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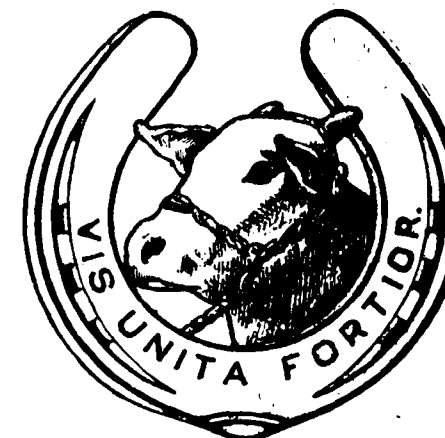
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(The Journal of the All-India Veterinary Association)



Editor:

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

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THE Indian Veterinary Journal

(The Journal of The All-India Veterinary Association)

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previously described, such as *Encephalitozoon cuniculi*, or any known species of toxoplasma. A full description of this protozoal parasite is given in this paper. It has never been observed except in animals naturally or experimentally infected with rabies and the possibility of its association with the aetiology of rabies has, therefore, been discussed in some detail.

II. MATERIALS AND METHODS

1. Strains of virus used

Most of the observations to be recorded were made on the brains of animals, chiefly guinea-pigs, experimentally infected with one or other of two strains of 'street' virus isolated from the brains of animals naturally infected with rabies. One of these strains was isolated from a jackal and the other from a dog. A more detailed description of each is given below:—

(a) *Jackal (J) strain*.—This strain was isolated from the brain of a rabid jackal in September 1937. The jackal's brain showed typical Negri bodies. A guinea-pig inoculated subdurally with a suspension of this jackal's brain developed 'furious' rabies on the fifteenth day after inoculation and died on the sixteenth day. Serial passage of this strain by subdural inoculation was continued in guinea-pigs during which the incubation period became progressively reduced. At the third passage (February 1939) the incubation period was twelve days; at the fifth passage (November 1939), ten days; and at the sixth passage (February 1940), eight days. From the seventh to the nineteenth passages, the incubation period varied from six to eight days, but from the twentieth passage onwards it was reduced to five days. Up to the time of writing this strain has been passaged serially in guinea-pigs twenty-five times. During the last nine passages, when the incubation period was reduced to only five days, Negri bodies were present only in very scanty numbers and were detectable only by prolonged examination.

From the time of first isolation, over five hundred animals have been infected by various routes with this strain at various stages of its passage in guinea-pigs. Typical symptoms of rabies occurred in every case.

Guinea-pigs inoculated subdurally with the jackal strain showed symptoms of furious rabies during the earlier passages. They were very excitable and rushed about their cages, falling down from time to time. There was a marked tendency for the animals to bite the cage wires. In some cases death occurred suddenly during the excitable stage, while in others, paralysis was observed prior to death. From the twentieth passage onwards, when the incubation period was reduced to five days, death from paralytic rabies was the rule. In those animals in which infection was induced by intraperitoneal or intramuscular injection paralytic rabies developed.

(b) *Dog (D) strain*.—This strain was isolated from the brain of a rabid dog in August 1942. Typical Negri bodies were observed in the brain. A guinea-pig inoculated subdurally with a suspension of the brain of this animal developed paralysis on the eighth day and died on the ninth day. Negri bodies were found in the brain. Serial passage of this strain of virus was continued in guinea-pigs and, up to the time of writing, the strain has been passaged fifteen times. Up to the seventh passage the incubation period varied from six to eight days, but from the eighth passage onwards, it was reduced to only five days. All the guinea-pigs used for the passage of this strain showed symptoms of paralytic rabies. Typical Negri bodies were observed in the brains of animals used during the earlier passages, but from the eighth passage onwards, Negri bodies became increasingly reduced in number and size.

(c) *Other strains*.—Other strains of 'street' and 'fixed' virus were used in later experiments and will be described in the appropriate place in the text.

2. Modes of infection of animals.

Infection was induced by the inoculation of 0.2 c.c. of the clear supernatant after centrifuging a 10 per cent suspension of brain tissue. In most cases, experimental infections were induced by subdural inoculation. In some cases however, animals were infected by the intramuscular (neck muscles), intravenous, intrasciatic or by the intraperitoneal route. Suspensions of other tissues, such as the sciatic nerve, or the submaxillary gland were used in some cases. In some of the later experiments, suspensions were filtered through Berkefeld V, N or W candles.

3. Histological technique.

Histological studies were carried out chiefly on tissues fixed in Zenker's fluid, embedded in paraffin, and stained with Mann's stain, iron-haematoxylin (long process) and in most cases, with Giemsa's stain for twenty-four hours.

