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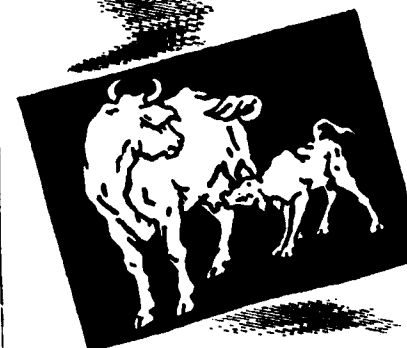
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(The Journal of the All-India Veterinary Association)



Editor:

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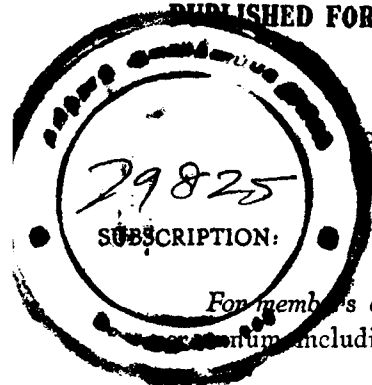
The Indian Veterinary Journal

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

PUBLISHED FOR THE ALL-INDIA VETERINARY ASSOCIATION

EDITOR:

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



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General Articles.

STUDIES ON SURRA I—CATTLE SURRA AND SOME PROBLEMS CONNECTED WITH THE DISEASE.*

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AND

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Bovine Trypanosomiasis or Surra of cattle in India is considered to be caused by the same Trypanosome—*Trypanosoma evansi* which causes 'Surra' in equines and camels. Observations on the disease in cattle infected experimentally as well as under natural conditions point towards the existence of a separate or more than one strain of Trypanosomes responsible for the disease. In experimental infections, cattle do not react to the organism to the same extent as the horse, dog or the white rat, guinea-pig or rabbit. A perusal of the literature on artificially induced Surra in cattle reveals that these animals, in most cases, show the organisms after about a varying period, in extremely few numbers and that, only for a few days, after which they (organisms) disappear. There is very little elevation in temperature, accompanied by no clinical symptoms. However, the blood of such infected animals is inoculable to susceptible small animals such as white rats and mice etc., causing infection in them to which they finally succumb. Even this infectivity of the blood passes off after about five months as was observed by Rao and Mudaliar (1934) and several others. The calf infected by the above workers with *T. evansi* was under observation for about eleven

*Paper presented to the Medical and Veterinary Section of the Science Congress in Delhi during its 1944 Sessions.

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months after which it was discharged. Henry Fraser (1910) in his experiments on Surra in the Federated Malay States inoculated a perfectly healthy Siamese cow about 3½ years of age with 5 c. c. of blood from a horse in which the parasites were swarming. The observations made by him bear quotation "On the evening of the 4th day (after inoculation) the temperature rose to 104° and on the following morning parasites were found microscopically; the temperature again fell to normal, but rose again in the evening to 105° F. and remained elevated for two days; thereafter it became intermittent. At intervals there were febrile attacks of from one to two day's duration, but after six months the temperature became normal and remained so. The parasites after their first appearance remained present for three days but were never abundant; they then disappeared for a day and returned for two days; they were not again found until the 51st day, from that day routine daily examination failed to detect the presence of trypanosomes. On the 162nd day by animal inoculation, parasites were proved to be present in the peripheral blood. On the 267th day, a rabbit was inoculated with 0.5 c.c. of blood, but did not become affected and on the 310th day a rabbit and a goat were each inoculated with 10 c.c. of blood but neither of them became affected.

During the first few months, the cow lost condition but afterwards regained apparently perfect health. On the 233rd day she was delivered of a well-developed calf and successfully reared it.

Ten and a half months after the first inoculation the cow was inoculated with 10 c.c. of blood from a naturally infected pony in whose blood trypanosomes were then swarming. On the 6th day parasites were found in the blood of the cow and persisted for three days; they then disappeared for three months after which they reappeared in great numbers for two days; thereafter they could not be found. The temperature was very irregular and the animal became much emaciated; now, 17 months after the first and six months after the second inoculation the animal is still alive."

The same author records of an acute or sub-acute course of the disease in two inoculated animals of a poor emaciated condition in which the organisms were found on the 7th and 11th days after inoculation and after a few relapses death occurred on the 78th and 16th days after infection.

Cross (1921) dealing with camel surra, attempted infection of buffaloes with surra and concluded that buffaloes do not die from inoculated surra and trypanosomes do not frequently occur in their blood. He further stated that goats do not die of camel surra nor lose condition and that trypanosomes are seldom found in the blood of goats, while sheep are susceptible to camel surra though trypanosomes are seldom found in their blood.

Sen (1936) experimenting with inoculated bovine surra has remarked that the inoculated control animals (buffaloes and hill bulls) showed the parasites at various intervals in their circulating blood, as revealed by the results of blood smear examination or of the sub-inoculation of their blood into the rabbit, the maximum period upto which evidence of infection was thus obtained having been about six months from the date of infective inoculation. He also records that when about 200 c.c. of blood from each of the control animals was sub-inoculated into susceptible equine subjects after the experiments were over (i.e. one and a half years) the results were entirely of a negative character and from this he concludes that in bovine surra spontaneous recovery is the rule rather than the exception.

It is thus well established that healthy cattle inoculated with *T. evansi* do not develop an acute infection of surra but show up only a few parasites in their blood at widely varying intervals of time and ultimately throw off the infection.

Course of the disease in natural outbreaks:

While artificially induced surra runs a chronic course ultimately being eliminated from such infected animals, the behaviour of the organism in natural outbreaks is entirely different. It has an acute course with heavy mortality in affected animals. In fact affected animals invariably die if no treatment is given to them. Such severe outbreaks have been met within the Madras Presidency and other parts of India as well. It is noteworthy that cattle used for conservancy work in Municipal towns and those in endemic areas are liable to such periodic recrudescence of the disease, in spite of the general condition of the animals being quite normal. A subacute phase of the disease in naturally affected cattle is recorded by Henry Fraser (1910) in which the affected animals exhibited frequent exacerbations of temperature, showing the trypanosomes during the pyrexial period only until the end came, which was as late as six months or more. He mentions cases in which the appearance of an intercurrent disease like foot and mouth usually precipitated the subacute phase into an acute one, resulting in the death of the animal, which was invariably due to surra and not foot and mouth disease.

Literature on natural infection of surra in bovines in India dates from 1895 when the first natural outbreak of surra in cattle was recorded by Lingard. This occurred in the remount depot at Karnal with 26 attacks and 20 deaths. Chetty (1922) has recorded a very severe outbreak of cattle trypanosomiasis among the cattle, used for conservancy purposes in the Corporation of Madras with 101 deaths out of 111 bullocks affected. Krishna Iyer and Sarwar (1936) have reviewed the literature on the course of the disease, both in inoculated as well as in natural outbreaks and have

recorded acute symptoms and high mortality that invariably ensue in the course of natural outbreaks of the disease.

Bachan Singh (1936) records an outbreak of Bovine Trypanosomiasis in Central Provinces and observes that the disease runs an acute, subacute, and also a chronic course with the usual characteristic symptoms. In summarising his paper, he states that the disease affects both cattle and buffaloes particularly working bullocks, the mortality being as high as 90 percent. In the acute form the death may occur from six hours to 24 hours while in the chronic type the animal may linger as long as one to three weeks.

The acute phase of bovine trypanosomiasis is thus attended with severe symptoms and mortality which are absent in the animals inoculated with this Trypanosome. Why this is so, it is not possible to say at the present moment. It has been proved by Rao and Mudaliar (1934) that bovine surra is transmissible to horses and other susceptible animals. But the equine surra is not capable of provoking an acute condition in cattle when inoculated experimentally. This has been the experience of other workers as well, as shown above. It may be said that cattle in debilitated condition may develop acute symptoms and succumb to the disease. But the general condition of cattle in acute outbreaks of endemic areas or municipal cattle used for conservancy work, in which such outbreaks are not uncommon, is far from being poor.

The annual report of the Mukteshwar Veterinary Research Institute for the year 1934-35 records of two serious outbreaks of bovine trypanosomiasis, one at Karnal and the other at Hyderabad. The two strains showed difference in their virulence to the hill bulls thus proving themselves to be of two different biological strains. The report mentions that the Karnal strain did not prove fatal when inoculated into the hill bulls at Mukteshwar while the Hyderabad strain was, though both of them were virulent in their respective areas. The same report for the year 1935-36 records an outbreak of bovine surra from Bombay, Nagpur, Gwalior and Assam and the concerned organism is indistinguishable from *T. evansi*. The report further says that the question of its exact identity is still engaging the attention of the protozoology section. Opinion is expressed to the effect that the parasite of bovine surra is perhaps no other than *T. evansi*. This information is embodied in the report of the same institute for the year 1936-37. But again the report for 1940-41 says attempts are being made to tackle the problem of the identity of the bovine surra organism from another aspect. For instance, the preliminary biometrical studies on surra trypanosomes have shown that trypanosomes of equine origin differ in size significantly from those of bovine origin. It is hoped that this will give a clue as to the exact identity of the various strains of Trypanosomes causing surra in animals.

More work on the elucidation of this problem of the identity of the trypanosome causing bovine surra remains to be done. In the opinion of the authors the organism of bovine surra appears different from *T. evansi* or atleast it is a biological variant of *T. evansi*, with its virulence exalted by factors remaining unsettled as yet.

The reservoir problem :

The question of cattle acting as the reservoir host of surra has been mooted by different workers from very early days. Advantage seems to have been availed of this reservoir hypothesis by workers in the absence of any other factor responsible for a fresh outbreak of surra following the off-surra season. But evidence is not overwhelming for maintaining this hypothesis. The opinions expressed by many of the previous workers e. g., Sen (1936) Rao and Mudaliar (1934) that in bovine surra spontaneous recovery is the rule rather than the exception, are against this hypothesis, Parkin (1938) has concluded from his experiments with *T. vivax* and *T. congolense* that a state of auto-sterilisation occurs in bovine trypanosomiasis. Animals may attain with or without the assistance of drugs a state of premunition which is an equilibrium between the animal and the parasite with the former in a state of normality and that in time the animal body may obtain the upperhand with the result that the parasite is innocuous.

Plenty of evidence has been quoted in the foregoing pages to prove that in bovine surra, acute cases die if untreated. Chronic cases continue carrying the organism for a long time and finally eliminate or cleanse themselves of the infection. It is probably this period of time that intervenes between the actual appearance of the organism in the peripheral blood and the entire sterilisation of the same from the animal as evidenced by failure of sub-inoculations to provoke trypanosomiasis in susceptible animals, that is most dangerous or potent of initiating a fresh infection, given the proper conditions for transference of blood to other animals. This period, must necessarily be not more than six months as stated above. So, cattle can act as reservoir hosts for about six months following a natural or experimental infection. If treatment be carried out at periodical intervals covering a period of six months, the question of carrier or reservoir could be annihilated. It should be necessary, periodically, to adopt measures by which the carriers could be detected and treated, especially in endemic areas. Within this carrier stage it should be ensured that no reinfection occurs; if there is reinfection, the period of reservoir or carrier stage will have to be reckoned from the time of the later infection. Probably this is what occurs in nature as otherwise it is difficult to explain the sporadicity of surra in cattle or even in horses.

Rao and Mudaliar (1934) have discussed the question of cattle acting as reservoir hosts and opined that this cannot be since they do not contain

sufficient number of trypanosomes in their peripheral blood so that biting flies could successfully transmit the organism from the sick to the healthy animal. In this connection, it may not be out of place to quote the experience of Everett Dutton et al (1907) in their attempts of Trypanosome transmission experiments. They state that "the status of cattle trypanosomiasis in the Congo free state furnishes an additional objection to explaining the propagation of trypanosomiasis by mechanical means alone. A considerable percentage of the cattle are infected. Trypanosomes are very rarely seen in their blood. Enormous quantities (10-50 c.c. or more) of infected blood must be injected into susceptible animals before they become infected and failures to infect are common. It does not seem possible that the mere mechanical transmission of an infinitesimal quantity of blood from animal to animal by an insect's proboscis can adequately explain the distribution of a strain of trypanosomes possessing so little virulence in direct inoculations.

If at all, such transmission from carrier cattle should become possible the following two factors should be envisaged. There must be a very large number of biting flies feeding on the infective animal and/or the general health of the animal must be affected by some intercurrent disease, thus resuscitating the latent infection to flare up, with the result that the peripheral blood contains a large number of trypanosomes. It appears that even the presence of large number of trypanosomes in the peripheral blood of the carrier animal or the need for the prevalence of biting flies in large numbers is not necessarily a prerequisite for the initiation of a fresh acute outbreak of surra, viewing the question in the light of the conclusions drawn by Topacio (1935). This worker successfully transmitted surra by transplanting a single trypanosome (not a dividing form) into a healthy animal. If this is possible, the initiation of a fresh acute infection from a carrier animal which might contain ever so few trypanosomes in its peripheral blood by the mechanical transference of an infinitesimal quantity of blood by a biting fly, during the carrier stage i.e., about six months, can be very well understood.

Even sucking flies such as the muscids may be able to bring about successful transmission from an infected reservoir if there are any wounds attended with bleeding as these flies can lap up the blood and on interruption may transfer to a healthy animal having a bleeding wound. This possibility is supported by the discovery of Dunn (1932) that the vampire bat of the canal zone could transmit *T. hippticum* (a variety of *T. evansi*) by alternately changing its feed from an infected to a healthy animal. These bats are said to cause a flow of blood by biting the animal and lap up the blood exuding from such a break of skin. When disturbed, they repeat the process to a neighbouring animal.

Thus the reservoir or carrier problem looms large in the successful initiation of an acute outbreak of surra and it is vitally necessary to break this link in the chain of a continuity of surra in the so called off-surra season.

While on the problem of carrier, it should be remembered that camels in addition to cattle are chronic carriers of surra. In fact, the camel was the medium through which surra was probably introduced into India from the western countries, like Persia through the western gates. The fact of this long retention of the trypanosome in their system must have afforded unlimited opportunities for the surra organism to slowly permeate into the animals of India, so much so the disease surra has come to stay in this country. It should not be forgotten that camel traffic was rampant and the only mode of transport from the western countries into India in very old days. Evidence in support of the above hypothesis can be gleaned from the existence of a strain of *T. evansi* common to the camel, horse, and cattle. In the course of a biometric study by one of us (H. N. R.) of the trypanosomes occurring in these three classes of animals, it was found that one uniform strain of *T. evansi*, measuring on an average 24 microns in length, with a range of 17 to 34 microns was present. In addition to this, another strain of trypanosomes with an average length of 29 microns and a variation from 20 to 40 microns was met with in bovines only. It has recently been found that this latter strain has also been found in the horses and mules of the Eastern Command in Assam and it is just possible that this strain in the horses and mules must have been obtained from the local cattle in Assam which have shown this strain on subsequent examination, whether or not the bovine strain (average 29 microns) has filtered into India from Burma and adjacent countries, is a problem requiring a good deal of elucidation. Anyhow as far as surra is concerned the equines appear to occupy a position between the devil and the deep sea—One strain of trypanosomes 24 microns long and another 29 microns in length. The result of studies undertaken on the biometric manifestations of the surra organisms will form the subject of another paper.

The problem of Vector:

It is admitted that transmission of surra either in the horse or cattle is purely mechanical and by means of species of biting flies mostly members of the family Tabanidae. So far no cyclical development has been recorded in these flies.

Everett Dutton, et al (1907) did some trypanosome transmission experiments using the "Congo Floor maggot" (larvae of *Auchmeromyia luteola*) *Anophelines*, *Simulium*, and *ornithodoros maubata* and all these failed to produce infection from the infected to the healthy animals.

Henry Fraser (1910) successfully transmitted surra in a gelding by means of two flies of the Genus *Tabanus* and these flies, after feeding on a horse whose blood had plentiful trypanosomes, were immediately transferred to the healthy animal. Trypanosomes were seen in 9 days after this transmission,

A chinese hairless dog was also successfully infected by *Tabanus* flies in the above manner. Similar experiments done with *Stomoxys* and *Hæmatopota* flies were unsuccessful. This author concludes that mechanical transmission of surra was possible by four species of *Tabanus* but not by *Stomoxys*.

Mitzmain (1913) used laboratory bred *Tabanus striatus* in the transmission of surra and has recorded three successful experiments by direct or mechanical transmission by interrupted feeding, when only a short interval was allowed between the bites on the infected and the healthy animals. He also found that the minimum number of flies with which the infection could be so transmitted was two.

Cross and Patel (1922) reported successful transmission of surra by the tick *Ornithodoros crossi* but Yorke and Macfie (1917) and Wenyon (1926) failed to confirm this.

Kelser (1927) reports that the common disseminating agent of surra among animals of the equine species, in the Philippine Islands, at least is *Tabanus striatus* and the mode of transmission purely mechanical. His experiments with the flies *Stomoxys calcitrans* and *Lyperosia exigua* and the ticks *Boophilus australis* and *Dermacentor reticulatus* to transmit surra were unsuccessful. However, in two instances mosquitoes of the species *Aedes ægypti* were found to infect two white rats and from this he surmises that mosquitoes may probably be responsible for an occasional case of surra, though he does not consider it probable that such insects are common factors in the spread of the disease.

Hoare (1940) in his studies on the behaviour of *T. evansi* in (tse-tse) flies concludes that attempts to induce *T. evansi* to develop in *Glossina* have failed. He also says that not only does no development take place but the overwhelming majority of trypanosomes do not survive even a few hours in the gut of the fly but perish and are digested. The number and distribution of carriers of *T. evansi* remarks Kelser (1927) are other strong arguments against the infection of animals of the equine species by permanently infected insect vectors. What applies to equines does so to the bovines and other susceptible animals.

In the face of the experiences of workers on the inability of *T. evansi* to develop in biting flies, it is considered likely that *T. evansi* does not have a cyclical development in any insect vector and also that mechanical transmission is the only means of propagation of the trypanosome. To achieve mechanical transmission, a constant source of the infection must be present in a carrier or harbourer stage in some animal. So far as cattle surra is concerned, they lapse to this stage following a natural infection, but such a stage may not persist for more than six months in the absence of a reinfection.

Apparently recovered cattle afford a continuous source of infection-latent infection, especially supplemented with later reinfections. In any concerted measure for the control of cattle surra, it should be the aim to spot out carriers preceding an expected outbreak in endemic areas—and treat them. Such treatment, if periodically undertaken, associated with the control of biting flies must result in the successful eradication of bovine surra.

Problem of diagnosis :

The most reliable evidence of infection is the finding of the trypanosomes in blood smears from the peripheral blood. In the absence of this, gland punctures, smears made from the superficial lymphatic glands can be examined for the presence of organisms. Sub-inoculations into susceptible animals, preferably white rats and mice will be very decisive by the animals getting infected and dying out of the infection. Recently the complement fixation test has been successful as practised in the laboratory of the Mukteshwar Institute. Quite recently, the nitric acid test as applied by Johnes (1936) in the detection of latent trypanosomiasis in cattle has also been tried with very encouraging results, and it is possible that these two serological tests read together must give us a very reliable evidence of chronic infection.

Treatment—Bayer 205 was very successfully used in equine surra as well as in other animals but since the drug is not available now, various other drugs notably Antrypol and aromatic diamidines have come into the field. As far as Antrypol is concerned, experience at this laboratory and opinions of other workers are favourable in the early stages of the disease. Experiments to assess the value of these latter drugs are in progress at the Imperial Research Institute, Mukteshwar and the results will form the subject for another paper. Antimonium tartaratum can also be used successfully in cattle though a small percentage of mortality has to be expected with this drug. The cause for this mortality is understandable when there are large numbers of organisms in the peripheral blood that it is unexplainable when it occurs otherwise.

(To be continued)

ACUTE BOVINE TRYPANOSOMIASIS IN MADRAS PRESIDENCY. *

BY

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Introduction :

The subject of Bovine Trypanosomiasis has at the present time assumed a position of paramount importance amongst diseases of livestock in India, in view of the reports that have appeared now and again, during recent years of fatal forms of this infection associated with symptoms which are almost comparable to those observed in equine species. While a considerable amount of speculation would appear to exist as to the circumstances under which the causal parasite of this disease (tentatively identified as *Trypanosoma evansi*.) which is normally harmless for the bovine species, becomes so markedly virulent for these animals, it has appeared to the present writer that the solution of this problem would be largely facilitated by bringing to bear upon it as large an amount of relevant field data as possible, collected from different localities in this country.

