four animals are still surviving, and the chestnut colt of the first set, born on 10th May 1948, has been considered good enough to be purchased by the Army Remount Department on 3rd March 1950. During an average year we have four or five twins born from 200 odd brood mares. It is fairly common for one of a twin to survive, but it is usually smaller than the corresponding single birth foal and frequently not of much use.

R.A.V.C. Decr. 1950.

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Of interest to A.I. personnel. The use of boiled milk as a diluent for semen. An abstract is given in the *Journal of the American Veterinary Medical Association* [(1950) 117. 337.] of an abstract in *Casopis Ceskoslovenskych Veterinaru* [(1950). 5. 23.] of an article by N. N. Michaljolov in *Konyevodstvo* (1949) No. 6. on the use of boiled milk as a diluent for semen. Boiling of the milk changes the lactose to glucose and galactose, both of which are more readily available for energy production of the spermatozoa. Cows' milk is best for bull semen, while mare's milk is preferable to stallion semen.

Milk is taken in a sterile container, filtered, brought to boiling point and filtered again. It is then cooled to the desired temperature for dilution. The mixture may be stored at 5°C.

The above procedure was carried out at the Artificial Breeding Centre, Department of Agriculture, Dunsany, Co. Meath, Ireland, and the livability of bovine spermatozoa clocked in this medium. Semen was collected from three bulls using the artificial vagina and examined for quality according to routine laboratory methods. Each sample was diluted 1 in 10, the following observations being made: motility was excellent for from two to four days, while motile spermatozoa were observed up to the ninth day. This method of dilution is a relatively simple one and may have great possibilities in future A.I. work.

Further investigation into the use of this diluent is proceeding.

Vet. Rec. Dec. 9, 1950.

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The Vaccination of Highly Susceptible Animals against Rinderpest.—By J. R. Haddow and J. A. Idnani. *Indian J. Vet. Sci.* Vol. XVII, Part 1.

1. Results are recorded of a small scale experiment with virus absorbed on alumina-gels.

2. Results of experiments on glycerolized vaccine are recorded. The findings of previous workers on the value of such vaccines are confirmed, but to obtain entirely reliable results it is necessary to increase the dosage and reduce the period of storage under glycerol. The method is somewhat expensive.

3. Successful attempts were made to fix rinderpest virus in rabbits. For this purpose, it is necessary to use a strain of high virulence for cattle. The virus becomes progressively attenuated in rabbits, until it loses all or nearly all its invasive power for buffaloes and cattle. At intermediate stages the virus appears to constitute a suitable vaccine, but the exact stage and method of maintenance are not yet defined. The virus in rabbit tissue is not present in large quantity and cannot be stored for long outside the animal body. It can, however, be readily transported in the living rabbit to areas within a range of seven days.

* * *

Some Observations on the Immunization of Sheep and Goats against Rinderpest.—By H. K. Lall, B.Sc. M.R.C.V.S. *Indian J. Vet. Sci.* Vol. XVII Part 1.

Anti rinderpest serum (ordinary) and goat tissue vaccine given at the same time produced a solid immunity in Betal and hill goats against rinderpest, while the administration of the vaccine followed by serum 24 hours later caused a severe reaction. The method has been safely utilized in the field and it was found that the dose of serum required in hill goats was slightly higher than that for Betal goats.

2. Goat tissue vaccine alone can be used to produce immunity against rinderpest in Bikaneri, Hissari (Merino and Bikaneri crosses) and *desi* sheep, but the use of serum is necessary in the case of sheep of the Lohi and Biangi breeds which are more susceptible. There are definite indications that all these breeds react differently to inoculation of the vaccine. Lohis are the most susceptible and react more or less like goats; Lohi lambs react still more severely.

3. The reaction produced in sheep and goats by bull virus was milder than that of the goat tissue virus obtained from the Punjab Veterinary College. When different doses of goat virus were given to sheep, no difference in the intensity of the reaction was noticed, though the duration of the reaction varied with the dose.