Serial sections of hippocampus major, cerebellum, and mid-brain at the level of the oculomotor nucleus, were made as a routine in all cases. Subsequent to the discovery of appearances suggestive of the presence of a protozoal parasite, sections of other organs were also studied, including the salivary gland, liver, spleen, kidney, lung and bone-marrow.

III. DESCRIPTION OF PROTOZOAL PARASITE

The protozoal parasite to be described below was first encountered in the mid-brains of guinea-pigs infected with the jackal (J) strain described above and has been most exhaustively studied in material derived from them. Further observations were made on the brains of guinea-pigs infected with the dog (D) strain already described, as well as in experimentally infected rabbits and naturally infected jackals and dogs.

In all cases, the presence of the parasite was associated with typical Negri bodies, the latter being found regularly in the same sections and even in the same cells (Plate XXIV, fig. 10).

The parasite to be described, with the exception of certain cystic forms of doubtful significance, invariably occurred in the cytoplasm of nerve cells, particularly those ventral to the central canal of the mid-brain. In a few cases, parasites were found also in the Purkinje cells of the cerebellum (Plate XXV, fig. 15), and in the hippocampus major. Although exhaustive searches were made in sections and smears of other organs and tissues, no evidence of the parasite was detected except for some doubtful forms encountered in the ganglion cells of the salivary glands (Plate XXVII, fig. 46). The following description is based chiefly on a detailed study of the appearances observed in the brains of animals infected with the jackal (J) and the dog (D) strains referred to above.

'Spore' forms.—The smallest forms of the parasite encountered were minute 'spores'. They were regularly found in the mid-brains of the naturally infected dogs and jackals referred to later and in the brains of guinea-pigs inoculated with suspensions of their brains (Plate XXIV, fig. 3). They were less frequently encountered in the brains of animals inoculated with the jackal (J) and dog (D) strains. The 'spores' stained dark blue with Giemsa's stain and blue with Mann's stain. They were always found in the cytoplasm of the nerve cells. Their sizes varied. The largest 'spores' were about half the size of *H. influenzae*, and the smallest could be seen only with difficulty under high magnification. The 'spores' might be found arranged singly (Plate XXIV, fig. 1), or in pairs (Plate XXIV, figs. 2 and 3), the latter arrangement being very common. They might occur in small groups (Plate XXIV, fig. 4), or in large groups (Plate XXIV, fig. 8). Sometimes, the cytoplasm of the nerve cell might be studded with these forms (Plate XXIV, figs. 6 and 7). Occasionally, a group of 'spores' appeared to be surrounded by a thin wall (Plate XXIV, fig. 5). The 'spores' might be found in the same cell with the other forms of the parasite (Plate XXVII, fig. 40).

Young forms.—The next stage of the parasite appeared to be the 'ring' form. The rings were variable in size. They might be very small, 0.5μ to 1μ (Plate XXIV, figs. 9 to 11), or large, 7μ to 8μ (Plate XXV, figs. 16 and 17). Intermediate sizes were also found (Plate XXIV, fig. 12; Plate XXV, figs. 13 to 15). The protoplasm of the parasite stained red with Giemsa's or Mann's stain, and was usually seen as a delicate, regular ring surrounding a vacuole. The chromatin mass stained blue with Mann's stain and dark blue with Giemsa's stain, and was usually single and prominent. It might be round or oval, and was variable in its position within the vacuole. It was usually situated in the centre of the vacuole (Plate XXIV, fig. 12) but sometimes, it might lie close to the margin of the protoplasmic ring.

(Plate XXV, fig. 15). The ring forms of the parasite were always found in the cytoplasm of nerve cells. A single ring might be present in a cell (Plate XXIV, figs. 9 and 12; Plate XXV, figs. 13, 14 and 16), or two rings (Plate XXIV, fig. 11; Plate XXV, fig. 15), or several rings (Plate XXIV, fig. 10). Occasionally, the ring forms were found lying on the nuclear margin of the nerve cell (Plate XXV, figs. 13 and 16).

Certain forms resembling the *accolae* forms of the malaria parasite were occasionally found. These forms consisted of a crescentic bridge of cytoplasm with a rounded chromatin dot. They might be in the cytoplasm of the nerve cell (Plate XXV, fig. 19), or might be situated over the nuclear margin (Plate XXV, figs. 18 and 20). The chromatin in these forms might be in the centre (Plate XXV, figs. 18 and 19), or at one end (Plate XXV, fig. 20).