The first authentic record of a natural outbreak of surra amongst cattle in India is one made by Lingard (1895). During that year, twenty six bullocks in the remount depot at Karnal were attacked by this disease of which twenty died and six were destroyed. Hutyra and Marek (1912) state that outbreaks of surra in cattle do sometimes occur, in which the disease appears in numerous cattle with severe manifestations such as high fever, etc., which may run an unfavourable course. Mukerji (1924) records an outbreak of cattle surra in Patna district, which occurred during the month of September 1923.

Pillay (1926) reports that an old Indian bullock died suddenly of surra in Penang in 1925.

Mention has been made in the Annual report of the Civil Veterinary Department, Punjab for the year 1926, 1927 that 1380 deaths were reported from surra in bovines from the Gurgaon and Rohtak districts.

Stirling (1927) and Gopalakrishnan (1927) have made mention of severe outbreaks of this disease in Central Provinces and Berar. Bachan Singh also (1934-35) records outbreaks of surra in C. P.

* Paper read at the 32nd session of the Indian Science Congress, held at Nagpur, in 1945.

Balwant Singh (1930) records a case of acute surra in a Holstein bull at Mukteswar, which exhibited brain symptoms, etc.

Mahajan (1934) records an outbreak of bovine surra in Hyderabad State (Deccan.)

Krishna Iyer (1935) records some deaths from bovine surra in the Imperial Cattle Farm, Karnal.

Localities affected :

The present report deals with outbreaks which occurred in North Arcot, Chingleput, Nellore and Chittoor districts. The primary enquiry was conducted on reports of outbreaks which occurred in North Arcot and Chingleput districts towards the end of 1936. The results of enquiries made in the affected areas in 1936 pointed to the conclusion that the disease had originated at Pudupakkam, a village in Conjeevaram taluk of Chingleput district. As this village borders on North Arcot district, it is more than probable that the infection rapidly spread into both the districts. Recently it has been found that the infection had spread to the adjoining districts of Nellore and Chittoor. Further, Conjeevaram, a town in Chingleput being a much frequented place of pilgrimage and also situated in close proximity to Pudupakkam, the spread of the disease would therefore appear to have been facilitated by the constant movement of large numbers of cattle brought by pilgrims from distant parts to the Conjeevaram festival. Recently in Tirupathi, in Chittoor district, another place of pilgrimage, the acute form of the disease has been recorded.

During the year 1936, the affected taluks comprised in order of severity of Arkonam, Cheyyar and Wallajah of North Arcot district, and Conjeevaram, Tiruvellore, Saidapet, Ponneri and Madurantakam of Chingleput district. During the year 1943, Arni, and Vellore taluks of North Arcot district, Chandragiri of Chittoor district, Nellore and Kovur taluks of Nellore district have been found affected.

The number of actual villages affected in each taluk during the year 1936 is as follows :—

Name of district.	Name of taluk.	Number of villages.	
1. Chingleput.	Conjeevaram	...	51
do.	Tiruvellore	...	16
do.	Madurantakam	...	5
do.	Saidapet	...	5
do.	Ponneri	...	2
2. North Arcot.	Cheyyar	...	53
do.	Arkonam.	...	15
do.	Wallajah.	...	12
Total		...	159

The previous record in the Presidency :

Sampath Iyengar (1919) records an outbreak of surra in a herd of 1070 head of cattle in Ramnad district of which one hundred died between March 20th and 23rd June 1918. In the same article the author makes mention of the outbreaks of surra in cattle, which occurred in the Godavari district in the year 1916.

Janakirama Iyer (1919) recalls his experience of outbreaks of bovine surra, which occurred in Arkonam taluk in Chingleput district, in November 1915 and says that more than a hundred cattle died in one village in the course of one month.

Venkatachala Ayyar (1920) says that bovine surra occurred in Gannavaram taluk of Kristna district in September 1919, and out of a total of about 2500 head of buffaloes, there were eight deaths.

Venkataratnam Chetty (1922) records an outbreak of cattle surra in the Corporation bullocks in Madras. Out of a total of 111 animals attacked 101 died, the mortality being 90%.

The disease has been recorded during the year 1932 in Kaveripakkam and Ranipet villages. It will thus be seen that outbreaks of the acute form of surra had already been recorded in some villages. The outbreaks of surra in 1936, is very unique and many villages were affected during the season causing heavy mortality.

Animals affected :

About 90% of the affected animals were bullocks and cows, the rest being buffaloes. In both the species the working animals suffered more than others. The infection occurred chiefly amongst draught bullocks, which are used for baling water for irrigation purposes. Calves were seldom affected. The infection was not noticed among the equines and it must be admitted that these animals were also generally rare in the infected villages. A case of equine surra was however encountered in Kaveripakkam and another at Conjeevaram during 1936 outbreaks. During the year 1943, many equines have been found affected in Nellore and Kovur taluks of Nellore district.

Some cases of surra among canines were recorded from Anaikattaputtur of Arkonam taluk and Tiruvottiur of Cheyyar taluk.

Symptoms :

In the majority of cases, the disease was observed to assume an acute form and in a few instances, it was found to run a subacute course. It is noteworthy, that towards the end of the outbreak, it was the chronic form

that was found to predominate. The symptoms that characterised these three forms were as follows :—

In the acute form, the symptoms were largely those of cerebro-meningitis. The animal suddenly falls down or turns round and round and shows evidence of loss of vision. The eyes are sunken with a watery discharge. Salivation is copious and there is frequent micturition. The affected animal moves forwards and backwards with a tendency to butt the wall, post or similar hard objects that may be in front of it and in such cases, the animal may become uncontrollable. Where the animal is down it struggles and kicks violently. In the final phase of the disease, the breathing is laboured. Death results within one or two hours from the onset of the first symptoms.

In the subacute form, the above symptoms appear in a less severe form, cerebro-meningitis not being prominent. There is no prostration and recovery is common.

The chronic form is marked by a loss of appetite and a staring coat. Both these symptoms last only for a day or two, recovery taking place without further visible symptoms.

In two or three cases of the subacute form, the occurrence of persistent wry neck was noticed. The animals concerned suffered for about 10 days and eventually recovered. Smears from these animals were negative for the presence of trypanosomes. Only acute symptoms were noticed among the canine species at Anaikattaputtur of Arkonam taluk and Tiruvettur of Cheyyar taluk.

In equines the usual pyrexial symptoms with petechiae of the m.m. of the eyelids and swelling of the dependant parts especially the sternum and the legs were noticed.

Differential diagnosis :

There is a likelihood of this disease of Bovine Surra being mistaken for Anthrax and Haemorrhagic Septicaemia as was actually done once. In bovine surra, there is no bloody discharge from the natural orifices as in anthrax and no swelling of the throat as in haemorrhagic septicaemia. Further, bovine surra can be at once differentiated from the other two diseases by the occurrence of cerebro-meningitis and also by the fact, that it generally affects the white cattle, whereas haemorrhagic septicaemia occurs mostly among buffaloes. Microscopical examination of the blood smears is however the deciding factor.

The relative severity of the infection in different infected areas :

It is worthy of note that in the Cheyyar taluk of North Arcot district, though the number of villages affected were more than in the Arkonam taluk,

Table I.—Statement showing the Number of attacks, Deaths, and Recoveries in the Various affected Taluks of Chingleput and North-Arcot Districts.

No.	DISTRICT.	TALUK.	DETAILS.	WHITE CATTLE.						BUFFALOES.					TOTAL.		
				Bulllocks	Bulls.	Cows.	Heifers.	Bull. Calf.	Cow. Calf.	He Buffaloes	She Buffaloes	Heifers	Bull. Calf	Cow. Calf			
1	Chingleput.	1. Conjeeveram ...	Attacks ... Deaths ... Recoveries ...	501 398 103	3 3 ...	71 55 16	1 ... 1	9 7 2	... ... ...	33 30 3	42 29 13	... ... ...	35 31 4	... ... ...	695 553 142		
2	North Arcot	2. Tiruvellore ...	Attacks ... Deaths ... Recoveries ...	30 21 9	14 4 10	16 16 ...	2 1 ...	4 3 1	2 2 ...	5 3 2	3 5 2	6 4 2	... ... ...	... ... ...	81 56 25		
		3. Madurantakam.	Attacks ... Deaths ... Recoveries ...	9 7 2	2 2 ...	15 7 8	1	1 1 ...	1 1 ...	... ... ...	... ... ...	... ... ...	... ... ...	... ... ...	... ... ...	27 17 10	
		4. Ponneri ...	Attacks ... Deaths ... Recoveries ...	7 7 ...	... ... ...	5 3 2	... ... ...	1 1 ...	1 1 ...	... ... ...	1 1 ...	8 2 ...	... ... ...	2 2 ...	1 1 ...	25 6 41	
		5. Saidapet ...	Attacks ... Deaths ... Recoveries ...	31 28 3	... ... ...	... ... ...	... ... ...	... ... ...	... ... ...	... ... ...	... ... ...	10 10 ...	... ... ...	... ... ...	... ... ...	38 3 903	
		1. Arkonam ...	Attacks ... Deaths ... Recoveries ...	625 496 129	11 8 3	128 118 10	3 3 ...	5 5 ...	3 3 ...	3 3 ...	61 51 10	49 44 5	3 3 ...	12 12 ...	3 3 ...	746 157 144	
		2. Wallajah ...	Attacks ... Deaths ... Recoveries ...	110 78 32		5 5 ...	2 2 ...	1 1 ...	1 1 ...		19 15 4	6 2 4				1 1 ...	104 40 443
		3. Cheyyar ...	Attacks ... Deaths ... Recoveries ...	339 292 47	6 5 1	37 28 9	3 3 ...	4	5		27 27 ...	19 17 2	2 2 ...	1 1 ...	1 1 ...		375 68 ...
		Average mortality with reference to attack, per cent.			80.3%	61.1%	82.0%	81.8%	72.0%	61.5%	86.3%	80.3%	100.0%	92.0%	87.5%	80.9%	

the actual number of deaths recorded was considerably less. Next to Arkonam is Conjeevaram taluk, where the disease occurred in a mild form. The number of villages, where the outbreak was very severe and the mortality was over 25, in each village is furnished below against the respective taluks :—

Arkonam taluk	...	...	5 villages.
Wallajah taluk	...	...	2 villages.
Cheygar	...	...	5 villages.
Tiruvellore taluk	...	...	2 villages.
Ponneri taluk	...	...	2 villages.

The table I shows the number of attacks, deaths and recoveries recorded in the outbreak.

Seasonal incidence :

The disease has a definite seasonal incidence. It occurs from January to October and it reaches its peak during June July and August, which corresponds to the fly season. Only one sporadic case of the disease is recorded during the month of November. There is no report during the month of December.

The following statement shows the number of affected Villages in different Taluks of North-Arcot and Chingleput Districts during the various months of the year.

	Jany.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
North-Arcot.												
Cheygar	...	...	1	...	3	7	8	19	5	...	...	...
Wallajah	...	...	...	...	1	3	3	4	...	...	...	...
Arkonam	...	1	3	2	3	13	22	3	...	...	...	...
Chingleput.												
Madurantakam	...	...	...	...	...	1	1	3	...	...	...	...
Saidapet	...	...	1	...	3	1	...	...	...	...	...	...
Ponneri	...	...	...	1	...	...	...	...	...	...	...	...
Conjeevaram	...	2	5	10	3	9	12	5	1	1	...	...
Tiruvellore	...	...	...	1	2	2	9	1	...	1	1	...
Total	...	3	7	8	21	19	36	56	32	6	2	1

Bachan Singh (1935) says that the disease appears after the rains and continues till the later part of the winter in the Central Provinces. Mahajan (1934) says that the disease usually occurs in Hyderabad State during the early winter months, when biting flies are plentiful and the plough bullocks are working hard.

Diagnosis :

Of the different centres visited by the writer, the disease was actually found prevailing at the time of his visits in twelve villages and was confirmed by the microscopical and Biological tests.

Defibrinated blood from an affected bullock in one of the infected centres was injected into a guinea-pig and Trypanosomes appeared in the blood on the third day. Subpassage conducted with the blood from the above guinea-pig into another gave positive results.

Identity of the trypanosomes.

From the examination of the many blood smears examined by the writer from horses, cattle and dogs, Trypanosome organisms indistinguishable from *T. evansi* were found. In one or two instances in bovines, the occurrence of *Trypanosoma theileri* has been recorded. Kumaraswamy Pantulu (1920) points out the difference in symptoms manifested in different outbreaks of cattle surra and suggests the possibility that each outbreak might be caused by a different species of *Trypanosomes*.

Anantanarayan Rao (1923) studied the morphological and biological features of the *Trypanosomes* affecting cattle and came to the conclusion that they are identical with *Trypanosoma evansi*.

Anantanarayan Rao et al (1934) say that the smaller trypanosomes found in cattle, dogs and ponies in S. India are identical with *T. evansi*. *T. theileri* is occasionally met with, in the blood of cattle in South India.

Mode of spread of the disease :

It is a well known fact, that surra is spread from animal to animal by blood sucking flies. If healthy animals have to pass through an area, where surra is known to exist and blood sucking flies are prevalent, the chances of healthy animals marching through the area without contracting the disease are very remote. Near to the water area or close to a permanent pond in a grazing ground in the plains, Tabanidae were found to be prevalent.

Flies from twenty six villages were collected and sent to the Principal, Madras Veterinary College, and to the Director, Imperial Veterinary Research Institute, at Mukteswar. All the flies proved on examination to be members of the genus *Tabanus* as stated by the Principal, Madras Veterinary College and they were specifically determined at Mukteswar as *T. striatus*, *T. virgo*, *T. tenens* and *T. rubidus*. While it is obviously not possible as yet to declare with any degree of certainty, whether one or more of these species were actually concerned in the spread of the disease, it is significant, that according to the local reports, flies were more numerous during this year than usual in the affected areas.

Curative and prophylactic measures adopted :

Curative :—The records of chemotherapy of this condition in the bovines are rare in this presidency. Venkataratnam chetty (1922) attempted treatment of a few ailing cattle with atoxyl and arsenic but not with much success.

Anantanarayan Rao (1923) tried sterilised extract of Neem leaves (*Melia Azaderachta*) in cattle surra with apparent success when given intravenously in doses of 250 to 500 c.c. There is no support in the subsequent years to confirm to findings and the efficacy of the method adopted. Mahajan (1934) found a 10% solution of Nağanol effective in cattle surra, if the intravenous administration of the drug was carried out sufficiently early in the course of the disease. The dose is 25 c.c. It is stated that the trypanosomes disappeared from the blood in about 16 to 18 hours after injection.

Bachan Singh (1935-1936) says that one intravenous injection of Tartar emetic has proved to be effective, when given in the initial stage of an acute form of the disease.

In this presidency Nağanol is used as a curative for the treatment of equines as a routine. This drug being a costly one, cannot be used as a routine for treatment of the affected bovines. A less expensive drug will have to be used so as to bring about a substantial reduction in the ultimate cost of the treatment. For the field worker, antimonium tartaratum is the only choice for its cheapness and practicability. Though the drug is much cheaper than "Bayer 205", the disadvantages following its use are very many. The drug is to be used with great caution.

Antimonium tartaratum, given intravenously in doses of 5 to 7 grains in 20 c.c. distilled water, has been used by the staff of the C. V. D., Madras in a number of centres and the results obtained are very encouraging. In the writer's experience, one injection of 5 grains intravenously in 20 c.c. of distilled water has been found very satisfactory and no untoward results have occurred.

In one acute case when 8 grains of Antimony Tartarate was given in 20 c. c. of distilled water intravenously the animal died, within 5 minutes. Similar experiences have been recorded by other workers, hence the necessity for using the drug with caution.

Prophylaxis :—It is a well known fact Tartar emetic, in spite of its powerful trypanocidal properties, diffuses quickly and is excreted completely from the body in a couple of days. Hence the drug cannot be of much value, as a prophylactic. Nağanol, on the other hand, by virtue of its larger molecular structure is said to remain in the blood in sufficient trypanocidal concentration for longer periods without being excreted. Hence this drug is of much value as a prophylactic. But as the cost of the drug is

prohibitive, Antimonium Tartaratum only was used as a prophylactic. Protective inoculation in 5 grain doses of antimony tartarate was carried out by the staff in 15 villages in the Conjeevaram taluk. In 13 of these, the animals concerned received only single inoculation, in the remaining two, a two dose schedule was adopted. These inoculations were done by the Veterinary Assistant Surgeons specially deputed for the purpose. From the information obtained it would appear that all the inoculated animals remained free from infection during that season.

Discussion :

The occurrence of the disease has been recorded in some of the same centres where the disease occurred during 1919 and 1932. This fact is an indication of the persistence of the infection in a dormant stage. Further, in the present outbreak it was reported by the ryots that the flies were more abundant during this year than the previous one. Hence it is worthwhile to study the part played by these flies, in the transmission of the disease.

Since Surra in Indian cattle is generally considered as a non-pathogenic affection the exact factors that are responsible for the periodical occurrence of such acute infections as the above recorded ones have to be closely studied.

As regards the animals affected, it has been particularly noticed that the white cattle especially bullocks are more prone to the disease than buffaloes; and even among the white cattle, draught animals suffer more than cows and the young stock. The etiology of this condition remains to be explained. The disease appears to be more common near water logged areas, tanks, irrigation channels and wells etc.

Summary and conclusions :

Bovine trypanosomiasis has been noticed in an enzootic form in North Arcot, Chingleput, Nellore and Chittoor districts with a mortality of 90 to 95% in acute cases.

The infection was noticed among canines also in two centres.

Among bovines, draught bullocks suffered most.

The spread of infection is facilitated by the movement of cattle for different purposes.

The disease has a distinct seasonal incidence, which closely coincides with the fly season.

The disease occurred in different places with varying virulence.

Antimonium tartarate both as a curative and prophylactic has given some encouraging results.

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A NOTE ON CHRONIC INFECTED WOUNDS IN ANIMALS. *

BY

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Introduction and Review of Literature.

"It is remarkable that the problem of wound infection which has engaged the attention of mankind since the dawn of history should still be a topic for discussion and controversy. Seventy years ago it seemed to be solved—yet today the solution still eludes us and we are even beginning to doubt whether much of the road trodden so laboriously may not have been in the wrong direction." These remarks made by Ogilvie in 1940 have acquired additional significance since the advent of various chemotherapeutic agents and antibiotic substances which have completely altered the concept of infected wounds. Most of these new drugs are very effective either by their bacteriostatic or bactericidal property; yet their action is limited only to particular types of organisms and even that under specific conditions. Choosing drugs "by tradition or by fashion" is no longer considered beneficial in all wound infections. As such for a rational treatment it is essential to ascertain the type of bacterial infection as also the therapeutic action of various drugs so that proper drugs with a definite action on those organisms may be selected. Rapid strides in this direction have been made during recent years on the bacteriological study of infected wounds of man and a number of useful articles in medical literature are now available. Unfortunately no detailed information is available along these lines in the Veterinary field. Although the method of treatment in animals is largely influenced by economic considerations and by the low hygienic surroundings in which live-stock exist, yet an investigation into the bacteriological study of wounds in animals is also desirable. While most human wounds receive more or less prompt treatment those of animals, as a rule, escape immediate attention, the treatment being adopted only after infection, probably by a large variety of bacteria, has gained a strong foothold. It would thus appear all the more necessary that wounds of animals should be intensively studied, with special reference to old wounds defying the routine treatment, and this article is a record of an attempt in this direction.