A Survey of the Feeds and Fodders and the Requirements of the Livestock in the United Provinces.—N. C. Das Gupta. *Indian J. Vet. Sci.* Vol. XVII, Part 1.

It is estimated that out of 1,619.7 thousand tons of protein and 57,304,550 thousand therms fuel available from food grains, seeds and milk, about 1,219.3 thousand tons of protein and 48,370,000 thousand therms fuel are required per year for 56 million human population of the province. The balance which is equivalent to 2,257 thousand tons dry matter, 252.3 thousand tons digestible protein and 4,481,960 thousand therms net energy, can be soared for the livestock.

The total requirement for maintenance, growth, production of milk or work for 30,208,247 livestock, excluding sheep, goats and swine, is 74,294 thousand tons of dry matter, 3,489.6 thousand tons digestible protein and 69,128,997 thousand therms net energy per year. The present total yield of 3,047 thousand tons of milk can provide, on an average, 5.3 oz. per head per day. If the consumption is to be increased to 8.0 oz. about 1,554 thousand tons more milk will have to be produced and the total requirement for livestock will increase to 8.0 oz. about 1,554 thousand tons more milk will have to be produced and the total requirement for livestock will increase to 3,569.9 thousand tons digestible protein and 70,411,997 therms net energy.

The amount of nutrients available for feeding livestock is 36,596 thousand tons dry matter, 813.6 thousand tons digestible protein and 23,880,890 thousand therms net energy which is only 49, 23 and 34 per cent respectively of the requirement.

Fodder crops provide nearly twice as much net energy as grain crops per acre. Though 4.8 times more protein and 2.9 times fuel is necessary for 30 million livestock than what is required for 56 million human population, only 3.6 per cent of the total cropped area is under fodder. With the present condition of poor yield, it is not possible to meet the requirement even if the total area corresponding to the excess of grains after providing for human population is put under the best fodder crops.

The shortage can be met if the yield can be increased by 50 per cent and about one-fifth of the total area is put under fodder crops, mainly legumes.

Cattle Food Position in Delhi Province.—By Ram Swarup, I.D.D., Assoc. I.D.I. *Indian J. Vet. Sci.* Vol. XVII, Part I.

It thus appears that Delhi produces only 84.5 per cent of the fodder requirements of her livestock population. If the livestock is to be kept in

in a nutritional condition for optimum production, it is necessary to make the balance good.

* * *

Suitability of Sugarcane tops for Silage making.—By T. M. Paul and M. C. Rangasamy. *Indian J. Vet. Sci.* Vol. XVII, Part I.

Silage was made from sugarcane tops alone, sugarcane tops with molasses and sugarcane tops with a mixture of guinea and napier grasses.

The molasses and mixed grass methods produced more palatable silage than that made from sugarcane tops alone.

The silage produced no adverse effect on the milk yield, fat output, general health and body weight of milking cows when fed to them in quantities up to 20 lb. each daily.

The Preparturient milking of dairy animals.—By Zal R. Kothavalla and A. J. Lazarus. *Indian J. Vet. Sci.* Vol. XVII, Part I.

The practice of milking Sindhi, Gir and cross-bred cows and heifer prior to calving was in no way advantageous. This treatment did not increase the milk yield to an extent which justified the extra cost involved. The calves of cows subjected to the treatment invariably failed to thrive as well as the controls and the mortality amongst them was very high.

* * *

Preservative Effect of Common salt on the development of acidity in stored ghee.—By Lal Chand Dharmani and Kartar Singh Lohara. *Indian J. Vet. Sci.* Vol. XVII, Part I.

To study the preservative effect of the common salt, ghee with varying amounts of moisture and butter milk (0.5 to 1.5 per cent) was kept in 1½ lb. tins and earthen pots of the same capacity. Salt was used at the rate of 2 per cent of the weight of ghee.

The development of rancidity of ghee was judged by the characteristic aroma, acid taste and increase in free fatty acids. Samples were tested periodically for 15 months. The results so far obtained show that a good quality ghee can safely be stored in air tight tins upto 15 months without showing any signs of deterioration. The use of common salt appears to be unnecessary.