Growing forms.—In slightly older forms, the chromatin mass was slightly larger, the protoplasm thickened and the parasite assumed a variety of shapes. It might be rounded (Plate XXV, fig. 21), oval (Plate XXV, figs. 22 to 24), fan-shaped (Plate XXVI, fig. 25), pear-shaped (Plate XXVI, fig. 26), elongated (Plate XXVI, fig. 27), or irregular in outline (Plate XXVI, fig. 28). The chromatin mass might be round or oval and situated in the centre or at the periphery of the protoplasm.

Dividing forms.—Segmentation of the chromatin appeared to be the next stage in the development of the parasite. In the segmenting forms the protoplasm appeared to be a solid mass with a varying number of chromatin dots. The chromatin might be divided into two fragments (Plate XXVI, figs. 29 and 30), or three to six fragments (Plate XXVI, figs. 31 to 34), or more numerous fragments (Plate XXVII, fig. 35; Plate XXVI, fig. 37). The fragments of divided chromatin might be arranged in linear fashion (Plate XXVI, figs. 32 and 33), or in a cluster (Plate XXVI, figs. 34 and 35). The mode of arrangement seemed to depend on the nature of the space available within the cytoplasm of the cell. The nucleus of the nerve cell might be pushed to one side by the dividing form (Plate XXVI, fig. 35). In certain cases, the segmenting forms appeared to be surrounded either partly or completely by a thin wall.

The condensation of the cytoplasm round the fragments of chromatins (Plate XXVI, fig. 37) and separation of oval-shaped bodies with a single nucleus resembling merozoites (Plate XXVII, fig. 38) were observed.

The limits of toleration of the nerve cell to these bodies growing within its cytoplasm were surprising. The whole cell might be filled with the dividing form and the nucleus and the nucleolus might still remain intact (Plate XXVI, fig. 36). Degenerative changes were generally more marked in the nerve cells showing the 'spore' forms compared with those showing the other stages of the parasite.

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General Articles ⁴⁴⁸

A PROTOZOAN PARASITE OF THE CENTRAL NERVOUS SYSTEM*

BY

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I. INTRODUCTION

THE findings to be described in this paper came to light in the course of an investigation undertaken primarily for the purpose of improving present methods for the diagnosis of rabies in animals.

Although it is generally accepted that the presence of Negri bodies in the brain is definite evidence of rabies infection, failure to demonstrate these bodies, while providing strong presumptive evidence against rabies, leaves the diagnosis in doubt and necessitates the issue of an inconclusive report.

In the course of these investigations the writer encountered appearances in the mid-brain of guinea-pigs, experimentally infected with rabies, which have not, apparently, been previously described. It is noteworthy that previous histological studies on the brains of rabid animals have been carried out chiefly on the hippocampus major and that the cerebellum, and particularly the mid-brain, have received little attention. The peculiar appearances encountered have been intensively investigated over the past six years and the conclusion has been reached that they are due to the presence of a parasite, probably protozoal in character, which is specific to the central nervous system. It has not been possible to identify this parasite with any

* This work formed part of a thesis accepted for the D. Sc. degree in the Andhra University.

Finally, the cell might disintegrate and forms resembling merozoites set free (Plate XXVII, fig. 39).

It was possible to demonstrate all the stages of development of the parasite in the brain of a single animal.

During this study, certain 'cystic' forms were encountered in the brains of four guinea-pigs. The relationship, if any, of these forms to the parasite is not clear. These rounded cysts appeared to represent a collection of spores enclosed within a wall. The cysts were situated outside the nerve cells in all cases. They were encountered in the hippocampus major, cerebellum and mid-brain of three different guinea-pigs inoculated intramuscularly with the jackal (J) strain. They were also found in the mid-brain of a guinea-pig inoculated subdurally with the dog (D) strain. Individual spores forming a cyst appeared to be uniform in size but the size of the spores in different guinea-pigs varied. Whether the larger spores represented the mature forms of the smaller ones, it is difficult to say.

The Feulgen reaction for the demonstration of chromatin was tried on sections of the brains of animals showing the parasite. The brains were fixed in Zenker's fluid. It was found that the chromatin of the parasite, generally, did not give the Feulgen reaction.

The changes in the various constituents of the nerve cells in the brains showing the presence of the parasite were studied in some cases. No evidence was found to suggest that the various forms of the parasite were the result of alterations in the constituents of nerve cells.