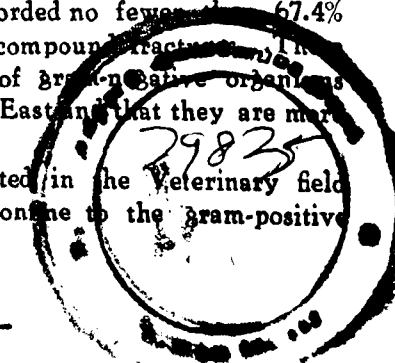
The Recent War gave a great impetus to the study of 'war wounds' of man and most of these surveys are confined only to acute severe injuries. It was believed till recently that the organisms that are commonly encountered in wound infections are mostly of the gram-positive type

*Read at the Provincial Conference of the Madras Veterinary Association in September 1946.

either Staphylococci or Streptococci and it was even expressed that the gram-negative organisms are very infrequent and are of little or no significance in wound infections. The report of the Medical Department of the U. S. Army in the last war (1929) mentions "that a combination of haemolytic streptococci and staphylococcus aureus was the most prominent of all the bacterial associations in wounds". Miles (1944) points out that "the two outstanding causes of severe wound infections are Staph. aureus and Strep. pyogenes, the one being present upto 100% and the other upto 70% of the infected wounds.....the two pyogenic cocci on the other hand are so prominent in wound infection that the epidemiology of infection by Staph. aureus and Strep. pyogenes not unfairly represents the epidemiology of wound infection as a whole." Similarly, examining a mixed group of 192 wounds in El Alamein campaign Pulvertaft (1943) found Staphylococci in almost 70% and in a small proportion of brain wounds. Cairns (1944) reports similar flora and Bodenheimer (1943) notes that in burns and surface wounds the incidence of Staph. aureus is almost 100%. Florey *et al* (1944,a) dealing with pyogenic infections of hands mentions that "in a great majority of cases the infecting organisms were either Lancefield's Group A Streptococci (*Streptococcus pyogenes*) or a coagulase-positive Staphylococci (*Staphylococcus aureus*) or both." While dealing with wound infection Cruickshank (1940,a) states that "the most important invader in pyogenic infections is *Streptococcus pyogenes* with *Staphylococcus aureus* second and the coliform group together with *Bacillus proteus* and *B. pyocyaneus* third. This last group of gram-negative bacilli usually become prominent in the later stages of the infected wound and they are to be regarded more as contaminants than pathogens although they contribute to the delayed healing of the wound." "With the control of Str. pyogenes and sensitive strains of Staph. aureus by penicillin," Harley *et al* (1946,a) point out that "Bact. coli, Ps. pyocyanea and the Proteus group of organisms have been left free to demonstrate their pathogenic potentialities and to show that in certain circumstances they are capable of behaving in a manner which is anything but saprophytic." They further point out that "in the East, B. coli, Ps. pyocyanea, and the Proteus group now represent the 'Big Three' so far as wound infection is concerned and workers recently coming from Europe should be made fully aware of both their malignant nature and of their ubiquity." Moffat (1946) who carried out investigation on antral, ear and throat affections was impressed by the very high incidence of Bact. coli and Ps. pyocyanea. Harley *et al* (1946,b) recorded no fewer than 67.4% of gram-negative organisms in late infected compound fractures. In recent surveys suggest the high prevalence of gram-negative organisms in wound infections of human beings in the East and that they are more than mere contaminants.

No similar studies have been conducted in the Veterinary field and the few that are available usually confine to the gram-positive

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infections. For instance, Mitchell (1940) dealing with War wounds and their treatment in animals points out that "the greatest harmful influence which hinders healing of accidental wounds is the presence of micro-organisms, particularly the pus forming organisms, Staphylococci and to a less extent Streptococci." As already stated in this investigation a study of chronic infected wounds in animals has been made and since the mode of wound infection in animals even if more frequent, is more or less similar to that in human beings, attempts have been made wherever possible for a comparative study.

Analysis of Data Collected.

In this study an analysis is made of 524 chronic cases in animals which have resisted healing by the routine methods of treatment and were finally referred to the Bacteriology Laboratory, Madras Veterinary College, for cultural examination and identification of infection. The results of bacteriological examination that are available from April, 1937 till July, 1946 have been consolidated in this paper. These cases comprise different species of animals including cattle, dogs, horses, elephants, cats, donkeys, sheep, goats, stags etc., and for this study they have been classified under three main groups as bovines, canines and others. The following table shows the number of cases examined each year under this classification.

Year	Bovines	Canines	Other Animals	Total
1937 — '38	28	29	3	60
1938 — '39	26	40	2	68
1939 — '40	25	40	5	70
1940 — '41	42	27	6	75
1941 — '42	46	19	2	67
1942 — '43	27	21	3	51
1943 — '44	29	19	1	49
1944 — '45	16	20	1	37
1945 — '46	12	18	3	33
1946 (till July)	4	10	—	14
Total	255	243	26	524

Clinical history in each case is generally one of chronic wound infection from different regions of the body and for all considerations the study can be taken as representative. Investigation was confined only to non-specific aerobic infections and the group of anaerobes was not considered. The types of organisms that were noted in these cases are classified under the following headings:—

1. Coliform organisms:—including Bact. coli and B. aerogenes group and the Proteus group.

2. B. pyocyaneus.
3. Staphylococci:—including all varieties either coagulase positive or negative.
4. Streptococci:—all varieties.
5. Diphtheroids.
6. Micrococci.
7. Mixed infections:—where more than one variety of organism have been encountered, the gram-negative preponderating.

The following table shows the total number of these cases classified under the above headings.

Organisms Encountered	Number of Cases	Percentage
1. Coliform Organisms	149	28'44
2. B. pyocyaneus	158	30'15
3. Staphylococci	171	32'63
4. Streptococci	8	1'53
5. Diphtheroids	15	2'86
6. Micrococci	9	1'72
7. Mixed infections	14	2'67

Since there are 255 cases in bovines and 243 in canines, an analysis in each of these species has been made separately to study any significant variation. The following table indicates the classification of these cases under the headings mentioned above.

Organisms Encountered	Bovines		Canines	
	Number	%	Number	%
1. Coliform Organisms	91	35'69	55	22'63
2. B. pyocyaneus	67	26'27	86	35'39
3. Staphylococci	70	27'45	86	35'39
4. Streptococci	5	1'95	2	0'82
5. Diphtheroids	18	7'06	3	1'24
6. Micrococci	2	0'79	1	0'41
7. Mixed Infections	2	0'79	10	4'12

It will be seen from the above table that the organisms of the gram-negative type predominate in chronic infected wounds which have not healed by the routine treatment. In the total number of cases they are

noticed to be about 59%, in cattle about 62% and in canines about 58%. The increase of about 4% noticed in bovines over the canines and 3% over the total number can be explained by the greater possibilities of soil and faecal infection in bovines than in other animals. The high incidence of gram-negative infections in these cases agree with the findings of Harley *et al* (1946) and with the remarks of Moffat (1946) regarding wound infections in human beings.

Another feature that will be noticed from the above tables is that Staphylococci form the major part of the gram-positive infections and that Streptococci are noticed only in less than 2% of these cases. This fact may appear rather inconsistent with the general idea that Streptococci are very frequent in suppurating conditions. But this may be explained by the fact that these were chronic cases which have resisted healing by the usual methods of treatment including the use of sulphanilamide compounds in some. As pointed out by Mitchell *et al* (1944) the more pathogenic cocci disappear in most cases as the wounds progress.

It is interesting to note that the so-called cases of 'blue pus' are frequent in chronic wounds since *B. pyocyaneus* was noted in 30.15% of the total cases 35.39% in canines and 26.27% in bovines showing an increase of about 8% in canines than in bovines.

The coliform organisms form 28.4% of the total cases and 35.7% in bovines and 22.6% in canines. The increase of about 13% noted in bovines than in canines can be explained by the greater possibilities of soil and faecal contamination in these animals than in others and this explanation is in accord with the remarks of Miles (1944, b) regarding the infected wounds on the limbs and lower portion of the body in human beings which are liable more frequently to a similar infection. It will be further noticed that the percentage of mixed infections is very low, about 3%.

No attempt has been made in this paper to specify the bacteriological identity of all gram-negative organisms encountered. Broadly they represent two varieties (1) *B. pyocyaneus* and (2) Coliforms including *Bact. coli* and *B. aerogenes* group and the *Proteus* group. The following table indicates the incidence of these two varieties in chronic wounds.

Species	Total Number	<i>B. pyocyaneus</i>		Coliforms	
		Number	%	Number	%
Total	306	158	51.63	149	48.37
Bovines	158	67	42.33	91	57.67
Canines	141	86	60.99	55	39.01

It will be noticed that *B. pyocyaneus* occurs more frequently in canines than in bovines while the reverse is the case with the coliform organisms.

Significance of the Analysis in Treatment.

The above findings have great significance for the practising veterinarian on whom lies the responsibility of successfully treating chronic infected wounds. Orthodox lines of treatment occasionally fail to bring about the desired result and unless proper drugs are selected the etiological agent may remain unaffected, thereby jeopardising the practitioner's reputation.

With the introduction of phenol derivatives in antisepsis by Lister (1867) various chemotherapeutic agents have been evolved during the last quarter of the 19th century, for the control of infection. Although the discovery of sulphanilamides and subsequently of penicillin and allied substances has marked a great advance in the treatment of wounds, it has brought to light the fact that the usefulness of these substances is limited more or less to infections of the gram-positive type. As Miles (1944 b) points out "in chemotherapy we have fairly efficient weapons with which to fight coccal infections but not infection with gram-negative bacilli; and already in penicillin-treated wounds the coliforms and other gram-negative bacilli are standing out as relatively intractable infectors of the tissues." It has further been suggested (Florey *et al*, 1944) that there is delay in the healing of wounds treated with penicillin and that penicillin-treated wounds are more susceptible to infection by coliform and other gram-negative organisms. There is enough evidence to show that gram-negative organisms are more than mere contaminants in as much as they delay the normal healing process. Effective treatment of wounds should therefore envisage the control of gram-negative organisms also besides the gram-positive organisms.

In chronic wound infections it is generally recognised that the local tissue reaction is at a minimal level and therefore such drugs which inhibit the already low phagocytic response should not be used in such cases. Drugs of the sulphanilamide group have been considered to inhibit to some extent the leucocytic activity, and utilisation of such agents may delay the healing process to some extent.

As suggested by Cruickshank (1940 b) use of vaccines specially of the auto-genous type either alone or in conjunction with suitable chemotherapy may be useful in these chronic infections since the auto-genous vaccines accelerate the body defences while the local applications help to control and eliminate infection. In this connection it may be pointed out that most of these cases referred to in this article have been supplied with

auto-genous vaccines and about 80% of these cases have been reported to have improved after the vaccine therapy.

Another method of treatment that is gaining popularity in the control of wound infection is the use of a combination of drugs, one having a predominant action on the gram-positive organisms and the other on the gram-negative ones. Effective drugs are available for the control of gram-positive infections, with the penicillin group standing foremost and the sulphanilamide series following them. In veterinary practice the use of penicillin is at present much restricted due to its prohibitive cost, and limited supply; the choice is thus confined to the other group of drugs. Very little information is available about effective drugs for the control of gram-negative infections. Mitchell *et al* (1944, a) point out that "normally these organisms (*B. proteus* and *B. pyocyaneus*) are resistant to most local applications" and "in large series of wounds they are seldom eliminated by any of the commonly used local agents". But Garrod (1940) suggests that *Ps. pyocyanea* which flourishes in the presence of many antiseptics succumbs to dilutions of acetic acid which other bacteria can resist and a 1% solution has been used successfully for dressing wounds infected with this organism". Mitchell *et al* (1944, b) state that there is some evidence that diflavine (2:7 diamino-acridine monohydrochloride) and 5 amino acridine are active against *B. pyocyaneus*. Falconer (1940) describing the experiments conducted by Russell and himself to determine which of the available antiseptics was least damaging to the tissues, suggests that proflavine sulphate and 2:7 diaminoacridine hydrochloride inflict the least necrosis and haemorrhage in the tissues. With this view Selbie and McIntosh (1940) paid special attention to a mixture of sulphathiazole (99%) and proflavine (1%) and reported rapid healing of many infected wounds and similar results have been reported by Mitchell and Buttle (1940). Some of these deserve to be tried in veterinary practice for the control methods of wound infections.

It will be noticed that although 'wonder drugs' have been evolved, the problem of control of wound infections has not been completely solved. Discoveries of suitable drugs and methods that combat the gram-negative infections as effectively as those available for the control of gram-positive infections are highly desirable.

Summary and Conclusions.

A brief survey has been made of chronic infected wounds in animals which have not healed by the usual methods of treatment.

Out of 524 cases considered gram-negative organisms have been noted in about 60% of the cases. Separate analysis of these cases in bovines and in canines has been made.

In chronic wounds, among the gram-negative infections, coliform organisms predominate in bovines (35.69%), while *B. pyocyaneus* occur more frequently in canines (35-39%).

Of the gram-positive group, Staphylococci were found to predominate (32%), Streptococci being noticed only in less than 2% of these cases.

Some alterations in the routine method of treatment of chronic wounds have been mentioned especially with a view to controlling gram-negative infections.

It is evident from this study that the bacteriological investigation of chronic infected wounds will be very helpful to the practitioner in the line of treatment to be adopted.

I take this opportunity to express my thanks to Sri M. Y. Mangrulkar, Lecturer in Pathology and Bacteriology, Madras Veterinary College. His guidance in the preparation of this paper has been immense. Mr. K. S. Nair, Principal, Madras Veterinary College, has been kind enough to permit me to utilise the records of the college for the study and I wish to thank him.

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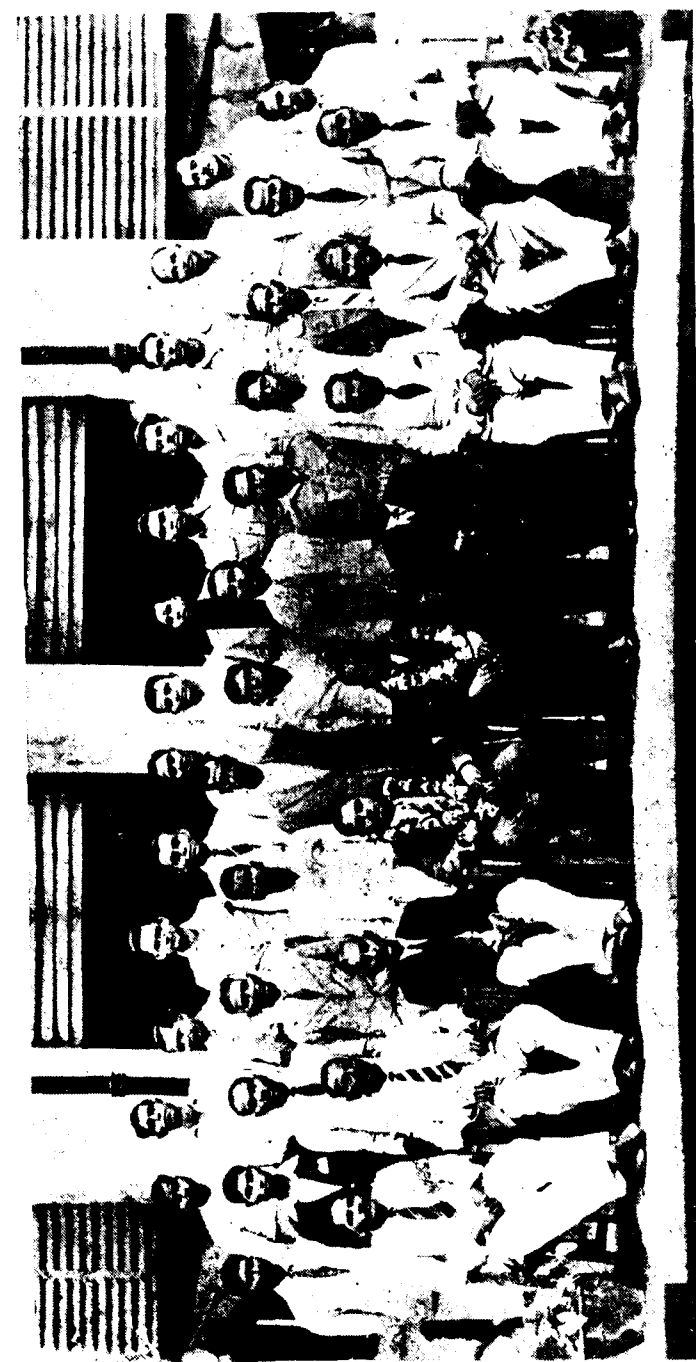
development as a very essential preliminary for the healthy development of human-beings has not been sufficiently recognised in practice, though in the speeches and harangues of men in position and power, the subject has been given its due importance. Our repeated attempts to focus the attention of the Government to this important subject and our earnest pleadings to the Government to act the Prince to this Cinderella of their Departments have not, we must admit candidly, met with any appreciable response so far. Now that the popular Governments with representatives of the people have been formed in the various Provinces and in the Centre, we fervently hope that, in the year 1947, we will see a new orientation in the policy of the Government and that many of the schemes which have been drawn up for the development of Animal Husbandry, will be actually launched for the benefit of the country and the people.

ASSAM'S PLIGHT.

We publish elsewhere in this issue extracts from the "Assam Tribune" and from the proceedings of the Assam Legislative Assembly which, we are sure, will be painful reading to our readers as it has been to us. They all show how inadequately Assam is served in regard to her Veterinary requirements. Paucity of trained Veterinary personnel, inadequacy of pay and prospects for even the few existing personnel, extensive jurisdiction, heavy cattle mortality from preventable contagious diseases, non-availability of Biological products in time for the combating of contagious diseases—these and similar other factors constitute the major vital defects in the administration of the Department of Veterinary Services. Effects of past neglect of the Department by the Government are evident in these defects and the Hon'ble Minister in charge of the Department did not mince his words when he expressed himself as follows: "Sir, that this Department has been so long neglected is not the fault of this Government. The blame lies at the door of the previous Government. I am fully in agreement with my friends that this Department of Veterinary needs all round improvement and for that purpose arrangements are being made

SECOND ANNUAL GENERAL MEETING ORISSA VETERINARY ASSOCIATION

Cuttack, 31-1-46.



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P. A. PARTHASARATHY NAIDU, G.M.V.C.,
Retired District Veterinary Officer, C.V.D., Madras.



K. S. NAIR, G.B.V.C.,
City Veterinary Department, Singapore, S.S.

for developing the Department..... At present the urgent need is for more staff in order to combat diseases like Rinderpest and other contagious diseases that are creating havoc in the country. The present staff that we have in our control is very very inadequate." These frank words coming as they do from the Hon'ble Minister give us hope that better days are ahead for the Department, and that the Minister will soon arrange to remedy the past neglect. Opening of a Research Institute for the preparation of Biological products for the control of contagious diseases appear to be very urgent as also starting of a Veterinary College. Needless to say that the Veterinary staff must be put on an adequate scale of pay and prospects as otherwise the Department will not attract the right type of students.

We understand that the Government is considering a proposal to create a separate post of Director of Animal Husbandry, independent of the Director of Veterinary Services. This is quite an unnecessary and superfluous creation and will be only a spoke in the wheel of progress. It has been accepted by one and all that "in the interests of efficiency and economy, livestock improvement and Veterinary work, should be unified under one single Department", and as such it passes our comprehension how Assam has come to think of a proposal to start a separate Animal Husbandry Department. The splendid livestock work which forms a special feature of Punjab is solely due to the fact that livestock development work has been in the hands of the Veterinary Department for a long number of years and, therefore, we would advise the Assam Government not to think of a special Livestock Department but to expand the existing Veterinary Department and include livestock operations in its scope of work.

RETIREMENT.

P. A. Parthasarathy Naidu, G.M.V.C.

Sri P. A. Parthasarathy Naidu, one of the pioneers of the the Madras Veterinary Department, retired recently on superannuation after a distinguished service of nearly 31 years.

He was one of those few Madrasis who was attracted to the Madras Veterinary College at its very inception. He joined the institution in 1909, after completing his early education at the Wesley College, Madras, and passed out creditably after three years. During his stay in the College he took a leading part in organising various out-door games and won several prizes in the Annual College Day sports. He won the championship cup awarded for the best atheletic in his Final Year in 1911. After graduating, he joined the Civil Veterinary Department as a Touring Veterinary Assistant Surgeon and toured in the various districts of the Presidency. He was one of those hardy pioneers who had to lead a semi-adventurous life in the efficient discharge of their duties and in popularising the benefits of scientific Veterinary treatment among the rural folk, who in those days, in their blissful ignorance, looked upon any "inoculation" with distrust and suspicion.

He was an earnest and resourceful Veterinary Practitioner and he will ever be remembered by the profession as being the very first person who introduced the successful treatment of Bovine Nasal Schistosomiasis by the intravenous injection of Antimonium Tartaratum. This was in the year 1921, though the cause of this disease was discovered only about 13 years later. This should have brought him some encouragement and recognition from the higher authorities but, unfortunately, the administration, being a wooden one, took very little notice of such a promising young enthusiastic worker. In course of time, Sri Naidu underwent his Post-graduate course and passed that examination with distinction. He was then drafted to the Madras Veterinary College as an Assistant Lecturer, in which capacity he worked for about 10 years with singular ability and distinction, much loved by the staff and students alike. During the latter part of his career, he was promoted to the Gazetted rank and posted as a District Veterinary Officer. He was a great success there also and was held in high esteem by his own staff and by the public.

After retirement from Government service, he served for some time under the War Food Department and was in charge

TRAINING ABROAD



A. E. KULKARNI, G.B.V.C.,
Bombay



C. R. SANE, G.B.V.C.,
C.V.D. Bombay



S. V. SAKHADEO, G.B.V.C.,
C.V.D., Bombay.



G. VENKATACHALAM, B.Sc., G.M.V.C.,
Madras.

TRAINING ABROAD



Z. A. HASHMI, V.I.O.,
Ajmer-Merwara.



MAQSOOD, L.V.P. (Hons.)
C.V.D., Punjab.