It is not advisable to store ghee in earthen pots because the acidity develops rapidly and because the ghee oozes out of the pots during summer months and thus causes considerable loss.

* * *

Infectivity by contact of Rinderpest virus, including Goat Adapted Virus, for cattle and goats.—By C. Seetharaman, B.V.Sc., *Indian J. Vet. Sci.* Vol. XVIII, Part II.

The possibility of goats or cattle undergoing vaccination with the goat-modified rinderpest virus spreading the infection to goats or cattle kept in the same shed has been tested. The experiments have given negative results. Under ordinary field conditions, therefore, there appears to be no danger of spread of the disease occurring through this cause.

Under artificial conditions of very close contact, as when healthy animals are compelled to breathe the expired air of infected ones, transmission is possible. Important factors here are the virulence of the virus and the degree of exposure in terms of time and distance between the animals.

Utilization of By-products of starch manufacture from maize as cattle feeds.—1. The nutritive value of maize husk.—By B. G. Pandit-teskere, S. C. Ray and N. D. Kehar. *Indian J. Vet. Sci.* Vol. XVIII, Part II.

Maize-husk or maize bran, apart from its total carbohydrates, is inferior in chemical make-up to wheat or rice bran. Contrary to other brans it is also extremely poor in phosphorus which is as low as 0.09 per cent.

When maize-husk is fed in a simple combination with wheat-bhoosa, the total dry matter consumption becomes sub-optimal digestibility is depressed and balances of N, Ca and P are negative. This nutritional defect is corrected if the ration is supplemented by linseed-cake to an extent approximately one-fifth of the maize-husk intake.

Under balanced feeding the digestibility co-efficient of maize-husk works out to be crude protein 55, ether extract 53 and total carbohydrates 79. Based on these co-efficients, the nutritive value has been calculated as 4.09 lb., 59.1 lb., and 67.9 lb. digestible crude protein, starch equivalent and total digestible nutrients respectively per 100 lb. of the material.

11. *The nutritive value of maize-oil-cake.*—In its organic constituents maize-oil-cake is similar to cocoanut oil cake, while the inorganic make-up it is poor and resembles groundnut-cake. The results of the digestibility trial show that the digestibility co-efficients of maize-cake are, crude protein 84, ether extract 79, crude fibre 47, nitrogen-free extract 63, and total carbohydrates 60. Compared to that of the commonly used cakes the digestible crude protein is rather low. Under the feeding conditions of

the present experiment using moize-cake and wheat-bhoosa, nitrogen, calcium and phosphorus balances were significantly positive.

Conjunctivitis of Sheep and Goats in India.—J. F. Shirlaw and N. S. Sankaranarayanan. *Ind. Jour. Vet. Sci.* Vol. 17, Part 11.

1. A sporadic disease of goats and sheep clinically comparable with rickettsial conjunctivitis [Coles 1931] exists in Bihar and has been detected in a minor outbreak, in an army livestock depot in India. An organism identical as *R. conjunctivae* occurs within the cells of the conjunctival epithelium of such cases.

2. An organism indistinguishable to morphological characters and staining affinities from *R. conjunctivae* was detected within the conjunctival cells of 32 goats, 10 sheep and five hill cattle selected at random, and in which, with one exception, viz. a goat affected with purulent conjunctivitis, the eyes showed no outward sign of disease.

3. An identical form of rickettsia was seen within the conjunctival cells of eight cases of human trachoma examined.

4. Lesions of irido-cyclitis were determined in one clinical case in a sheep.

5. The disease could not be transmitted to sheep with outwardly healthy eyes by means of ocular discharge from a diseased animal or by close contact in a small shed over a period of 82 days.

6. It is doubtful whether the finding of *R. conjunctivae* in cases of conjunctivitis in the Indian goat and sheep has real aetiological significance.

Effect of four times milking and handling on the yield of milk in Cows of the Tharparkar Breed.—By C. H. Parr and S. Sen, *Indian Jour. Vet. Sci.* Vol. 17, Part 11.