ALAUDDIN AHMAD, B.Sc., B.Ag.,
C.V.D., Bengal.



AKHTER HOSSAIN, G.V.Sc.,
C.V.D., Bengal.

of the Military Dehydration Meat Factories at Madras and Poona.

Very cheerful and optimistic in outlook, Sri P. A. Parthasarathy Naidu has been a popular figure among the Veterinary Surgeons in Madras. Though "old" according to Government calculations, he is still very young in spirits and we are glad to hear that he has been elected as Secretary of the Madras Veterinary Association.

We wish him a long period of active and healthy life in his "retirement".

Training Abroad.

We are glad to announce that the following persons have been selected for training in U.K., and U.S.A., for higher studies as Government Scholars from the different Provinces and States:—

Civil Veterinary Department, Bombay.

S. V. Sakhadeo, G.B.V.C.	Animal Genetics, U.S.A.
C. C. R. Sane, G.B.V.C.	Animal Husbandry, U.K.
A. E. Kulkarni, G.B.V.C.	Horse Breeding, U.K.
	(Privately)

Civil Veterinary Department, Bengal.

Alauddin Ahmad, B.Sc., B. Ag.	M.R.C.V.S., in U.K.
M. Akhter Hossain, G.V.Sc., P. G. (Mukt.).	Advanced training in Poultry Diseases at U.K.

Civil Veterinary Department, Punjab.

M. Maqsood, L.V.P. (Hons.) P. G. (Mukt.).	Advanced studies in Physiology, U.K.
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Rajputana.

Z. A. Hashmi.	Training in Poultry Husbandry, Michigan State University, U.S.A.
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Madras.

G. Venkatachalam, B.Sc., G.M.V.C. Advanced training in
Veterinary science,
Michigan State College,
U.S.A. (*Privately*).

Imperial Veterinary Research Institute, Izatnagar.

Dr. D. N. Mullick, M.Sc., Ph.D., Advanced training in
Physiological Hygiene.

Civil Veterinary Department, Central Provinces & Berar.

Abdul Hamid Khan. Dairy Science
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Clinical Articles

A CLINICAL INVESTIGATION ON CONTAGIOUS GASTRO ENTERITIS IN SHEEP AT THE LIVESTOCK RESEARCH STATION, HOSUR*

BY

M. RAMAKRISHNAN, G.M.V.C.,
Veterinary Investigation Officer, Madras.

Introduction:

The Livestock Research Station at Hosur is situated in Mathigir Village of Hosur Taluk in Salem District, bordering the Mysore State. The elevation of the place being about 3,000 feet above the sea level, the climate is very cool and mild and of a dry kind. March and April are the hottest and December and January are the coldest months in the year. The Farm comprises mainly of dry lands measuring nearly 1,800 acres—a major portion of which is utilised only as a pasture area. Hence there is ample facility for the grazing of animals throughout the year excepting the hot summer months. While spear grass is of natural growth in the Farm, a few acres are cultivated with Guinea grass, Lucern and Berseem. The soil being mostly of red gravel, there is no chance for the stagnation of water during rainy season anywhere within the main farm land. This is further facilitated by the natural sloping of the land and other drainage arrangements. But in spite of all these natural facilities and artificial arrangements for proper drainage, there is a lowlying area adjoining the Kurnoor tank where most of the storm water from the farm stagnates. In fact it is into this low lying area that the feeding channel first empties itself and whence the water to the main reservoir finds its way. When the tank becomes full regurgitation takes place from the main tank and a shallow area of 8 to 10 acres is submerged in about waist to knee-deep water for $1\frac{1}{2}$ to 2 months or even sometimes longer and then slowly passes to the main tank when the water level gets gradually reduced. It is this area, that always contains an abundant growth of green grass even during summer months when other parts of the farm become dry. A similar area could be noticed in Jiggoor tank along its upper margin but the extent involved is less.

Conditions of feeding, housing and management.

All the animals are sheltered for the night in well-protected and ventilated stalls. Drinking water from the wells is readily supplied in

*Article read at the Provincial Veterinary Conference, Madras, held in September, 1946

tubs. All the animals are allowed a free range of grazing and in addition, they are given concentrates in appropriate quantities. While the young stock gets skimmed milk upto five to six months, lambed ewes are supplied with green fodder up to one month. All hygienic measures such as cleaning white washing and liming of stalls and pastures together with veterinary aid are readily provided. Regular worm-dosings against helminthic infections are carried out periodically.

Sheep breeding has been going on in this farm since 1924. From 1924 to 1937, the breeding was one of selective kind being confined purely to the Bellary breed only. From 1938 onwards, both selective and cross breeding with Bikanir rams are being carried out. The percentage of annual mortality among sheep (*Vide Table No. I*), due to various causes from 1924 to 1938 was between 2'35 to 12'93. But during 1939 it suddenly shot up to 22'83 and there was a slight decline to 15'40 in 1941. Again it rose up to 40'37 in 1942 and to 36'91 per cent in 1944.

It was among the animals of this farm, that a severe epidemic which was hitherto unnoticed in this Presidency broke out in two outbreaks—the first one in March 1942, and the second one in January 1944. The disease was of a highly infectious kind, characterised by acute enteritis, bottle-like sero-gelatinous swelling at the jaw, and sero-sanguineous effusion at the peritoneal and pericardial sacs—sudden invasion, rapid advance with a mortality ranging up to 70 percent. In both the outbreaks, the sheep were in excellent condition at the time when the disease broke out. In the first outbreak, the ewes were nearing parturition but in the second, the disease started when the animals were of about two to two and a half month's pregnancy. In both the outbreaks, the number of adult ewes, that got affected, topped the list.

Literature Review:

A similar disease in sheep to the one described in this paper has been recorded in western countries like Ireland, Wales, part of Scotland and Germany under the name of either Braxy or Bradsot. The first record on its clinical aspects was made by Viborg as early as 1846 and later by Krabbi in 1875. Nielson (1888) found out the organism responsible for the condition and the same was identified as *Vibrio septique* by Gaiger (1922) and by Jensen (1924). Borthwick (1934) conducted laboratory experiments and obtained further confirmation.

During 1925, 26, Dalling tried vaccination experiments in the form of a combined vaccine in Braxy and Black-leg in sheep. Gordon and Dungal tried a formalised whole culture of *Clostridium septique* with favourable results.

Viswanathan (1945) is the pioneer worker on this disease, in India, who brought to light the existence of this condition under the name of Braxy. An earlier record has already been made by him in the form of a "Talk and Discussion" at the last Annual Conference of the Madras Branch of the All-India Veterinary Association, held in April 1945.

Object of the Investigation.

Since the author happened to be posted to the Veterinary Hospital at the Hosur Cattle Farm during 1942 (i.e.) immediately after Mr. Viswanathan had finished his investigations and pronounced his opinion as Braxy on the disease, he (the author) thought it worthwhile to collect all the relevant clinical data available on the spot with a view to either correlate or contradict the findings of the previous worker, depending upon the results obtained. It is with this intention that he collected the necessary field data which are compiled in this article.

Animals Affected.

Though the Farm contains Sheep, Cattle and Buffaloes, sheep were the only victims affected. Ewes in lambs died mostly. Rams were the next in order. Yearling lambs got the infection but were found to be more resistant than the adults. Weekold lambs withstood the disease admirably. In fact, most of them, though suckling their infected mothers never got the disease at all.

Breed susceptibility.

From the figures available, it appears that both the pure and the cross-breeds are equally susceptible, the percentage of attacks and deaths being about 50 and 75 percent respectively.

Predisposing Causes

In the first outbreak the disease started immediately after shearing and in the second two months after shearing. In the first outbreak, the ewes were nearing parturition and in the second, they were of two to two and a half months' pregnancy. The above two factors produce conditions favourably for easy infection and spread of the disease. Because immediately or a short time after shearing the bare body of the animal with slight shear wounds here and there serves as the best avenue of infection. In the case of pregnant animals naturally they become easy receptors of the disease owing to the reduced vitality. Since the above two conditions existed during the time of both the outbreaks, there is every possibility that these two factors might have jointly or severally helped the easy spread of the disease.

Source of Infection:

The whole area of the farm in question is well protected with wire fencing all round, and there is absolutely no chance for the infection from

being brought from outside source. When enquiries were made in the adjoining villages within a radius of 5 to 6 miles from the Farm, with a view to finding out the existence of the infection elsewhere, it transpired that just about the same time as the infection started in the Farm, there were two outbreaks of a similar nature, one at Godusantha (6 miles from the Farm) with 60 attacks and 30 deaths and the other at Sarakapalle (5 miles) with 50 attacks and 40 deaths. In both these villages, the animals affected were only sheep. Though there were goats grazing with the same herd, they did not get the infection. Cattle and buffaloes were also free. The symptoms noticed by the shepherds appeared to be similar to those noticed in the farm and the deaths were mostly confined to the adult stock. But as already mentioned, there is no chance of the infection from any of these villages, being brought into the Farm, since outside animals have no entry into the Farm lands, nor the Farm animals are allowed to leave the farm premises. When we consider the period at which the disease started in the Farm, it is seen that the first outbreak started during the hot weather (*i.e.*) on the 21st of March 1942, and the 2nd outbreak started just during the latter part of winter (*i.e.*) 7th January on both of which seasons, we don't expect to find much pasture. During the time of the first outbreak particularly (*i.e.* 21st March), the pasture was dry and the animals had necessarily to go to low lying areas where they could have some grazing. It is thus possible that they might have picked up the infection from the soil from some of the low lying areas within the Farm itself, especially when they have to graze quite close to the ground owing to the scarcity of grass in the hottest part of summer. Further, there is evidence to show that the ewes and ewe lambs were grazing in the vicinity of the Kurnur tank at low lying area already mentioned and ram and ramlambs near the Jiggoor tank, just before the commencement of the first outbreak.

Etiology.

Smears and other pathological materials from most of the cases that died of the disease were sent to the Principal, Madras Veterinary College and the results received were "No organisms of any specific kind were noticed." Blood transmission experiments conducted by the Superintendent, Serum institute, Madras on buffaloes for Rinderpest, and the same experiments conducted by the Veterinary Investigation Officer, Madras, on rabbits for haemorrhagic septicaemia have both given negative results.

Mr. G. R. Viswanathan visited the Farm during both the outbreaks, conducted postmortem examination on a number of carcasses and took materials for microscopical and biological tests. His report is as follows—"Biological tests conducted on guineapigs with the abomasal cultures revealed lesions of braxy." This finding of his is further confirmed by the Director, Imperial Veterinary Research Institute, Mukteswar, in his following two letters.

(1) Letter No. V/12, dated 12-1-43.

"The tubes sent with your letters referred to in the above quoted letter contained a variety of organisms but one resembling *Clostridium septique* was isolated from some of them. The organism corresponds to *Clostridium septique* in cultural and biochemical characters, but the identification should be held as tentative pending cross immunity tests for which small animals have so far been unobtainable."

(2) Letter No. V/84, dated 8-4-1943.

"Of the several specimens sent by you from diseased sheep from Hosur Cattle Farm, only the culture recovered from the heart blood of guinea-pig No. 18 proved to be *Clostridium septique* by immunological tests."

Hence it is seen that the etiology of the disease has been definitely settled to be one of *Clostridium septique*.

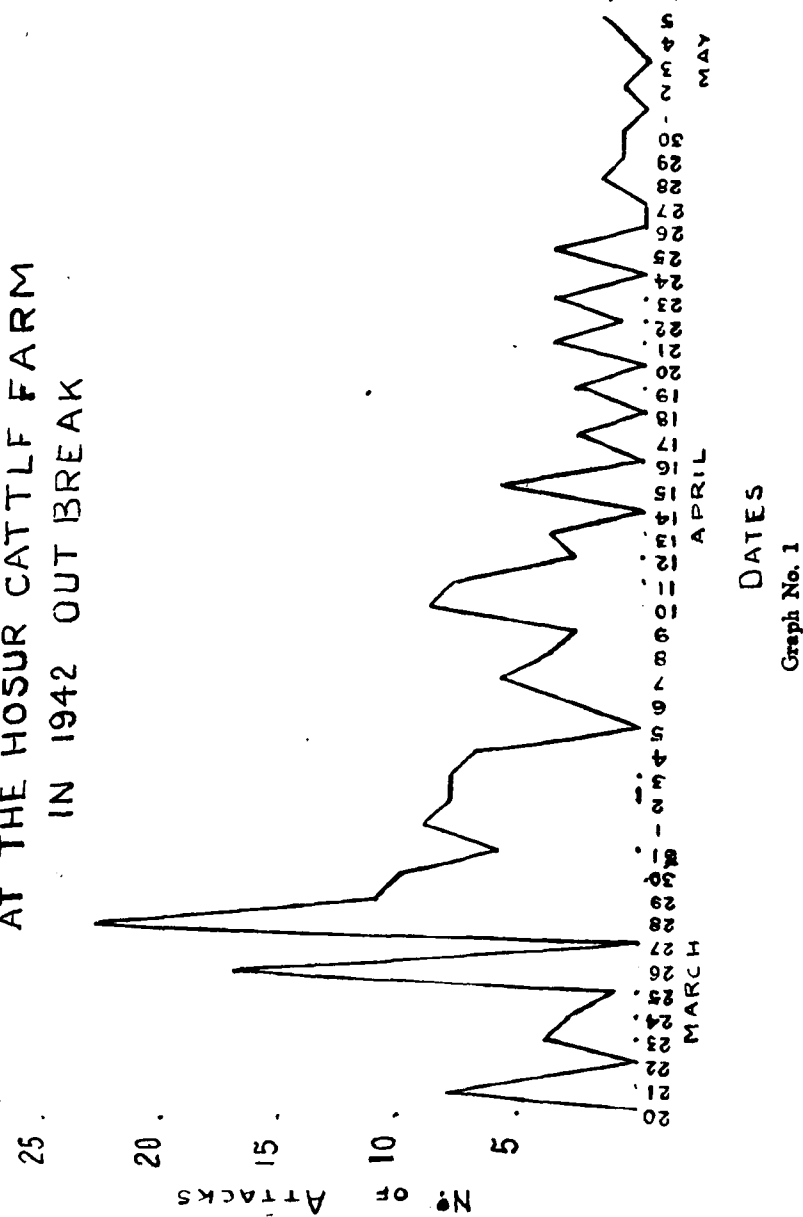
Course of the outbreak.

The first outbreak started all on a sudden with 8 attacks on the first day. It went on suddenly decreasing upto the fourth when the number attacked was actually one. Then again it shot upto 17 attacks on the fifth and 23 on the seventh day—the highest number recorded on a single day in this outbreak. After the end of the first week, there was a steady decrease until at last it was one or two per day towards the end of the outbreak. Graph No. 1 gives the details. From this graph it is evident that while there were as many as 23 attacks on a single day by the end of the first week, it went on steadily decreasing to either one or two towards the end of the outbreak. Further the outbreak had a prolonged course of 45 days from the commencement to the end. From this it would appear that the disease is highly infectious and contagious not only due to its prolonged course, but also in virtue of its heavy number of attacks at the beginning of the disease and comparatively very low number at the end. The high number of attacks at the commencement and very low number at the end of the outbreak are factors strongly in support of the disease being one of bacterial in origin.

Percentage of Infection and Mortality.

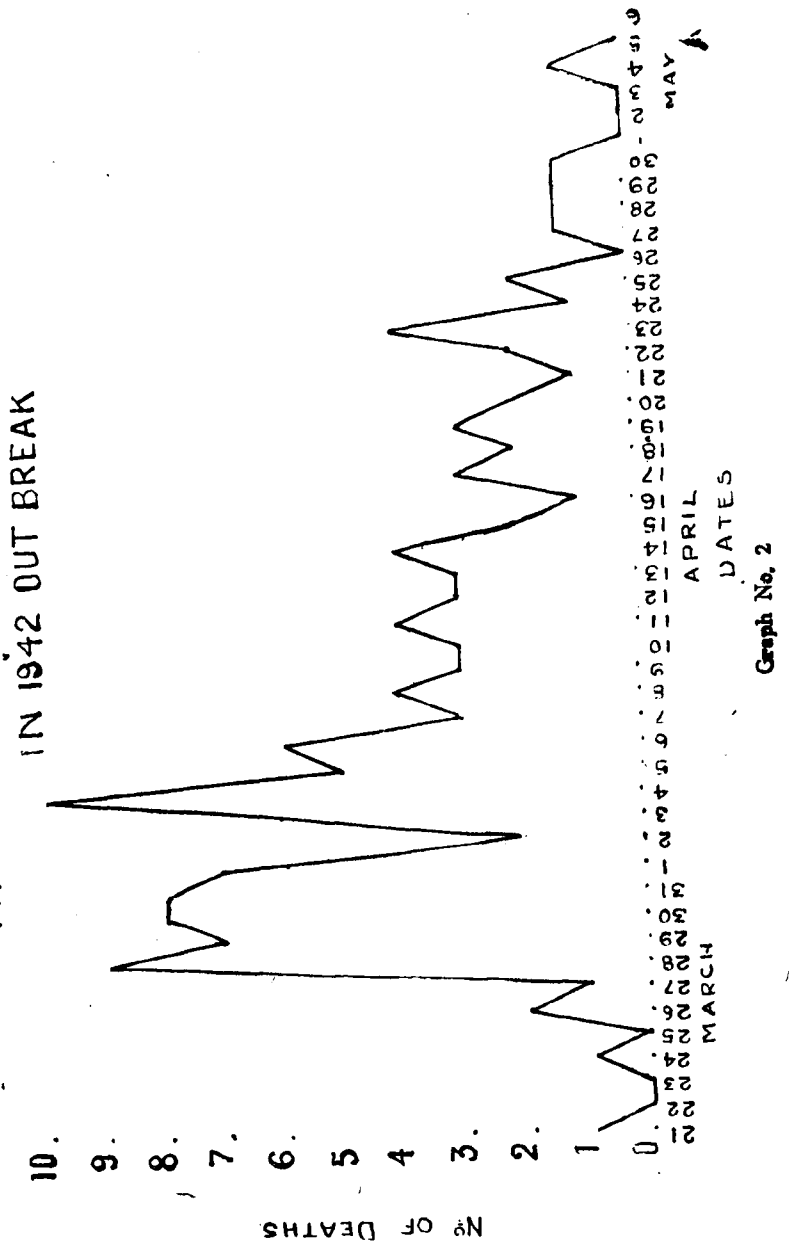
In the first outbreak (1942) out of a total healthy stock of 317 animals (sheep) 188 got the attack and 128 died. Thus the percentage of attacks to the healthy and the percentage of deaths to the number attacked are respectively 60 and 70. In the second outbreak also out of a total of 230 animals, 115 got attacked and 85 died—the percentage of attacks to the healthy and the percentage of deaths to the number attacked being almost the same as in the previous outbreak.

GRAPH SHOWING THE NO OF ATTACKS PER DAY
DUE TO CONTAGIOUS GASTRO ENTERITIS
AT THE HOSUR CATTLE FARM
IN 1942 OUT BREAK



Graph No. 2 gives the details of daily mortality as recorded in the first outbreak. It starts with one death on the first day reaches by almost gradual rise the maximum of 10 at the end of the first fortnight. Then there is almost a gradual fall to either one or two deaths by the end of the outbreak. Thus while the mortality wave almost approximates that of

GRAPH SHOWING THE NO OF DEATHS PER DAY IN SHEEP
DUE TO CONTAGIOUS GASTRO-ENTERITIS
AT THE HOSUR CATTLE FARM
IN 1942 OUT BREAK



infection in its gradual ascent and descent, both the waves seem to jointly and severally lend their support to the view that the disease is one of bacterial in nature.

Though there has been such a high incidence and heavy mortality it is very interesting to note that while adult animals suffered most, the young

stock have comparatively resisted the infection. There were suckling lambs as many as 60 alive after the first outbreak which had survived the infection, and which were subsequently hand-fed even though they had lost their mothers either immediately after birth or a few days later. Table No. II and Graph No. III give the necessary details.

Table No. I.

Statement showing the details of total Livestock and mortality among sheep during the years 1924-25 to 1943-44 at the Livestock Research Station, Hosur Cattle Farm.

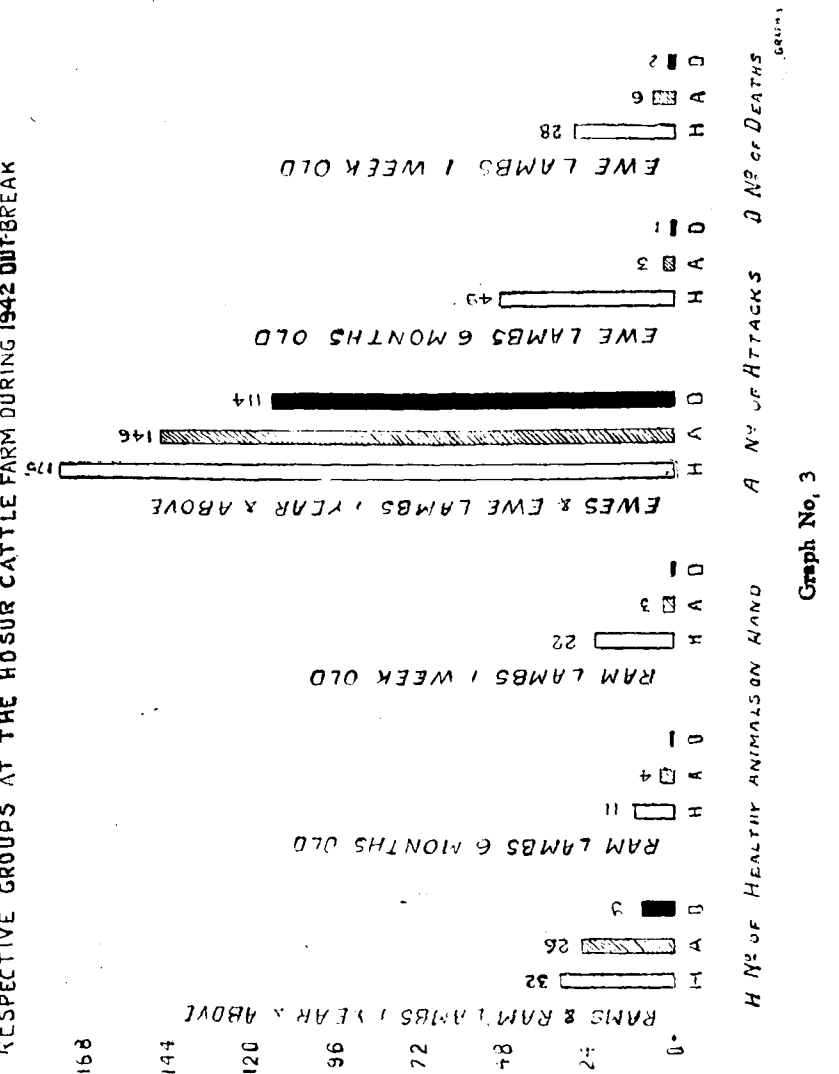
Year.	Livestock.	Mortality.	Percentage.	Remarks.
1924-25.	170	4	2.35%	
1925-26.	207	13	6.28%	
1926-27.	275	11	4.00%	
1927-28.	330	42	12.72%	
1928-29.	352	28	7.95%	
1929-30.	348	45	12.93%	
1930-31.	334	36	10.78%	
1931-32.	223	32	14.35%	
1932-33.	226	28	12.39%	
1933-34.	163	21	12.88%	
1934-35.	182	9	4.95%	
1935-36.	200	12	6.00%	
1936-37.	178	19	10.67%	
1937-38.	137	15	10.95%	
1938-39.	265	26	9.81%	
1939-40.	368	84	22.83%	
1940-41.	371	71	19.14%	
1941-42.	396	61	15.40%	
1942-43.	317	128	40.37%	
1943-44.	230	85	36.91%	

Table No. II.

Statement showing percentage of infection to the healthy stock and the percentage of mortality to the number attacked among sheep at the L.R.S. Hosur, during the 1942, outbreak.

Particulars of Animals affected.	Healthy on hand.	Number affected.	Number died.	Percentage of attacks.	Percentage of deaths.
Rams and ram lambs 1 year old	...	32	26	81%	38%
Ram lambs 6 months old	...	11	4	36%	25%
Ram lambs week old	...	22	3	14%	33%
Ewes and ewe lambs 1 year old	...	175	146	83%	71%
Ewe lambs 6 months old	...	49	3	6%	33%
Ewe lambs week old	...	28	6	7%	33%

GRAPH SHOWING THE NO OF HEALTHY ANIMALS ON HAND AT THE COMMENCEMENT OF THE DISEASE WITH ATTACKS AND DEATHS IN THE RESPECTIVE GROUPS AT THE HOSUR CATTLE FARM DURING 1942 OUTBREAK

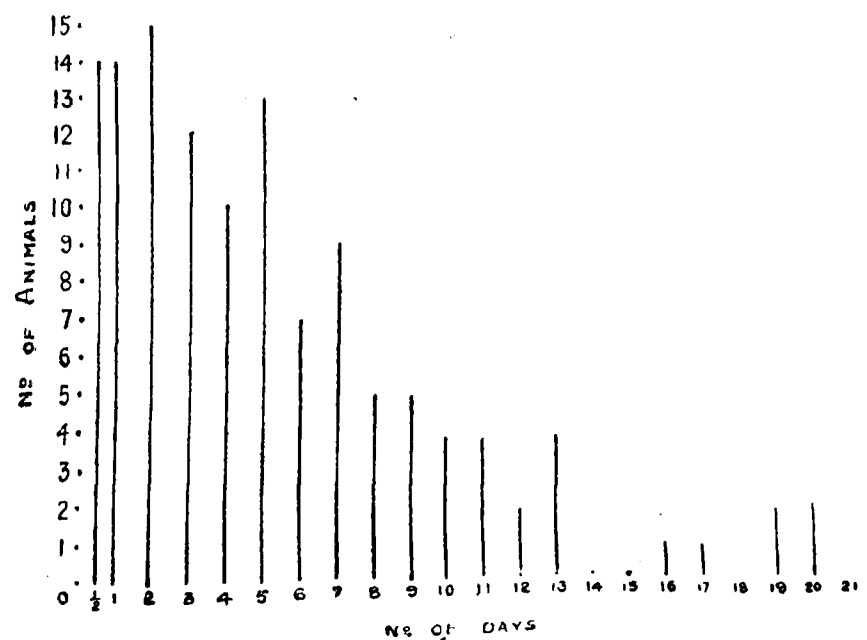


Graph No. 3

Duration of illness.

Duration of illness varied from 12 hours to 20 days in the majority of the cases. In the hyperacute stage it ranged from 12 to 24 hours, in the acute stage from one to 2 days and in the chronic stage from 5 to 20 days. In four exceptional cases, swelling of the throat and diarrhoea persisted from 60 to 65 days. While ewe No. 68 and ram No. 302 had swelling and diarrhoea for 64 and 65 days respectively and died, Ram Nos. 101 and 206 had both the above affection for 60 and 65 days and recovered. Since these four animals form rare exceptions, they are deleted from the Graph (Graph No. IV), which gives the details of duration of illness.

GRAPH SHOWING THE DURATION OF ILLNESS OF
CONTAGIOUS GASTRO-ENTERITIS IN SHEEP AT
THE L.R.S HOSUR DURING 1942 OUT BREAK



Graph No. 4

From the above graph, it would be seen that the duration of illness can be roughly divided into three phases, namely, 12 hours to 5 days, 6 to 13 days and 16 to 20 days. Of these three phases, the number of animals affected in the first one is 78, the number in the second is 40, and that in the third and the last phase is 6. The difference between the first and the last phase is very striking. This goes to prove beyond doubt the acute nature of the disease.

Symptoms :

The sudden appearance of illness in a healthy flock is the characteristic feature of the disease. The animals that were found quite hale and healthy the previous evening were found either badly attacked or dead the next day morning. So much so, it was not possible to record any symptoms in the few animals that died at the commencement of the disease. These may be put down to hyper acute cases. In the acute cases, if noticed very carefully the affected animals will lag behind from the rest of the herd during progression or will stand quiet and aloof when other animals

are grazing. The temperature will be from 105 to 108° F., and slight dullness may be noticed. In one or two days, the characteristic circumscribed swelling appears at the jowl which was present in 80 to 90 percent of the cases. The swelling used to appear in the evening and disappear in the morning. In some animals, the whole face and head were found swollen in addition to the jowl giving the appearance of a miniature hippopotamus. The consistency of the swelling used to be soft and flabby. During this stage, the affected animals totally refuse any food, and they appear decidedly ill, standing most of the time quiet with their heads drooping. Diarrhoea may or may not supervene. But death occurs in two or at the most three days. These may be classified as acute cases.

In the subacute cases, the jowl swelling increases in size with the evening and decreases with the morning. The consistency of this swelling also becomes harder and harder slowly. By the third or fourth day, greenish watery diarrhoea starts. One or two days after the diarrhoea has set in, if the animal is able to withstand the disease certainly there is a bright look in the animal, the temperature almost drops down to normal, and the animal even takes to some feeding and grazing. This stage may last from three to six or even seven days, towards the end of which it may suddenly die.

The behaviour of the chronic cases is really interesting to record. There will be a hard circumscribed lump hanging almost like a pendulum at the jowl. The typical watery greenish diarrhoea will be passed very frequently. The animal will be moving and grazing sometimes even running about as though there is nothing wrong with them. Neither the throat swelling nor the diarrhoea will disappear till the animal dies of emaciation, weakness and exhaustion. As mentioned already the diarrhoea and throat swelling persisted upto a little over two months in four cases.

The swelling when excised in initial stages contained serogelatinous exudate, but the older swellings revealed organised matter.

Recurrence of the Disease in the same Animal and Immunity by a Natural Attack.

Table No. III gives the details of animals that had got attacked in 1942 and had either a second attack in 1944 or withstood the infection with results. Out of 35 animals recovered from the first attack, 23 had a recurrence only 12 having escaped the infection. Hence the percentage of animals that had immunity by a natural attack may be put down to only 34 percent. the remaining 66 percent having had a recurrence.

Out of 23 animals that had a recurrence, 15 died and 8 recovered. Hence the mortality and recovery in the case of animals that had already suffered the disease may be put down to 65 per cent and 35 per cent respectively.

Table No. III.
Statement showing the particulars of animals that got affected in 1942 and had either a second attack in 1944 or withstood the infection with results at the L.R.S. Hosur.

Description of Animal.	Brand No.	Date of 1st attack in 1942.	Date of attack in 1944.	Duration or disposal.	Results.	Remarks.
Bikanir Ram	790	21-3-42	...	...	Recovered.	
" "	816	17-4-42	...	...	...	
" "	101	26-3-42	7-1-44	8-1-44	Died.	
Bellary Ram	382	21-3-42	...	...	...	
" "	395	24-3-42	...	...	...	
Bellary Ewe	256	21-4-42	...	...	...	
" "	311	23-3-42	3-2-44	...	...	
" "	318	19-4-42	2-2-44	24-2-44	Died.	
" "	47	28-3-42	6-1-44	7-1-44	"	
" "	58	15-4-42	15-1-44	22-1-44	"	
" "	113	28-3-42	4-1-44	8-1-44	"	
Cross bred Rams	115	15-4-42	...	...	...	
" "	144	13-4-42	...	...	...	
" "	181	1-4-42	...	...	...	
Cross bred Ewe	103	21-4-42	1-2-44	...	...	
" "	151	29-3-42	2-2-44	...	...	
" "	194	29-3-42	27-1-44	31-1-44	Died.	
" "	198	22-5-42	2-2-44	23-2-44	"	
" "	205	23-4-42	...	...	...	
" "	223	17-4-42	8-1-44	11-1-44	Died.	
" "	228	18-5-42	11-1-44	14-1-44	"	
" "	241	8-5-42	2-2-44	27-2-44	"	
" "	244	8-5-42	15-1-44	18-1-44	"	
" "	247	5-5-42	18-2-44	...	...	
" "	248	11-5-42	15-1-44	16-1-44	Died.	
" "	251	8-5-42	...	...	...	
" "	257	11-5-42	14-1-44	27-1-44	Died.	
" "	259	2-4-42	12-2-44	...	...	
" "	262	28-3-42	6-1-44	7-1-44	Died.	
" "	267	6-5-42	1-2-44	...	...	
" "	281	19-4-42	...	...	...	
" "	287	11-5-42	1-2-44	...	...	
" "	297	26-3-42	3-2-44	...	...	
" "	314	11-5-42	3-2-44	23-2-44	Died.	
" "	319	11-5-42	...	...	...	

From this it would appear that a single natural attack confers immunity only in a small number of animals.

Autopsy.

The carcase undergoes decomposition very rapidly. Bloating of the abdomen was a marked feature even in carcases, a few hours old. Effusion of sero-sanguineous fluids in the peritoneal and pericardial sacs is more or less a constant feature. While the peritoneal effusion measured about 1½ to 2 pounds, the pericardial fluid was about 2 to 4 drachms. The gastric

inflammation uniformly described by Hutyrá and Marek and also by Gaiger was very marked, in this disease. The mucous membrane of the abomasum showed acute general congestion in the majority of the cases. But in a few, big localised patches of congestion were seen. In either case, the area around the pyloric orifice was found invariably affected. The mucous coat at the affected part invariably showed thickening. The above inflammatory changes were always found extending upto the deodenum. Jejunum, Ileum, Caecum and Colon showed similar changes at localised patches of considerable length. The thickening of the mucous membrane of the alimentary tract in chronic cases is liable to be mistaken for Jhones disease. However, this complication (Jhones disease) was recorded in two cases.

In hyper acute and acute cases, the whole of the contents of the intestinal canal was haemorrhagic in character.

Early decomposition of the liver was a constant factor. Enlargement and fatty degeneration of the organ was noticed in a number of cases. The gall bladder is invariably found over-distended. The bile is brownish green in colour and sometimes even yellow with brownish deposits. The mucous membrane of the sac shows slight thickening. Spleen and kidneys showed only acute congestion. In two cases only fatty white kidney was noticed. The mesenteric lymph glands are generally found enlarged.

In the heart, the epicardium shows slight congestion with engorgement of the superficial vessels, the endo and myocardia almost remaining normal. No changes were met with in the cardiac valves. Auricles and ventricles contained the usual amount of clotted blood.

Thoracic effusion was not met with excepting in four cases. One case had pleuro-pneumonia, another consolidation of the left lung and two had partial consolidation of the different lobes of the lung.

The uterine mucous membrane in the pregnant animals showed slight congestion while in the non-gravid uterus it was almost normal.

The buccal cavity showed no abnormality. Neither ulcer nor congestion was noticed even in one case. The trachea was free except in the four cases mentioned above.

Examination of the brain in the acute cases revealed moderate degree of congestion of meninges and the external surface of the brain.

Other organs did not reveal anything of unusual interest.

Parasites Found:

Adult worms of *Cotyloforon cotyloforum* were found invariably in all the animals in the rumen and reticulum. *Haemonchus* species in the abomasum in a few animals and *trichuris* snodules in the colon and caecum in some were met with.

Materials sent to the Principal, Madras Veterinary College, with Results.

Materials from ten selected cases were sent to the Principal, for histopathological examination. These comprised pieces of liver, kidney, abomasum, ileum, caecum, ileocaecal valve and colon. Out of eight liver specimens sent, only in two, parasitic lesion was reported. Postmortem changes were noticed in four, congestion and fatty changes in two. The sections sent from the intestinal tract in two cases proved negative for Johnes Disease. Table No. IV gives the details of specimens sent with results.

Table No. IV.

Statement showing the results of examination of Pathological materials sent from the Livestock Research Station, Hosur Cattle Farm, to the Principal, Madras Veterinary College during the 1944 outbreak.

Description of Animal.	Brand No.	Kind of material.	Date of despatch.	Results.
Bellary Black Ewe ...	4	Piece of liver.	26-2-44.	Congestion, cloudy swelling with early fatty changes present.
Cross Bred Ewe ...	314	Piece of ileum, caecum, ileocaecal valve.	26-2-44.	Negative for Johnes' Disease.
Bellary Ewe ...	318	Piece of liver.	26-2-44.	Negative for Johnes' Disease.
Cross-bred Ewe ...	378	"	26-2-44.	Marked Postmortem changes in addition to bile pigment.
Crossbred ram lamb ...	385	"	19-2-44.	Early postmortem changes only.
Bellary Black ram ...	67	"	19-2-44.	Slight congestion and cloudy swelling with signs of parasitic infection.
Bellary Ewe ...	406	"	14-2-44.	Degenerative parasitic lesion only.
Cross-bred Ewe ...	312	Liver and kidney.	10-2-44.	Liver-congestion only. Kidney-acute glomerulo-tubular nephritis.
" "	196	Piece of liver, abomasum and kidney.	10-2-44.	Liver-marked P. M. changes; Kidney-acute glomerulo-tubular nephritis. Abomasum—nothing significant.
" "	194	Piece of liver.	1-2-44.	Putrid liver preserved in formalin.

Differential diagnosis.

The disease may be mistaken for either Haemorrhagic Septicaemia or Blackquarter in the hyper acute stages. The subacute cases may mislead one to suspect the condition for Rinderpest, but the presence of jowl swellings and the absence of mouth lesions will be sure indications to identify the affection from Rinderpest. Chronic cases are apt to be confused for Johnes' Disease, but the examination of bowel-washings during life and postmortem examination after death will clear the doubt.

Discussion.

Though this disease has not been noticed hitherto in this Presidency, a disease clinically similar to the above, but etiologically different appears to have been recorded in Northern India. The Veterinary Investigation Officer, Ajmer-Merwara has recorded during 1937-38, a disease under the heading of "Pito" and during 1938-39, under the heading of "Gillar and Pito" among sheep and goats. While the symptoms and postmortem appearances may look apparently similar to the disease described in this paper, on a close scrutiny, it would be found, that there are very many differences on fundamental points. He does not make any mention of the gastric inflammation, which was almost a constant factor of this disease. He says that animals were in poor condition and that anaemic changes were predominant. But, it was just the reverse here. Most of the animals that died were in trim condition and anaemic changes were totally absent. The peritoneal fluid according to his findings appear to be a non-inflammatory transudate, whereas, it was distinctly inflammatory in character, as it was sero-sanguineous in the animals at Hosur. Pallidity of the lung was not noticed at all in this disease as recorded by him. While enlargement and fatty degeneration of the liver was noticed in a number of cases, liver cirrhosis was not met with even in a single case as per his findings. Over and above all, the condition reported in Ajmer-Merwara appears to affect both sheep and goats, but the disease at Hosur was purely confined to sheep only, as it was ascertained from outbreaks in the adjoining villages.

Monnig (1945 Ed) also describes under *Cotyloforon cotyloforum* infection, only about the intestinal infection, but no mention is made about the gastritis or other changes in the abomasum. He further says that the animals die mainly of diarrhoea due to exhaustion. This was noticed in this disease only at the end of the outbreak in which only a few animals were involved. In the bulk of the animals that died during the first and second phases of the disease the death appeared to be due to toxæmia.

Wooldridge (1922 Ed) in his description under *Braxy* narrates symptoms and postmortem lesions which resemble those given in this paper in many respects.

Treatment.

The treatment adopted was purely symptomatic, and all kinds of antiseptics and astringents were tried without any avail. Tr. Opium and Acid Sulphuric-Dil have not given any useful results. An emulsion containing Creosote, Thymol and Tr. Catechu suspended in Ol. Ricini was tried in a fair number of cases with the same result as above. Sulpho-thiozole was tried orally in a limited number of cases without any success. Injection of iodine with camphor only produced a severe local reaction but did not give any relief to the animal.

Summary :—

The outbreak of gastroenteritis in sheep at the Livestock Research Station, Hosur, appears to be an acute infectious and contagious disease.

Animals affected were only sheep; goats being free; adults are more susceptible than the young stock.

The source of infection seems to be from the soil.

The causative agent of the disease is *Clostridium septique*.

The course of the outbreak extended upto a period of 45 days.

Infection and mortality were very high; 60 and 70 percent respectively.

The duration of illness had a wide variation ranging from 12 hours to 20 days in the majority of the cases and 60 to 65 days in very exceptional cases.

Characteristic swelling at the jaw and greenish watery diarrhoea were the constant symptoms in 80 to 90 percent of the cases.

Acute gastro-enteritis and sero-sanguineous effusion in the peritoneal and pericardial sacs were the chief postmortem findings.

The disease may be mistaken for Haemorrhagic Septicaemia or Blackquarter in the acute or hyper-acute stages, for Rinderpest in the sub-acute stages and for Johnes' Disease in the chronic stages.

Curative treatment is of no avail.