At the Agricultural Substation, Karnal, 11 Tharparkar cows were milked four times in a day and 'handled' i.e. udder massaged 15 to 20 days before calving and milked as secretion started, while 12 cows were milked twice a day and not 'handled'.

The increase in the average yield per day for the wet period due to four times milking and 'handling' was 47 per cent over cows milked twice a day.

The overall average and lactation yield showed 61 per cent and 74 per cent increases respectively.

The calving interval for cows under four times milking was 442 days and that for cows under two times milking was 414 days. This variation was due to the slightly longer service period necessitated by the longer lactation period in the case of cows under four times milking. But this longer interval has not affected the overall average which was 61 per cent more than the cows milked twice daily.

When the yields of cows under the two and four times milking were graphed, the latter showed a definite upward trend of the curves with each succeeding lactation and a development of flush period. Under the two times milking no development of the flush period took place, and the yield curves showed a rapid downward trend in the later lactations.

* * *

The value of Boro Rice Straw as a Cattle Feed.—Indubhushan Chatterjee M.Sc., L.Ag., and Sachindra Nath Sarkar, M.Sc., Ph. D. *Indian Jour. Vet. Sci.* Vol. XVII, Part 11.

1. The feeding value of Boro variety of rice straw has been investigated and comparative data have been presented.

2. The experiment was conducted with 'No lime' and 'lime'. The lime was given a calcium carbonate. The feeding of lime did not offer any advantage. On the other hand there was a depression of digestibility which was well marked in ether-extract and crude fibre, the former also exhibiting great fluctuation.

3. The main feature of this straw is a large percentage (compared to other rice straws) of protein content, a lower percentage of fibre, a very large percentage of insoluble silica and also a high percentage of oxalic acid.

4. Like Aus rice straw, Boro rice straw is definitely superior to Amon rice straw in its nutritive value on the organic side. As it contains the highest percentage of protein compared to the other two straws, is definitely economical in protein requirement and from that standpoint is superior even to Aus straw.

5. Its unsatisfactory feature is that its oxalic acid content is highest for which its lime requirement is highest (amongst all rice straws); and for reasons still unknown the chlorine balance has also exhibited a negative tendency besides lime, potash and phosphate which are usually so found in other rice straws.

6. Further experiments are required to devise correctives for the unsatisfactory lime, potash and chlorine metabolism as well as for high content of oxalic acid and also to see how the large quantity of insoluble siliceous matter as found in Boro straws, is likely to react on the animal system specially under a prolonged feeding.

* * *

Studies on haematology of dogs in health and when injected with Babesia Gibsoni (Patton 1910):—B. M. PRASAD. *Indian Jour. Vet. Sci.* Vol. XVII, Part 11.

This paper records the results of studies made to determine the total red and white cell counts, the differential white cell counts, and the haemoglobin content of the blood of dogs during health and during piroplasmiasis (*B. Gibsoni* infection) of three apparently healthy dogs between two to four years of age, two of which were infected artificially with the parasites and the third was used as a control. Morphological studies and haemoglobin estimations were made of the blood of these animals before infection and also during the disease. In the two infected dogs the readings did not change significantly during the incubation period.

For comparative purposes seventeen (17) counts were made on the blood of 10 apparently healthy pariah dogs with results similar to those obtained in the case of the experimental dogs before infection was established.

In the two infected dogs the red count fell to about one million per c. mm. during the disease. The white cell count increased to a peak at nearly 80,000 per c. mm. and this was followed by a gradual decrease to almost normal level, irrespective of whether the disease ended in death or recovery. The differential white cell count showed during a period of marked leucocytosis a mild neutrophilia, slight lymphopenia, eosinopenia, and a shift to the left of the neutrophils and this was followed by a moderate monocytosis. During the disease the average haemoglobin content dropped to 12.5 per cent from normal.

The outstanding features of *B. gibsoni* infection in dogs are the decrease in total red cell count and the marked fall in haemoglobin due to a certain extent to rapid destruction of the cell cells, but more to the failure of formative tissues.