Conclusions :—

After studying the disease in its varied aspects under field conditions, the author completely agrees with Mr. G. R. Viswanathan that it is Braxy. Now that, the etiology of the disease has been proved to be *Vibrio septique*, and that the infection has appeared more than once in the farm, the next step should be the preparation of a suitable vaccine or anti-toxin to combat the disease in case of future outbreaks either in the Farm or outside.

Acknowledgment :—

I am grateful to Mr. T. J. Hurley, O.B.E., M.R.C.V.S., D.V.S.M. I.V.S., Director of Veterinary Services, Madras, for the valuable hints, he has given personally during the time of his visit to the Farm, as to the lines on which this investigation should be conducted. I am equally thankful to Mr. G. R. Viswanathan, G.M.V.C., P. G. (Edin.), Veterinary Investigation Officer, Madras (On leave) for having paved the way for the above investigation and who actually demonstrated the line of work during the time of his visit at the second outbreak. My thanks are also due to Mr. R. W. Littlewood, N.D.A., Livestock Development Officer, Hosur, (Retired) and Rao Sahib T. Vinayaka Mudaliyar, G.M.V.C., L.D.O., Hosur (Retired) and to their staff for the necessary facilities afforded to me during the time of the outbreaks. Finally, I have to thank my Assistant Mr. G. Venkataratnam, B.V.Sc., and my staff for the valuable assistance rendered in getting up this paper, and Mr. Duraiawamy Mudaliyar, the College Artist for the preparation of the Graphs.

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INCIDENCE OF ANTHRAX IN SHEEP, GOATS AND CATTLE IN BARODA STATE.

BY

H. V. KULKARNI, G.B.V.C., P.G.,
Veterinary Investigation Officer, Baroda State.

During the month of February 1942, while camping at one of the Government Cattle Breeding Farms in Mehsana District, I happened to see a nomadic herd consisting of about 200 sheep and goats grazing in the

field opposite the Government Farm. Out of inquisitiveness, I made enquiries about prevalence of any disease amongst sheep and goats and I was told that animals were dying from some unknown disease. There had been 40 deaths amongst them within a period of 8 days. I inspected the herd and found one goat and one sheep exhibiting the following symptoms:—Off feed, slight nasal discharge, congested mucus membranes, shivering, laboured breathing and high temperature.

Blood smears were positive for Anthrax and this was confirmed by the Imperial Institute of Veterinary Research, Mukteswar. The affected sheep and goat died after a sickness of 32 hours.

Source of infection and mode of spread:—It was very difficult to trace the source of infection as the herd belonged to Bharwars—a wandering shepherd tribe. The Rabaries and Bharwars both within and outside the State, maintain large numbers of sheep and goats and move for about six months from village to village when there is scarcity of water and fodder.

Control measures.—Arrangements were made for the proper disposal of the carcasses of animals that died of Anthrax and also for the protection of all animals. But, unfortunately, before the arrival of the biological products from the Imperial Institute of Veterinary Research the nomads left with their animals to places outside the state, and consequently nothing could be done to protect their sheep and goats. The Government animals numbering 150 head of cattle were however immediately inoculated with Anti-Anthrax serum. A fortnight later, they were vaccinated with Anthrax Spore Vaccine.

Reaction:—In the case of vaccinated animals, mild local and febrile reaction lasting for 2 to 3 days was noticed: but there was no death amongst them.

ANTHRAX IN CATTLE.

In the month of March 1942, a report was received about an outbreak of some obscure disease among the cattle in Lodhi Pinjarapole.

Symptoms:—The symptoms were sudden illness, dyspnoea, shivering, colicky pains, high temperature and death within 24 hours.

Diagnosis:—Blood smears sent by the Veterinary Assistant Surgeon proved positive for Anthrax. This was subsequently confirmed by the Imperial Institute of Veterinary Research. Out of 1251 cattle and 95 buffaloes of the Lodhi Pinjarapole, 48 deaths amongst cattle were recorded within a period of 8 days.

Source of Infection:—Animals of any species, whether healthy or sick, are freely admitted to the Pinjarapole. These unrestricted admissions are therefore, responsible for the outbreak of contagious diseases as well as for the spread of such diseases.

Control measures:—In order to check the spread of the disease, mass inoculations with Anti-Anthrax Serum and Anthrax Spore Vaccine supplied by the Imperial Veterinary Research Institute were carried out. Serum was used in affected herds while vaccinations with Anthrax Spore Vaccine were undertaken in the surrounding unaffected herds. About 2000 head of cattle and buffaloes were thus immunised against the disease.

Slight thermal reaction and local swelling at the site of inoculations were observed.

Arrangements were also made for the proper disposal of the carcasses of the animals that died of Anthrax, for the segregation of affected animals and for the thorough disinfection of infected places. The disease was thus brought under control within a period of 15 days.

Similar outbreak in cattle was recorded in April 1946 in Sankheda Taluq and it was brought under control by immunising about 1,000 healthy animals with Anthrax Spore Vaccine and 400 animals in affected areas with Anti-Anthrax Serum.

Discussion and conclusion:—Cases of Anthrax amongst livestock of Baroda State have not been recorded previous to my investigation.

2. The disease appears chiefly among cattle and sheep and causes heavy losses.

3. The Baroda State is divided in five almost flat Territorial blocks, cut off from each other by British Indian Territory and Indian States and as there are no efficient Veterinary services in the petty Indian States, there is no effective check over the spread of contagious and infectious diseases.

4. A main source by which the infection is spread is by the movements of cattle, sheep and goats owned by Sindhis, Lamans, Rabaris and Barwars. These tribes travel throughout the State for about 6 months in a year, when there is scarcity of water and fodder and sell their animals—healthy and sick—on their way wherever possible.

5. And, therefore, diseases like Anthrax, Rinderpest, Foot and Mouth Disease cannot be effectively checked unless and until there is a complete check over the nomadic herds.

SKIN DISEASE (LEUCODERMA ?) IN A BUFFALOE-BULL

BY

T. RAMMOHAN RAO,

Veterinary Assistant Surgeon, Kothapeta, E.G. Dt.

Subject :—Murrah Buffaloe-Bull. Age 2½ Years.

General Condition :—Normal (except for the skin)

History :—The animal was brought with the complaint that its skin has turned white gradually (since about 8 months).

Symptoms :—On examination it was found that the animal is having white patches from the size of a pea to walnut all over the body. Except for the white colour there is no scale formation, pustules, ulceration, discharges or even pruritis. The animal was feeding well with no temperature and was normal in all other respects. Microscopic examination of the blood was *negative*. It was not possible to collect any material from the skin for microscopic examination.

Treatment :—Arsenic treatment was decided upon as it is indicated in most of the skin affections and as an alternative. Hence treatment was taken up with daily subcutaneous injections of Atoxyl (*Burroughs Welcome Laboratories "Tabloid" Brand Soamin*).

First course :—

1st to 3rd day	9 grs. in 10 c.c.	Distilled water
4th to 6th day	11 grs. do.	do.
7th to 10th day	13 grs. do.	do.
11th to 15th day	15 grs. do.	do.

An interval of 15 days was given. From the end of the 1st week after the commencement of treatment a decided improvement was noticed. Small black spots (developing in size daily) replaced all the white patches. As this observation has justified the treatment taken up, a second course of injections was decided upon. This commenced from the 30th day of the beginning of the treatment and another 15 days interval was given at the end of the second course. The condition of the animal by the end of this period was as follows. All the white patches have disappeared leaving the skin quite black and normal looking, except for a few persistent pin point patches of white colour in a few places over the body and a little larger patches on the inner surface of the ears and at the perenium. Also it was found that the animal has put on fat and appeared better in general condition than at the commencement of the treatment. A third course of treatment was given to eradicate the still

A Peculiar Case of Black-Quarter

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persisting small patches of white colour. At the end of the third course the animal was found to be completely cured of the condition. Throughout the course of the treatment and long after (six months) the treatment, no untoward reactions (i.e. Arsenic poisoning etc.) or reappearance of the condition were noticed.

URO-LITHIASIS IN A BULLOCK.

BY

M. H. NAGAMIA, G.B.V.C.,

Veterinary Assistant Surgeon, Bardoli.

Subject :—Bullock, seven years old.

History :—Straining hard for micturition but without any result for the past three days. Bowels costive, off feed.

Symptoms :—Oedematous swelling over the entire length of the sheath. On exploration per rectum, removed hard pellets of dung mized with mucus and found the bladder full and tense. Careful palpation along the penis revealed a small hard substance at the meatus urinarius.

Treatment :—The penis was gently drawn out and held firmly. The meatus urinarius was enlarged and an oval-shaped golden-coloured calculus which was firmly imbedded there was removed by means of forceps. Immediately a few drops of urine were passed with a jerk and this was followed by a free flow of urine. The enlarged meatus urinarius was not closed but kept open. Urinary antiseptics internally and application of stimulating lint externally effected an uneventful recovery.

A PECULIAR CASE OF BLACK-QUARTER.

BY

K. A. PADMANABHA MENON, G.M.V.C.,

Touring Veterinary Assistant Surgeon, Nellore

During the course of my tour to a village to attend an outbreak of Black-quarter the following case was noted. The animal was a heifer calf, aged 1½ years and in very good condition. The animal got

the attack on 23-9-46 morning when it was noted by the owner to be completely off feed and exhibiting lameness of the left shoulder. The disease was suspected by the owner as Black-quarter and hence the affected shoulder was branded. The swelling developed rapidly and the animal died the same night by 10 p.m.

The dead animal was examined by me on 24-9-46 morning by 7 a.m. and on examination it was found that there was the characteristic Black-quarter swelling (crepitous swelling) on three legs viz., left shoulder, left quarter and right quarter. The swellings were incised and the affected muscles were typical of Black-quarter (charred appearance with rancid smell). The post-mortem of the animal was conducted and nothing abnormal was noted.

Smears were taken from those affected regions separately and also from the heart blood and examined microscopically (using leishman's stain). The examination of the smears from three affected regions separately revealed the presence of typical "*Clostridium chauvoei*" as also in the heart blood smears.

Conclusion:—A case similar to this has not been recorded by me before. The cause of death in Black quarter is due to 'Toxaemia and the disease turns 'Bacteremic' just before or after death only in pure cultures. The presence of typical *Clostridium chauvoei* in the heart blood smear (taken about 10 hours after death) speaks definitely of the disease being Black-quarter and not due to any other bacteria of the anaerobic group.

FRACTURE OF RADIUS AND ULNA IN A POMERANIAN DOG

BY

LIEUT. G. V. NARASU, G.M.V.C.,

GWALIOR KENNELS, C.I.

History:—An orange Pomeranian dog, tied by its lead to a cage for over two hours, attempted to escape and got himself entangled with the lead twisted around the right fore-leg. When eventually he was found to be limping on the right-fore time to time and could not place weight on that limb.

Diagnosis:—Manipulation of the leg revealed no appreciable crepitation or displacement except that the animal evinced local pain. The limb was therefore X-rayed on 10-5-46. A transverse fracture of both radius and ulna at their lower extremities was detected (See Fig No. 1)

Fracture of Radius and Ulna in a Pomeranian Dog

Treatment:—The broken bones immobilised with a Plaster castor which was kept in position for a period of about three weeks (See Fig. 2). An X-ray photo was taken on 3-6-46 (See Figs. 3 & 4) and it showed the callous formation and the union of the broken ends. The dog was also found to be using this limb freely and well.



Fig. 1.



Fig. 2.



Fig. 3.

After about six weeks, the dog was found lame again and the limb in question was skiaographed once again on 15-7-46 (See Fig. 5). This time it was observed that although the callous was intact there was a mild periostitis at the seat of fracture.

Antiphlogistine applications for a week and an adhesive bandage with plenty of cotton wool over the seat of fracture were enough to effect a good recovery.



Fig. 4.

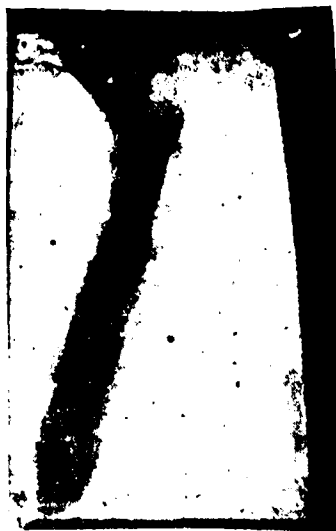


Fig. 5.

Acknowledgements:—I wish to convey my thanks to Lt. Col Dr. H. K. Mehra, M.R.C.V.S. (Lond.), Director, Veterinary Department, for advice and guidance during the course of treatment; to Mr. K. G. Pataskar, G.B.V.C., P.G., for his assistance and to Dr. Razdan, M.B.B.S., D.T.M.H (Lond.), D.M.R.E. (Cantab), L.R.F.P. & S. (Glas), Radiologist, J. A. Hospital, Gwalior, for the skiagraphs.

Association News.

THE ORISSA VETERINARY ASSOCIATION.

Proceedings of the 2nd Annual General Meeting of the Orissa Veterinary Association.

Before proceeding with the meeting a group photograph of all members present was taken.

The second Annual General Meeting of Orissa Veterinary Association was held in the evening of 31-1-46 and the following were present:—

1. Mr. H. Lal, Esq. I.C.S., Director of Development, Orissa, (Patron).

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2. Mr. R. L. Kaura, Esq. B.V.Sc., M.R.C.V.S., Deputy Director of Veterinary Services, Orissa, (President.)
3. Sri P. S. Kuppuswamy, G.M.V.C., P.G. (Edin), Veterinary Investigation Officer, Orissa, (Vice-President.)
4. Sri U. Patnaik, B.Sc., (A&ri), B.Ed., Livestock Officer, Orissa.
5. Sri B. B. Choudhury, G.B.V.C., (Cal.), Veterinary Inspector, Angul.
6. Mr. M. S. Mohanraj, G.B.V.C., (Cal.), P. G. (Muk.), Veterinary Inspector, Berhampur Circle.
7. Mr. B. N. Das, G.B.V.C., (Cal.) P.G., (Muk.), Veterinary Inspector, Cuttack Circle.
8. Mr. J. Mohanty, G.B.V.C., (Pat. & Muk.), Assistant Superintendent, Military Dairy Farm, Cuttack.
9. Mr. P. Gartia, G.B.V.C., (Cal.) P.G., (Mad.), Officer in charge, Goat Tissue Virus Section, (Secretary.)
10. Mr. G. Giri, G.B.V.C., (Cal.) Office Veterinary Assistant Surgeon.
11. „ B. Das, G.B.V.C., (Cal.) P.G., (Muk.) (Poultry), Assistant Disease Investigation Officer, (Poultry).
12. Mr. G. Biswal, G.B.V.C., (Pat.) Research Assistant,
13. „ N. Patnaik, G.M.V.C.,
14. „ L. N. Das, G.M.V.C.,
15. „ K. Sahoo, G.B.V.C. (Pat.)
16. „ B. Samal, G.B.V.C. (Pat.)
17. „ G. S. Dehuri, G.B.V.C., (Cal.), P.G. (Muk.), Manager, Provincial Livestock Breeding Farm, Angul.
18. Mr. J. N. Panda, G.B.V.C., (Pat.)
19. „ Mv. S. G. Hussain, G.B.V.C., (Cal.)
20. „ J. Prusty, „ (Pat.)
21. „ G. B. Patnaik, „ (Cal.)
22. „ D. Kohore, „ (Pat.)
23. „ L. D. Panda, „ (Pat.)
24. „ P. Das, „ (Cal.)
25. „ G. S. Panda „ (Pat.)
26. „ R. K. Sahoo „ (Pat.)
27. „ S. K. Dalbehera „ (Pat.)
28. „ A. Rath, „ (Pat.)
29. „ K. N. Mohapatra, „ (Cal.)
30. „ R. Kanungo, I.D.D. (Bangalore).
31. „ D. S. Rao, G.B.V.C. (Pat.)
32. „ S. Dutt.

Mr. H. Lal, Patron, left earlier as he had some other engagements. Mr. R. L. Kaura, B.V.Sc., M.R.C.V.S., Deputy Director of Veterinary Services, Orissa, presided.

Before proceeding with the agenda Mr. P. Gartia, the Secretary of the Association proposed that the members present should express their respect to late Mrs. Kaura and their friend late Mr. B. K. Dasappa by standing for 2 minutes in silence and the proposal was readily accepted by all.

The Secretary read out the proceedings of the 1st Annual General Meeting which was accepted by all.

The Secretary next placed before the meeting the accounts of the Association for the year 1945 which was accepted by all.

The following resolutions were moved and passed in the meeting.

1. Resolved that the Secretary should frame rules and bye-laws of the Association with the help of the Head Quarters staff and circulate the same among the members for their approval or any modification.

2. Resolved that the Secretary should take immediate steps to get the Association affiliated with the All-India Veterinary Association.

3. Resolved that the Orissa Veterinary Journal should ordinarily comprise of the following.

(a) Abstracts from foreign literatures.

(b) Articles on technical subjects like Nutrition, Genetic Diseases and pests, Dairying, Poultry etc., by the experts in the Department.

(c) Clinical articles.

(d) Reproduction of important articles appearing in other journals.

(e) (i) Questions and answers.

(ii) Association news etc..

Resolved that in view of the demand for betterment of scale of pay by Government servants in other Departments the Government be requested to expedite the grant of the same and other allowances to the employees of this Department as well.

The following office bearers were elected for the current year.

1. Mr. R. L. Kaura, B.V.Sc., M.R.C.V.S., Deputy Director of Veterinary Services, Orissa, President, Ex-Officio.

2. Mr. P. S. Kuppuswamy, Veterinary Investigation Officer, Vice-President.

3. Mr. P. Gartia, Secretary.

4. Mr. B. Das, Joint Secretary.

5. Mr. J. Mohanty, Treasurer.

It was resolved that the funds of the Association be deposited in the Post Office Savings Bank and the treasurer Mr. J. Mohanty be authorised to open an account on behalf of the Association.

The board of Editors for the proposed Orissa Veterinary Journal as suggested by the Chair and approved unanimously comprised of the following:—

1. Mr. R. L. Kaura, B.V.Sc., M.R.C.V.S., Deputy Director of Veterinary Services, Orissa—Editor.

2. Mr. P. S. Kuppuswamy, Veterinary Investigation Officer

3. Mr. U. Patnaik, B.Sc., Agri, B.Ed., Livestock Officer.

} Joint Editors.

Next the following gentlemen spoke on the subjects noted against their names:—

1. Mr. U. Patnaik—The problem of feeding of Cattle in Orissa.

2. Mr. P. S. Kuppuswamy—Incidence and control of Brucellosis in Orissa.

3. Mr. B. Das—Improvement of Poultry in Orissa.

4. Mr. G. Biswal—Control of Bovine mastitis.

Many of the members present, joined in the discussion and the President also gave his valued views on all the 4 subjects discussed. The President also requested all the four speakers to submit written papers on their respective subjects.

The application of the Veterinary Assistant Surgeon, Bamra State and that of the Veterinary Stockmen of the Province for enrolment as members of the Association was next considered.

The secretary was requested to enquire from the Secretary, All-India Veterinary Association about the eligibility of the above applicants to be members of the Provincial Association.

It was resolved that the valuable services rendered by Mr. P. Gartia as Secretary of the Association during last year may be placed on record.

The meeting terminated with a vote of thanks to the Chair.

All the members present were entertained at a tea party specially arranged for the occasion.

19-9-1946

P. GARTIA,
Honorary Secretary,

Proceedings of a special meeting of the Orissa Veterinary Association, held on 12-8-46,

MEMBERS PRESENT:

1. Mr. P. S. Kuppuswamy, G.M.V.C., P. G. (Edin.), Director of Veterinary Services.
2. Mr. Patra, M.Sc., G.M.V.C., B.V.Sc., Assistant Director of Veterinary Services.
3. Mr. P. Gartia, G.B.V.C., (Cal.) P. G. (Mad), Secretary, Superintendent, Orissa Serum Institute.
4. Mr. U. Patnaik, B.Sc., (A.B.) B.Ed., Livestock Officer.
5. Mr. Das, G.B.V.C. (Cal.) P. G. Muk (Poultry), Joint Secretary.
6. Mr. J. Mohanty, G.B.V.C. (Cal.) P. G. (Muk & Pat), Treasurer.
7. Mr. B. N. Sahoo, G.B.V.C. (Pat.)
8. Mr. A. Rath, Do,
9. Mr. G. B. Patnaik, Do (Cal.)
10. Mr. K. M. Das Do (Pat.)
11. Mr. D. S. Rao Do (Pat.)
12. Mr. G. Biswal Do (Pat). P. G. (Muk.)

Mr. P. S. Kuppuswamy, G.M.V.C., P. G. (Edin.), Director of Veterinary Services presided over the meeting.