* * *

There is now evidence that infectious diseases of fish under natural conditions are more common than is usually realized. Epizootics of viral, bacterial and protozoan nature are well known at hatcheries, but fish in natural surroundings were thought to be relatively free from disease. Some of the conditions recently found in the latter instances are unknown to hatcheries.

N.A.V., Vol. 29, No. 8,

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N.B.—It is earnestly requested that the members of the profession send in their contributions to the memorial fund at an early date.

Madras Veterinary
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P. SRINIVASAN,
Secretary,
The Madras Veterinary Association.

Reviews

Veterinary Obstetrics.—By FRANZ BENESCH and JOHN G. WRIGHT. Pp. viii—460, with 244 figures. 1950. Price 50s. net. *Bailliere, Tindall & Cox, London.* [Copies can be had through the Editor, I.V.J.]

With his original translation of Professor Benesch's work on the treatment of dystocia in the cow and mare by manipulation *per vaginum* sandwiched between two of his own contributions, Professor Wright has brought out an excellent publication on Veterinary Obstetrics at a very opportune moment when the veterinary profession is devoting increasing attention to the affections of the female generating organs of the farm live-stock. The author is well known to the profession for the clarity of his writings and for his meticulous attention to details in his descriptions. The present publication maintains that high standard.

In the first part of the book, a detailed consideration of Physiology of the reproduction from the view point of the practitioner has been given and these details are very finely illustrated. The second part is the translation of Prof. Benesch's work on dystocia while the last and third part deals with caesarian section on farm animals, bitches and cats, and the more common post-parturient problems, like retention of placenta. As the author rightly observes, the caesarean section has now attained an established position in bovine practice and it is therefore, very pleasing to find it being dealt with in detail. The important subject of infertility also finds a place here and the author has shown great understanding and appreciation of the practitioner's problems in the discussion of this subject. The book is therefore one that should be in the hands of every practitioner and student alike.

The publishers are Messrs. Bailliere Tindall & Cox and the get up is up to their high standard.

Diagnostic Methods in Veterinary Medicine.—By GEO. F. BODDIE, B.Sc. (Edin.), M.R.C.V.S., F.R.S.E. Third Edition, 1950. Price 20s. net. *Oliver & Boyd, Ltd., Edinburgh—1.* [Copies can be had through the Editor, I.V.J.]

Prof. Boddie has to be congratulated on bringing out his book on Diagnostic Methods in Veterinary Medicine up to date in a third edition. This book, in its first two editions, has been very well received by the profession in that it filled a keenly felt want. There are indeed very few veterinary books which deal with clinical practice and the methods of diagnosis and Prof. Boddie has really done useful service to the Veterinary Profession by this publication.

This third edition is practically on the model of the previous editions except that a few chapters have been expanded and recast. The section on clinical haematology by Dr. H. H. Holman also has been amended. A suggestion that can be considered for further editions is the inclusion of actual radiographs in preference to the sketches which are now found in the book.

Radiology in Small Animal practice; A text on applied Radiography and Diagnosis.—By GERRY B. SCHNELLE, V.M.D., Assistant Chief Veterinarian of the Angell Memorial Animal Hospital, Boston, Mass. Second Edition, 351 pages, 305 illustrations. *The North American Veterinarian, Inc., Evanston, 111.* Price \$ 8.00.

Radiology has been of very great help to practising veterinarians who, till its introduction a few years ago, were very much handicapped for want of an auxiliary agent to guide them in their diagnostic work. Books

on Radiology of animals are not very many and this book which first appeared in 1943 under the title of 'Radiology in canine practice' has come out 're-written and amplified in part'. It is indeed a very useful and valuable publication which would be very readily welcomed by the practitioner who specialises in the treatment of small animals.