Mr. R. L. Kaura, B.V.Sc., M.R.C.V.S., President of the Association, having left this province, it was unanimously resolved that until the Annual General Body Meeting of the Association, Mr. P. S. Kuppuswamy, G.M.V.C. (Edin.), Director of Veterinary Services be the President and Mr. M. Patra, M.Sc., G.M.V.C., B.V.Sc., Assistant Director of Veterinary Services, Vice-President of the Association.

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Two letters, one each from the Veterinary Assistant Surgeon, Jeypore and the Touring Veterinary Assistant Surgeon, Koraput and one telegraphic message from Messrs B. B. Choudhury, Y. K. Viswanathan and J. N. Panda of Angul, expressing their inability to attend the meeting and giving their full support for the resolutions were read out by the Secretary in the meeting.

The Secretary next read the proceedings of the 2nd Annual General Meeting, which was accepted by the house.

Regarding the revision of pay of the officers in the department on cent percent basis, it was resolved that the Director of Veterinary Services be requested to address the Director of other provinces to furnish.—

(1) The existing scales of pay of their officers both in the subordinate and the Gazetted cadres.

(2) Present rate of other allowance such as special pay, T. A. and house allowances.

It was resolved to form a sub-committee with the following six members to frame concrete proposals regarding revision of scale of pay and to select members to wait on deputation on Government and also to go through the bye-laws :—

1. Mr. M. Patra.
2. Mr. P. Gartia.
3. Mr. U. Patnaik.
4. Mr. B. Das.
5. Mr. J. Mohanty.
6. Mr. G. Biswal.

Resolved that 50% of the Gazetted posts of the department be reserved and filled up by promotion from the subordinate staff possessing special training combined with seniority.

Resolved that, the Director of Veterinary Services be requested to see that when retired Veterinary Inspectors are reemployed, they should not continue as Veterinary Inspectors to jeopardise the limited chances of senior officers in the department being promoted to such posts.

Resolved to record the very valuable services rendered by Mr. R. L. Kaura as President of the association and to communicate a copy of the resolution to him.

The meeting terminated with a vote of thanks to the chair.

18-9-46

P. GARTIA
Secretary.

NEWS FROM ORISSA.

The Civil Veterinary Department of Orissa since its very inception on 1-4-36 was placed under the control of the Director of Development. The Provincial Government have now separated the Department with effect from 17-6-46. Mr. P. S. Kuppuswamy, G.M.V.C., P.G. (Edin), Veterinary Investigation Officer, Orissa who was officiating as Deputy Director of Veterinary Services after the departure of Mr. R. L. Kaura, B.V.Sc, M.R.C.V.S., has been appointed to officiate as the Director of Veterinary Services, in addition to his own duties.

The staff and members of Civil Veterinary Department, Orissa were at home to Mr. P. S. Kuppuswamy, G.M.V.C., P.G., (Edin) on 18-6-46 to felicitate him on the occasion of his appointment as the first Director of Veterinary Services, Orissa.

The staff and members of Civil Veterinary Department, Orissa congratulated Mr. M. K. Patra, M.Sc., G.M.V.C., (Madras) at a party on his appointment as Assistant Director of Veterinary Services, Orissa on 24-6-46. He has also been selected by the Orissa Government for higher training in U. K.

P. GARTIA,

Secretary,

Orissa Veterinary Association.

18-9-1946.

College News

BENGAL VETERINARY COLLEGE.

The following students have passed the Supplementary Diploma Examination of the Bengal Veterinary College for the session 1945-46 held on the 18th and 19th November 1946:—

- | | | |
|-------------------------|-----|---------|
| 1. Niranjana Sen Gupta | ... | Bengal. |
| 2. Paritosh Mitra | ... | " |
| 3. Ram Niti Lahiri | ... | " |
| 4. Keshab Chandra Goḡoi | ... | Assam. |
| 5. Bishnupada Ghosh | ... | Bengal. |
| 6. Muhibuddin Ahmed | ... | Assam. |

Calcutta,
2nd December 1946. }

J. M. LAHIRI,
MAJOR, M.R.C.V.S.,
Principal,

Correspondence.

The views expressed in letters addressed to the Editor represent the personal views of the writer and must not be taken as expressing the opinion or having received the approval of the A.I.V.A.

Returned Home on Furlough.

Mr. K. S. Nair G.B.V.C., an Officer who was holding a superscale appointment in the City Veterinary Department, Singapore during the Japanese occupation in Malaya, returned home safely after undergoing a good lot of ordeals during the time of war. He is now living with his brother Mr. M. V. Pillai, G.B.V.C., (late of the Penang and Johore Veterinary service) in Trivandrum. Immediately before the Japanese occupation he was in charge of the department for over 10 months in the absence of the Chief Veterinary Officer who was then on furlough. During the Japanese regime he was drafted to the Pathological section of the medical department where he had to work along with the Japanese scientists. He was reverted to his original post as second in command of the department when the British Military authorities took over the administration of Malaya.

Mr. Nair, after qualifying from Bombay in 1923, joined the Bombay C.V.D., as a V.A.S., in North Canara. Working there for about 4 years he was recruited to Singapore service as A.V.O., on a salary equal to that of a medical Graduate. He soon made a mark for himself as a successful practitioner and an efficient Officer and wielded a great popularity among the European and Asiatic circles. In recognition of his good work and popularity he was raised to the present grade.

The city veterinary department is a well organised and strictly disciplined organisation under the Municipal Corporation where there are two qualified Veterinary Surgeons and a number of Inspectors appointed to look after the various slaughter houses of modern type, and the prevention of cruelty to animals. Licensing of bird shops and their inspection, destruction and licensing of dogs, inspection of other animals and race horses are also under the control of the department. A well equipped infirmary is also maintained which serves as a quarantine station for dogs and horses imported from foreign countries. All veterinary public health questions are strictly and promptly dealt with by the officers of this useful department.

Trivandrum.
2nd October 1946. }

M. V. PILLAI,
G. B. V. C.

Some Hints on Poultry Breeding.

Poultry and their produces form important items of food. It therefore, becomes necessary that the breeding of Poultry should be undertaken under the "Grow More Food" campaign with a view to increase the quantity and quality of poultry and their products. The following hints may hence be found useful.

How to start:—It is always safe to begin on a small scale. At the outset, the nucleus stock may consist of one cock and 10 pullets. Through hatching of eggs obtained from this nucleus stock, the number of birds may gradually be increased.

Selection of breed:—It is always best to keep only one breed and to breed to a pure-bred cock. Desi hens are poor layers, their average egg yield being about 30 to 60 per year. Exotic birds such as White leghorns, Black Minorca and Rhode Island Reds lay on an average 100 to 120 eggs per year, at the least. These are therefore to be preferred to Desis.

Selection of birds:—In selecting birds for breeding, it is not enough to go by the pedigree sheet alone. The breeder must, personally select large sized best type birds which are best layers. Careful and rigid selection ensures the improvement of the stock. Every year the best hens and pullets are to be picked out of the stock and mated with the best cockerals and cocks. Old, bad and defective birds must be culled out and either sold or used for table purposes.

Systems of breeding:—(1) Cross breeding is the mating of a cock of one pure breed with females of another pure breed.

(2) *In-breeding* is the mating of closely related birds. This system tends to the deterioration of the stock in size, productiveness, fertility and resistance to disease.

(3) *In and in-breeding* is the mating of brother and sister and should always be avoided.

(4) *Line breeding* is a systematic and carefully worked out programme used by experts in mating closely related birds. In this system the progeny will carry the blood lines of the family or individual. Only experts must attempt this system because faults and weaknesses as well as desirable features tend to be multiplied.

(5) *Selective breeding* is the mating of the best cock with the best hen.

(6) *Grading* is the mating of pure bred cocks to mongrel hens or hens of unknown ancestry. The off-springs are known as 'grades'. If the pullets are mated to pure bred cocks for five generations the result will be birds carrying 96.87 per cent. pure blood. If for instance country hens

are graded for six generations with males of, say, pure bred white leghorns, a flock of white leghorns as good as pure breeds for all practical purposes will result.

The art of breeding:—The following are simple rules to follow:—

- (1) Select only the largest and well formed birds of the breed you wish to breed from.
- (2) Don't breed from weak, sickly, stunted or deformed birds.
- (3) Select, the best, layers to breed from.
- (4) Don't breed from cocks or hens under a year old or more than three and a half years old.
- (5) The males must be of a different family from the hens they are mated with, though of the same strain. Do not breed in or in-and-in-breed.
- (6) Use cocks which is superior to the hens.
- (7) Careful management and proper food ensures success.
- (8) Avoid over-crowding in poultry runs or houses.

Poultry Runs:—Select an elevated land whose soil is sandy, with a good proportion of Lime or chalk in it, and with a natural drainage. Stony ground should not be selected as it hurts the feet of the birds and causes bumble-foot. Heavy soil which retains moisture, marshy, dirty or badly drained land should not be selected for poultry run.

To protect the birds from the sun and hot winds there should be a shed and a number of large shrubs inside the run. The shrubs must be kept pruned periodically so that they may not grow to more than a certain convenient height. Tall shady trees which give room for crows to perch upon should be avoided.

A wire netting fence all round the poultry run about 6 to 7 feet high guards against snakes and mongoose and other harmful animals.

A poultry house with a tin or zinc sheet top and with the bottom slightly above the level of the ground should be placed within the run. This house accommodates the birds during nights.

A shallow pit at one corner of the run filled with ash to which disinfectants are added acts as a dust bath to the birds to free them of ectoparasites.

Provision should be made inside the run for a good, abundant and protected water supply for the birds.

The runs should be periodically disinfected by mixing quicklime with the soil.

Provision should be made for change of runs every three years.

Food and feeding:—A good diet is one that supplies the necessary and adequate amount of nutrients in the right proportion. Any neglect or mistake in the matter of providing good food to the birds causes serious loss. The quality of the food given must be of the best. Bad food will endanger disease. The diet must supply adequate quantities of carbohydrates, fats, proteins, minerals and vitamins. Grains such as paddy, ragi, kumbu, cholam, etc., supply carbohydrates and fats. Meat and fishmeal supply animal protein; ground nut-cake and bran supply vegetable protein. Green feeds supply vitamins. Limestone, bone meal and shell grit provide the necessary shell forming minerals.

Careful attention to feeding is essential. There should be frequency and regularity in feeding. The following routine may be observed with advantage.

Open the pen at 6 A.M., and inspect the birds. If everything is normal and the birds are in good health, let them out. Throw a small quantity of grains on the ground for the birds to scratch and pick up; rate approximately one handful for every two birds. At 11 A.M., feed them with wet mash to which a little cut onions and greens are added. Feed the mash in feed troughs at the rate of one handful for two birds. At 2 P.M., cooked rice with a little beef or meat on alternate days and wheat bran mixed with cut greens on alternate days should be given. At 5-30 P.M., grain feed as in the morning but double the quantity must be given and fed in feed troughs. Once a week any one of the grains such as paddy, cholam, kumbu, wheat, etc., may be soaked in a pot, for 12 hours and boiled the following day and given to the birds. This can be a substitute for their meal at 2 P.M.

Clean water must always be available and changed at 7 A.M., 11 A.M. and 3 P.M., daily. Add a little Potassium permanganate to drinking water.

Provide the birds with shell grit and small pieces of charcoal broken sea-shell, river shell and limestone can be supplied and made available to the birds in a hopper. Chickens should not be fed for 48 hours soon after hatch. Chicks may be given as their first feed, finely broken grain such as wheat, maize, cholam, kumbu. Baby chicks upto 10 days may be given finely ground grains five times a day at 6 A.M., 9 A.M., 11 A.M., 1 P.M., and 4 P.M. Clean water or butter milk or skim milk may be given for their drinks. From 10 to 20 days grain food as noted above, boiled eggs, finely grated with shell and bread crumbs may be given. The drink is the same as noted above. Feed the chicks with white ants and worms. From 20 days to a month the chicks may be given grain food as noted above but cracked a little bigger. Greens may be hung

before them for picking. Fine shell grit and charcoal may also be supplied. The drink is the same as noted above. From 4 to 6 weeks give the chicks grain feed as noted above but feed them three times a day. Shell grit, and charcoal are to be supplied as noted above. The drink consists of clean water with a little potassium permanganate added to it. From 6 weeks to 4 months give grain feed three times a day. A wet mash with greens added to it, cooked rice and beef on alternate days are to be given.

Hatching:—Broody hens are employed for hatching eggs and it takes 21 days for the eggs to hatch. As only a limited number of eggs can be placed for hatching under a hen, incubators are to be used if there are a large number of eggs available for hatching. Eggs from vigorous and healthy birds should be used for setting. They should be of uniform oval shape, size and colour and the shells should be of sound texture. The sitting hens should be let out daily until the 19th day at 9 A.M. and 4 P.M., for about 15 minutes at a time. She should be fed on grains and not with soft food like mash, boiled rice. She should have clean water and a dust bath at her disposal. The eggs are tested on the 10th day. The infertile eggs and those with dead germs are removed and only the fertile ones are retained. The sitting hen is not to be disturbed from the 19th day to the end of the hatch on the 21st day.

TINNEVELLY }
2—12—45.

R. PRASANNA RAO,
Veterinary Assistant Surgeon.

A Short Note on Manaparai Cattle and the Weekly Cattle Market at Manaparai, Trichinopoly District, Madras.

Manaparai is a big village and the headquarters of a Deputy Tahsildar Division in Kulitalai Taluk, Trichinopoly District. It is situated, 24 miles from Trichinopoly town on the South Indian Railway line going to Madura. It is a dry area with scanty rainfall. There is a protected water supply maintained by the Panchayat Board.

Manaparai is neither a breeding centre nor can be classed as a good cattle rearing locality; but all the same a breed known as "Manaparai breed" has become well known to all agriculturists and cattle owners of the Districts of Trichinopoly, Tanjore and Madura and the Indian State of Pudukottah.

These cattle are fairly good type of animals both from the point of working capacity and also from the point of milk production when compared with other ordinary local cattle. The animals are a little bigger

in size than the ordinary local variety, have more or less short symmetrical horns directed upwards and slightly curved inwards. They are mostly of grey colour but there are some of tan colour. The body is well developed with small hump, short head, dark eyes and large ears. Legs are well set and are moderately long and thick. Tail reaches the hock with a fine switch at the end below the hock.

These animals are a class by themselves and are a great treasure to the average cultivator of the locality.

This type of animal is the result of breeding between the Kangayam bulls and local cows. The origin of the breed is rather peculiar. The weekly market at Manaparai attracts animals from adjoining parts of the Coimbatore District which is noted for the famous Kangayam breed of cattle. Among these animals a few Kangayam bulls are always available at the market for sale and these are purchased by the ryots of the surrounding locality for purposes of cultivation and with the 'specific' purpose of breeding alone. These bulls are maintained in their villages for varying length of time until they can fetch good profit when they are exposed for sale. During the period of maintenance these bulls are allowed to serve the local cows. The so-called 'Manaparai Breed' is the result. No Kangayam bull under any approved scheme is being kept in the locality.

The Cattle Market is situated at the entrance to the village on the Trichinopoly Road on a rectangular plot of land about 10 acres in area with a compound wall all round. Water supply is from the Panchayat Board of water supply scheme. Trees are planted to provide shade for animals.

The average weekly attendance at the Cattle Market is about 2,000 cattle during the six months from January to June and then diminishes to a certain extent as the rainy season advances. Majority of these animals come from the surrounding villages within a radius of 10 to 15 miles. A fair percentage of animals come from the adjoining Districts of Coimbatore, Madura and Pudukottah State. Animals purchased by the ryots at one shandy are again exposed for sale at the next or any of the succeeding shandies and are sold more often for a profit. Many ryots of the locality earn a living in this way. Occasionally, animals are purchased by cattle dealers and taken to other shandies for sale outside the Districts. The average price of a good pair of work bullocks is Rs. 800 to Rs. 900 when they are two teeth *i.e.*, (2 years and 9 months) and that of II class bullock of smaller size is Rs. 500. Good pairs of Kangayam bullock from Kannapuram side in Coimbatore District are brought for sale and the prices of such bullocks are from Rs. 1,000 to Rs. 1,500 a pair. Manapari bullocks can be had from the month of April to July, while young animals are available for sale throughout the year.

A short note on Manaparai Cattle and the weekly Cattle Market 351

The milch cows of this breed yield from one to 2½ Madras measures and their prices range from Rs. 100 to Rs. 200 when they are in the prime of their life.

Old and deformed cattle for slaughter purposes are always available in the market and regularly; they are purchased by contractors and taken to Trichinopoly, Negapatam, Dindigul and Madras. About 100 to 150 such cattle can be had every week. The price of such cattle ranges from Rs. 20 to Rs. 80.

Sheep and Goats.—About 1,000 to 1,500 sheep and goats also come up for sale from the same source as that of cattle. These are purchased for food purposes. There is no sheep available for production of wool. The price ranges from Rs. 10 to Rs. 30 each. The average weight of the young ones below 1½ years is 25 lbs. while that of the adult is 52 lbs.

Hides and Skin.—About 2,500 to 3,000 raw skins are available for sale every week, mostly sheep and goat skins, which are purchased and taken to Tanneries at Dindigul, Trichinopoly and Madura. The skins of cattle and buffaloes exposed for sale are very few and are about 25 to 30 at ordinary times.

The prevailing prices of skin are as follows :—

Raw skin of cattle and buffaloes per pound As. 5½ to As. 6.

Raw skin of sheep per pound As. 9.

Raw skin of goat per pound As. 10.

Water supply is fairly sufficient. Water pipes have been laid by the Panchayat Board.

Fodder supply is also fairly sufficient though costly and is available throughout the year. 25 to 30 lbs. paddy straw can be had for a rupee. During rainy season green grass also is available for sale in plenty.

I am much indebted to the District Veterinary Officer Sri K. R. Lakshminarayana Aiyar for his valuable suggestions in drawing up this report.

R. SUBRAMANYAM, G.M.V.C.,
Touring Veterinary Assistant Surgeon, Perambalur.

Extracts

["ASSAM TRIBUNE"]

Heavy Cattle Mortality

Lack of Adequate Veterinary Staff at Dhubri

Dhubri, Nov. 21.

Cattle mortality by rinderpest is heavy in the sub-division.

A large number were recently affected in Dindinga area where due to timely administration of vaccine by the veterinary assistant surgeon they could be saved.

Supply of vaccine, it is understood, which is done by the Government of Bengal does not reach at proper times, causing many cattle to die or reach a serious turn in disease. Lack of adequate veterinary staff is also responsible for not timely tackling this deadly disease.

The local authority, it is further understood, is not keen about the establishment of a veterinary hospital, well-staffed and fitted, urgently needed for the cattle and therefore, for agriculture.

Save the Starving Cattle

Jamiat Ulema's Request to Agriculture Minister

(From Our Correspondent)

Nowgong, Nov. 15.

In a special meeting of the Nowgong Jamiat-ul-Ulema held under the presidency of Maulana Sadaruddin Ahmed, a resolution was passed criticising the Hon'ble Minister of Agriculture for not visiting the flood-affected areas and expressing the hope that he would even now do the needful to save the starving cattle.

"In view of the fact that cattle are dying of starvation and diseases in the flood-ravaged areas and that people have lost all their supports of cultivation, and the Hon'ble Minister in charge of Agriculture and Veterinary, Maulavi Abdul Matlib Majumdar, has not yet deemed it proper to visit the affected areas, this meeting of the Nowgong Jamiat-ul-Ulema places on record its strong protest and condemnation of his action, and hopes that the Hon'ble Minister will even now do the needful to save the starving, dumb and mute cattle, the only means of self-support of the cultivators."

CATTLE DYING FOR WANT OF FODDER

Gross Negligence" of Government

(From Our Correspondent)

Nowgong, Nov. 5

In a meeting of the Executive Committee of the Nowgong Flood Relief Committee held yesterday, the Deputy Commissioner disclosed that Rs. 900 has been donated by His Excellency, Sir Henry Knight, Governor of Assam, from his personal fund, to be utilised in 9 different centres. The Secretary disclosed that up to date (4-11-46) Rs. 17,462-11-0 was collected and expenses incurred are Rs. 1,174-0-0. The amount is exclusive of rice, dal etc. that have been received.

It was discussed that the Procurement Department has refused to give any paddy for distribution and the matter has been referred to the authorities. Cess on paddy still continues and members requested the D. C. to arrange for selling of paddy to stricken people without any cess levied by the Government. Mr. Muhammed Rafique insisted that co-operative stores in the affected areas should be given permits to buy and sell paddy at controlled rates to those who can afford. The Deputy Commissioner agreed to consider the matter.