Beginning with a short introductory chapter on the basic principles in radiography, the author takes us through a description of the X-ray equipment and the protective measures which are essential to prevent the dangerous effects of the ray to the operator and attendants. The underlying principles that are involved in the application of the radiographic energy, the calibration formulae and the position and immobilization of the patient for obtaining a clear and definite picture are described in the concluding chapters of Part I of the book. Parts II and III deal with radiography of the bones and joints and soft tissues with a number of excellent radiographs. We have always maintained that ossification of inter-vertebral discs is not an uncommon complaint in dogs which exhibit symptoms of locomotor ataxia and paraplegia and we are very glad that the illustrations given in the book (Figs. 95, 96 and 97) bring out those lesions very distinctly. It would have been of very great advantage to the practitioner if the author had given in this part radiographs of the joints in their normal condition. This would have enabled one to appreciate the radiographs of the morbid joints more intelligently. In the last section the author gives a good narration of radio-therapy and its application to the different parts of the body.

The illustrations in the book are excellent and enables the reader to understand the lesions even without explanatory notes. We, however, do not see the necessity for carrying over to this edition also 'some of the poor reproductions from the first edition'.

The book has been got up very well reflecting great credit to the publishers.



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Obituary

A. B. BOPAYYA, G.M.V.C.

It is with deep regret that we have heard of the death of Dr. A. B. Bopayya, formerly Chief Veterinary Officer, Coorg, in August 1950.

Graduating from the Madras Veterinary College in 1911, Dr. Bopayya underwent special training in the treatment of elephants in the live-stock section of the Civil Veterinary Department, Madras and entered service in the Coorg Veterinary Department in the year 1912. After a varied and successful career, he retired in 1944 as Chief Veterinary Officer, Coorg.

The late Dr. Bopayya had made a special study of elephants and his contributions to this *Journal* will bear testimony to the intimate knowledge he had of this valuable animal both in nature and under domestication. Endowed with a fund of optimism and of a versatile nature, very social and sociable, Dr. Bopayya's activities were many sided. Besides taking interest in developing the young department, he spent his spare hours in sports and in the practice of music and poetry and so endeared himself to one and all. In his death, the Department and the State has lost a popular figure.

We offer our condolences to the members of the bereaved family.

P. G. ROZARIO, G.M.V.C.

The sad death occurred on 4th November 1950 of Mr. P. G. Rozario the Inspector of Livestock, Calicut, just on the eve of his retirement from the Animal Husbandry Department, Madras.

After passing out from the Madras Veterinary College, Mr. P. G. Rozario entered the Civil Veterinary Department on the 1st March 1929 and saw service in different parts of the State. For the past nearly 20 years he was attached to the Livestock section of the Forest Department and worked amongst the elephants in the forest areas on the Western Ghats. He had acquired extensive knowledge of these animals and his views and opinions on them were greatly sought after by the people.

Our sympathies go out to the members of his family.

P. VISWANATHA PILLAI, G.M.V.C.

We are sorry to learn the death of Mr. P. Viswanatha Pillai, a Veterinary Assistant Surgeon, in the Animal Husbandry Department, Madras, on 30th December 1950.

After qualifying for his veterinary diploma from the Madras Veterinary College, Mr. Viswanatha Pillai entered the Madras Government service in February 1917 and worked in the various parts of the state. He was a very familiar figure in all professional gatherings and will be sadly missed by the members of the profession.

We extend our sympathies to his family.

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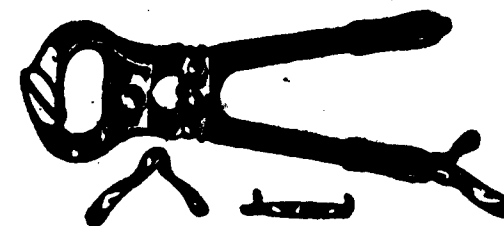
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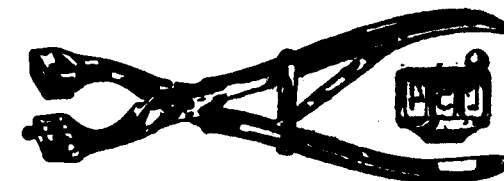
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