It was revealed that the seed position was extremely difficult as no winter crop seed was available from any quarter. Mustard, which could be cultivated in large scale basis, is extremely wanting. The Department of Agriculture has not been able to do anything till now. Even assurances given by the Hon'ble Premier that Bihar may send seeds is not happy as the process itself would take more than a month by which time it would be

Plight of Cattle

There were no discussions on the question of the plight of cattle and gross negligence of the Government regarding fodder. S. Haladhar Bhuyan, President, District Congress Committee, read his report and narrated the starving condition of the cattle. Mr. Muhammad Rafique, President, District Muslim League, strongly criticized the Government red-tapism. He narrated his discussions with an Inspector of livestock who asked Mr. Rafique to go to the Veterinary Department, as livestock was not concerned with fodder. The Veterinary inspector, in turn said that their duty was to see to diseases, not to fodder.

He moved the following resolution which was unanimously carried:—The committee views with alarm the inability of the Government upto now to arrange winter crop seeds for supply to the people in the flood affected areas, and in the meantime, time for winter cultivation is fast passing, and unless immediate arrangements are made for distribution of such seeds now the people in the affected areas will be deprived of their only chance of self-support, and will inevitably lead the people to the jaws of a long and unmitigated famine."

A sub-committee was formed to prepare a scheme for fodder with the following persons: Mr. Muhammad Rafique, S. Haladhar Bhuyan, Rai Saheb D. Barua, D.F.O., Dr. D. Phookan, D.M.O.H., and the Veterinary Assistant Surgeon.

Director of Animal Husbandry

Sir,—There is a provision for a Director of Animal Husbandry in the "Grow More Food" Campaign sub-head under Agriculture in the budget estimate for 1946-47. We fail to understand the inclusion of an Animal Husbandry Director in the "Grow More Food" allotment. On the other hand, a Director under a Director with the same pay (Rs. 1,200 p.m.) is hardly sensible.

There are about 955 officials in all in the proposed Agricultural Department. Those drawing pay between Rs. 175 and Rs. 1600 number 31. There are 152 or more officials drawing pay between Rs. 50 and Rs. 300 besides T.A., D.A. and contingencies. And the rest imply half-starved subordinates, who are to move about in the muddy village roads.

In connection with the post of Director of Animal Husbandry, we find it is only superfluous and is a mere wastage of public money. We are glad to read an article regarding the Livestock and Veterinary in your issue of the 13th September. The Veterinary Director is at present the competent Director of the Animal Husbandry with M.R.C.V.S. qualifications and can be expected to carry out the dual office. When personalities like Sir Col. Arthur Oliver, the retired Animal Husbandry Expert to the Government of India, and Dr. Sir N.C. Wright, M.A., D.Sc., Ph.D., in their report of the Development of Cattle and Dairy Industries of India (1937) recommended that in the interest of efficiency and economy, livestock improvement and veterinary work should be unified under one single department, and when most of the advanced provinces of India have already amalgamated the two departments we hope the Animal Husbandry Section of Assam which is as yet under the Agricultural Section, should immediately be placed under the management of the Veterinary Department. The total expenses of the Animal Husbandry Section is more than six lacs including mixed farms and the allotments in the "Grow More Food" sub-head for the Animal Husbandry work.

Lastly we shall be pleased to know through the Press, the amount of public work done, with the allotment of twenty lacs in the "Grow More Food" sub-head during 1945-46.—

Yours, etc.
Interested Public.

Assam Needs a Veterinary College.

Mr. Rajanikanta Hazarika writes —

The want of Veterinary Surgeons is being greatly felt by the masses more than the educated. It is now realised that these people are to deal with no mean subject, but a Nation's cattle wealth of Rs. 10,70,22,185 and a source of annual yield of Rs. 7,96,70,414 (pre-war price estimate approxi-

mately), besides pet animals, horses, elephants, poultry etc., which have definite high money value in these days. And they are the only personnel to deal with the production of healthy milk and meat for the nation. In a country where the production of milk per head is from 2 to 1.4 ounces per head whereas the minimum average of milk consumption per head should be 15 oz. per head, the improvement of livestock is of utmost importance. This can only be effected by adequate trained Veterinary personnel.

There are about 50 Veterinary Dispensaries in Assam, which are to serve more than 60 lacs animals in the province. It shows that one Veterinary Surgeon is to serve more than a lac of cattle. But according to the Royal Commission of Agriculture (1927) "the aim should be to provide on an average at least one V.A.S. for every 25,000 cattle" and even this is not adequate "but should be regarded as a frame work round which a more complete service can grow up". Hence, there should be at least 240 V.A.S. in the province to start with the work of Veterinary aid. According to the reconstruction plan, 150 Veterinary graduates are necessary, of which if 56 trained people are absorbed in higher services and 10 V.A.S., of the existing staff retires, only 84 trained personnel will be available for the reconstruction scheme. Hence, in our opinion, if the Department wants to move in the right way, at the least 300 Veterinary Graduates will be necessary in the course of five years.

Now, just like Assam, other provinces have their own reconstruction plan. There are only 5 Veterinary Colleges in India, in five provinces. Madras is already claiming a second college. Other colleges are already overcrowded. Only 4 or 5 students may probably find seats in different colleges. And according to the existing percentage of successful candidates, each year 1 or 2 trained personnel may be available; and thereby the Assam Veterinary Service may probably compensate the gap of the 10 V. A. S. caused by retirement. In case the proposal of training of 300 V. F. A.'s is materialised, the ratio of one V.A.S. to 6-7 V.F.A., will only undermine the efficiency of the profession. As naturally a man picked up, with a low general education for V.F.A. job, can grasp very little of the scientific working of the profession. And by this arrangement, within the next 10 years, people will be induced to abandon Veterinary aid for its inferior standard of work.

To relieve the scarcity of trained personnel and thus to bring the reconstruction programme into effect, a Veterinary College will be the need of the hour. It may be suggested that the standard of education in the proposed college should be the same with that of Bombay. It may subsequently be raised to the standard of Madras or Lahore. The College should also provide for the training of V.A.S. in the refresher's course, and other advanced courses, and be a focal centre for Research Works, Vaccine Sections and all other associated works. Thus Assam will not have to look forward to other Provinces for trained personnel and other Veterinary needs.

Funds:—A non-recurring sum of Rs. 4,65,000 has been allotted for training 150 men for Veterinary Graduateship. Thus on the average a minimum of Rs. 3,100 will have to be spent for each candidate in foreign place (Post-war Reconstruction Assam), and Rs. 36,000 for training of Veterinary Field Assistants. Rs. 1,000,000 is being allotted to the Veterinary

Department in the fourth Draft by the Government of Assam. And as no separate staff as Live-stock Inspectors, Deputy Directors, Assistant Deputy Directors, Farm Managers, Demonstrators will be required, in case the Animal Husbandry Section is placed under the Control of Veterinary Department a large sum from this head will also be available for the education and Researches in the latter. Thus, approximately the sum of Rs. 2,456,000 (Capital) and Rs. 8,44,000 (Recurring) will be available for the establishment of the Veterinary College and the management of the Animal Husbandry Section.

Under the present conditions, critics may find dearth of candidates seeking admission into the college, but when the pay and prospect are made attractive the right type of men will be induced to take up the profession. It is the duty of the Government to make the profession attractive enough for young men to join the Veterinary College so that the requirements of the country may be adequately met.

The question of finding qualified hands will never be a handicap to the progress of the college. The present Veterinary Director with his previous experience as Professor may be rightly suggested to be a suitable candidate for the Principalship of the College, while some graduates picked up from the profession and some recruited, and the experts of Poultry Diseases, Investigation Officers etc. can supply the necessary staff for giving the start to the College.

It is hoped that the Government will include this programme in the 4th draft of the reconstruction scheme. Government is said to be paying increased attention to the welfare of the Agriculturist. But it need not be emphasised that without the improvement of the Veterinary Department, the agriculturist can hardly be benefitted.

["THE ASSAM GAZETTE"]

Proceedings of the Second Session of the Second Assam Legislative Assembly

Grant No. 21

(41.—Veterinary)

The Hon'ble Maulavi Abdul Matlib Majumdar: On the recommendation of His Excellency the Governor of Assam, Sir, I beg to move that a sum not exceeding Rs. 2,85,400 be granted to defray the charges which will come in the course of payment during the year ending on the 31st March, 1947 for the administration of the head "41.—Veterinary."

The Hon'ble the Speaker: Motion moved:

"That a sum not exceeding Rs. 2,85,400 be granted to defray the charges which will come in the course of payment during the year ending on the 31st March, 1947 for the administration of the head '41.—Veterinary.'"

Now I find that the Cut Motion No. 8 is an omnibus one. So, we will take up that.

Maulavi Abdul Bari Chaudhury: Sir, I beg to move that the total provision of Rs. 2,85,400 under Grant No. 21, Major head—41.—Veterinary, at page 121 of the Budget be reduced by Rs. 100, i.e., the amount of the whole grant of Rs. 2,85,400 do stand reduced by Rs. 100.

Sir my intention is to raise a general discussion on the policy of the Government in their administration of the Department of Veterinary. Sir this is a most neglected subject and no considerable attention has ever been assigned to it in the Province of Assam. With all respect to the present incumbent, I might be allowed to say, that this has always been considered as a minor portfolio and entrusted to junior Member of the Council of Ministers. We so often profess that the cattle is the only wealth of the cultivators but a shabby treatment has always been meted out to the Veterinary Department.

The present lay-out of the Veterinary Administration would appear to a casual observer to be disjointed and unsystematic. The Department should be re-organised as early as possible. All efforts should be concentrated to improve the Veterinary service. I may be allowed to point out that in the training of the Veterinarians of the future, great emphasis should be laid on preventive medicine—comprising pathology, bacteriology and hygiene than in pure medicine and surgery. For such re-organisation, a beginning might be made with the mechanisation of the Provincial Service in so far as it is concerned with the contagious diseases. Such mechanised service should consist of (1) a research and diagnostic branch for combating the outbreaks of obscure contagious diseases and (2) a vaccination and inoculation branch for the control and suppression of all outbreaks of diseases. To enable the Veterinary Department to attract the right type of men with aptitude and enthusiasm for veterinary work, the pay and prospect of subordinate veterinary staff should be improved.

In recent years rinderpest has proved to be the worst fell disease and it has been responsible for the high percentage of cattle mortality in Assam. It can be eradicated by vaccination. With the development of practical and comparatively cheap methods of immunisation, the time has come when measures can be devised, which, if prosecuted vigorously, would ensure success. The Department should consider the various technical methods of immunisation and the wider aspects of the application of such methods to the cattle population as a whole.

Sir, rinderpest in Assam is of sufficient gravity and it warrants special consideration from all other diseases.

For the last few years we are crying for the urgent need of making suitable arrangements for cold storage of the vaccine and serum. Unless this is done, mass inoculation will lose much of its value, and it will mean a sheer waste of public money.

With these words, Sir, I commend my Motion to the acceptance of the House.

The Hon'ble the Speaker: Cut Motion moved:

"That the total provision of Rs. 2,85,400 under Grant No. 21, Major head—41.—Veterinary, at page 121 of the Budget, be reduced by Rs. 100 i.e., the amount of the whole grant of Rs. 2,85,400 do stand reduced by Rs. 100."

Khan Sahib Maulavi Nurul Hossain Khan: Mr. Speaker, Sir, the administration of the Veterinary Department appears to be very defective. There are only a few Veterinary hospitals here and there. I come from Habiganj which is the biggest Sub-division in the Province of Assam. It contains a population of about 7 lakhs of people and as good a number of cattle. But there are only two Veterinary dispensaries, one at Habiganj and the other at Shaistaiganj. It is not possible for people to come to the dispensaries with their cattle from long distances of 20 miles or so. Practically these two dispensaries do not serve the purpose of the huge population. There is a very large number of cattle in the villages, but they cannot be attended to when cattle mortality breaks out. It is necessary that Veterinary dispensaries should be established at Baniyachong, Nabiganj and Chunarhat.

A few days back I had a talk with a Veterinary Assistant who said that there were three or four Veterinary dispensaries in the Province of Assam where there were no Veterinary Assistant Surgeons. That shows that we have not got sufficient number of Veterinary Assistant Surgeons. It is therefore necessary in the interest of agriculture and also in the interest of the cattle that Government should grant stipends to suitable persons and send them for training to the Veterinary Colleges.

With these words, Sir, I beg to support the Motion and commend it to the acceptance of the House.

The Hon'ble the Speaker: Would Dr. Terrell like to move his Motion separately or would he like to speak on this? We have got only nine minutes and he will have to finish within three minutes.

Dr. C. G. Terrell: Mr. Speaker, Sir, my Motion is to draw the attention of Government to certain remedial defects in the administration of the Veterinary Department of Assam, which are responsible for an unnecessary loss of cattle every year.

At the outset I want to make it clear that my object is not one of destructive criticism, but one of, what I hope will be accepted as, helpful suggestion. Furthermore, I only propose to deal with one aspect of the Department's numerous activities—namely, preventive measures for control of infection relating to certain of the more acute diseases such as anthrax, haemorrhagic septicaemia and rinderpest. These are very serious and infectious diseases which have usually fatal consequences and are associated with a rapid spread of infection, if immediate steps are not taken to treat infected animals and to protect the contacts. Unless this is done these diseases are capable of destroying whole herds of cattle and unfortunate owners have the grave misfortune of seeing their whole capital and life earnings wiped out in a very short space of time. Anthrax has an additional importance in that it is communicable to human beings.

It is the painfully slow and unsatisfactory procedure which exists for dealing with these outbreaks, at any rate in the Surma Valley, that has

* Dr. C. G. Terrell to move.—

That the total provision of Rs. 2,85,400 under Grant No. 21, Major head—41.—Veterinary, at page 121 of the Budget be reduced by Re. 1 i.e., the amount of the whole grant of 2,85,400 do stand reduced by Re. 1.

(To draw the attention of Government to the urgent need for establishing a first class veterinary laboratory and arrangements for cold storage of vaccines and serums in the Surma Valley.)

prompted my Motion, and also because I have on many occasions been a helpless witness of these tragedies and their ample evidence in the cattle cemeteries which abound.

It will be understood that for successful prophylactic inoculation to be carried out, it is essential for a correct diagnosis to be made, and this is achieved by microscopic examination of blood slides from suspected cases. The usual procedure when an outbreak is reported to a Veterinary Assistant Surgeon in an outlying district is as follows:—He visits the place concerned, and after making his blood slides, forwards them by post to the Department's laboratory at Gauhati, usually with a request that if found positive, serum may be supplied. Owing to the considerable distance involved, which is partly responsible for the delay, not less than a week elapses before the Assistant Surgeon is in possession of the material essential for dealing with the outbreak and which by this time has probably developed into an epidemic. Moreover, there appears to be a further obstacle to rapid inoculation as a preventive measure in that, I understand, indent for serum is only permitted for actual immediate contact cases.

Although this may be extended to possibly as many as fifty to a hundred doses, its actual interpretation means that only a comparatively small number of animals can be given protection; at any rate, until such time as the disease has made further devastating inroads into the herd and after considerable delay. As presumably all village herds graze on the same usually very limited grazing grounds available, it stands to reason that the cattle must all be exposed to infection and ought to be protected by inoculation as quickly as possible.

It will be argued that there is a Veterinary Hospital in the Surma Valley at Silchar with an Inspector attached and microscope available, and therefore why should specimens be sent all the way to Gauhati for diagnosis? The explanation of this is that the Veterinary Inspector and Staff Assistant Surgeon at Silchar are both touring officers, and that they may very probably be out of the station. For this reason District Veterinary officers quite rightly prefer to send the specimens to Gauhati, from where they know that eventually a report will reach them.

I understand that limited stocks of serum vaccines are kept in Silchar, but these are liable to rapid deterioration except under cold storage conditions, which are not available, and therefore here again District Officers prefer to accept the extra delay involved and obtain fresh stocks from Gauhati for their requirements.

For reasons that it is difficult to understand, the Veterinary Department has for the last five years discontinued its practice of issuing Annual Reports containing details and statistics of the various cattle diseases and mortality rates. However, a study of the figures available in the older reports confirms very fully the great value of prophylactic inoculation as a life saving measure. In place of the useful reports which were available up to the year 1940-41 we have only a comparatively valueless pamphlet issued by the Director of the Civil Veterinary Department of Assam. It is, however, gratifying to note that in the general remarks contained in his Report for the last year he says:—

"Of the many problems which confront us at present and consequently require immediate solution, the most important is the control and suppression of contagious and infectious diseases.

He suggests as remedial measures the appointment of propaganda officers and legislation for the control of movement of cattle. Although sound in principle, these suggestions lose their value unless preventive and remedial facilities are easily available, and I would like to urge that a valuable contribution towards increased efficiency for dealing promptly and efficiently with outbreaks of infectious diseases would be for a permanently staffed and properly equipped laboratory with cold storage facilities for serums to be established without delay in the Surma Valley, and this would automatically assist the Gauhati centre by relieving it of much extra work. The expense involved would not be great and it would supply a real and overdue need and in particular would benefit those least able to bear the crippling financial loss they are always subjected to from these epidemics of cattle disease.

I sincerely hope, Sir, that this proposal, which I have repeatedly put forward in this House, may receive the support of our new Government, which I feel in the public interest it deserves.

The Hon'ble Maulavi ABDUL MATLIB MAZUMDAR: Mr. Speaker, Sir, I do not quite appreciate the remark of my hon. Friend, on the Opposition, Maulavi Abdul Bari Choudhury, when he says that this Department has been entrusted to a Member of the Cabinet who is a junior one. Having had to deal with Local Board and Municipal affairs for the last 20 years, I think, I cannot be called too junior as I have passed that stage long ago.

Maulavi ABDUL BARI CHAUDHURY: I did not say that the Hon'ble Minister is too junior. I said that the Department is always entrusted to a new Minister, who is a junior Member in the Cabinet.

The Hon'ble Maulavi ABDUL MATLIB MAZUMDAR: My hon. Friend may consider himself to be too junior (*laughter*) for such a task and he may have inferiority complex. I am confident that I am quite equal to the task and will try my utmost to acquit myself creditably as far as opportunities and circumstances allow me.

Sir, that this Department has been so long neglected is not the fault of this Government. The blame lies at the door of the previous Governments. (*Voice—No question of blame.*) I am fully in agreement with my Friends that this Department of Veterinary needs all-round improvement and for that purpose arrangements are being made for developing the Department. There are many factors to be considered to deal with this problem. At present, the urgent need is for more staff in order to combat with diseases like rinderpest and other contagious diseases that are creating havoc in the country. The present staff that we have in our control is very very inadequate.

Sir, I come from a District of which 95 per cent. of the population are cultivators and I know how terribly the cultivators are suffering from cattle diseases. In the District of Cachar the cultivators use buffaloes also as plough cattle and the buffaloes more frequently contract these diseases.....

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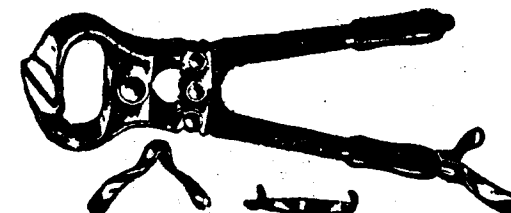
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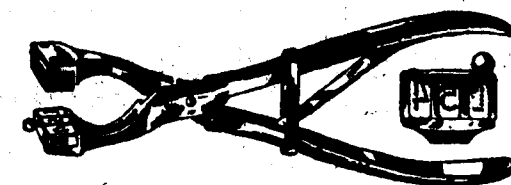
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Editorial

THE NEW YEAR.

The year 1946 has been rung out and the New Year 1947 has been rung in and we wish all our readers a Happy and Prosperous New Year—a year which, we fervently hope, will give us freedom from want above all else.

The past year has been a great trying year indeed. Threat of famine was sitting like a nightmare over the land but, thanks to the energetic measures adopted by the various Governments, the crisis has been fortunately tided over. The large imports into the country have helped us in this. There is still the scarcity of foodstuffs and people continue to have their rations fixed on a low scale. The protective foods like milk and eggs are still articles of luxury beyond the reach of the ordinary citizen. We are aware that various schemes have been formulated for the expansion of Animal Husbandry but very few of these schemes have actually been launched. They have all been on paper and files. As one Member in the Central Legislative Assembly remarked, if files can produce more food, we in India must have, by now food in plethora. Animal Husbandry development has not made as much headway as the needs of the country demand and we are constrained to state that the subject continues to be a neglected subject. The importance of Animal Husbandry