IV. CONDITIONS UNDER WHICH THE PARASITE WAS OBSERVED

No evidence of the parasite described above was detected in the brains (hippocampus major, cerebellum and mid-brain) of sixty guinea-pigs which died as a result of infection with the jackal (J) strain of virus prior to the sixth serial passage in guinea-pigs, i.e. when the incubation period varied from ten to fifteen days. Negri bodies were, however, invariably present. Subsequent to the sixth passage with this strain, i.e. when the incubation period of the virus was reduced to eight days, the parasite was invariably found. Several attempts were made to detect the presence of the parasite in the brains of guinea-pigs inoculated with other strains of 'street' virus without success. In each case the incubation period in guinea-pigs was fifteen days or more. When, however, the dog (D) strain described above was isolated the incubation period on first passage was only eight days and forms identical with those described above were demonstrable in the brain. The parasite was detected in the brains of thirty-eight guinea-pigs inoculated subdurally with the jackal (J) strain and twenty guinea-pigs inoculated subdurally with the dog (D) strain. The brains of one hundred and forty-two guinea-pigs inoculated intramuscularly with the jackal (J) strain and

ten guinea-pigs inoculated intramuscularly with the dog (D) strain, were carefully examined and the parasite was detected in all of these animals. The brains of two guinea-pigs inoculated intraperitoneally with the jackal (J) strain and two guinea-pigs inoculated intraperitoneally with the dog (D) strain, revealed the presence of the parasite in each case. The parasite was demonstrable in the brain of a guinea-pig whose sciatic nerve was aseptically exposed and pricked by a needle infected with the jackal (J) strain virus. The occurrence of the parasite in the brains of the experimental animals was therefore, independent of the mode of infection of the experimental animals used.

The clear supernatant obtained after centrifugalization of a 10 per cent suspension of the brain of guinea-pig infected with the jackal (J) strain or dog (D) strain virus in serum water was filtered through Berkefeld V, N and W candles and the filtrates inoculated subdurally into guinea-pigs. The brains of two guinea-pigs inoculated with the V filtrate (Plate XXV, fig. 13; Plate XXVI, fig. 33) and one guinea-pig inoculated with the N filtrate (Plate XXV, fig. 17) of the jackal (J) strain virus showed the presence of the parasite. The parasite was also demonstrable in the brain of a guinea-pig inoculated with the V filtrate and another inoculated with the N filtrate of the dog (D) strain virus. The Berkefeld W filtrates of the jackal (J) or dog (D) strains of virus did not prove to be infective.

The parasite was detected in the brains of guinea-pigs inoculated subdurally with suspensions of the submaxillary glands of other guinea-pigs which died as a result of infection with the jackal (J) or dog (D) strain of virus (Plate XXIV fig. 5; Plate XXV fig. 14).

In one guinea-pig inoculated with the jackal (J) strain and killed at the onset of the disease the parasite was found in large numbers in the mid-brain but the Negri bodies were very scanty. Relatively smaller numbers of parasites and numerous Negri bodies were encountered in the brain of another guinea-pig inoculated with the same material but allowed to die of the disease.

The parasite was also demonstrable in the brains of other animals inoculated with the jackal (J) and dog (D) strain.

Rabbits.—The brains of two rabbits inoculated subdurally with the jackal (J) strain and two rabbits inoculated subdurally with the dog (D) strain showed the presence of the parasite. The parasite was also demonstrated in the brains of guinea-pigs inoculated with suspensions of the brains (Plate XXV fig. 24; Plate XXVI fig. 36), or sciatic nerves (Plate XXIV fig. 12) of rabbits infected with the jackal (J) or dog (D) strain. The brain of a rabbit inoculated intraperitoneally with the jackal (J) strain and the brains of two rabbits inoculated intraperitoneally with the dog (D) strain revealed the presence of the parasite in every case. The parasite was demonstrable in the brain of a rabbit inoculated intravenously with the

jackal (J) strain and in another rabbit inoculated intravenously with the dog (D) strain. The parasite was not detectable in the brains of twenty-five rabbits inoculated intramuscularly with the seventh guinea-pig passage of the jackal (J) strain. It was, however, encountered in the brains of six rabbits inoculated intramuscularly with the tenth guinea-pig passage of the jackal (J) strain virus. The brain of a rabbit inoculated intrasciatically with the dog (D) strain showed the presence of the parasite.

The incidence and morphology of the parasite in rabbits were similar to those observed in guinea-pigs. The parasite was never encountered in the liver, spleen, kidneys, lungs, bone-marrow and blood of any of the experimental animals examined.

Dogs.—A few small Negri bodies were detectable in the brain of a dog inoculated intramuscularly with the jackal (J) strain and another dog inoculated intramuscularly with the dog (D) strain virus but no evidence of the parasite was observed in either of these animals. The parasite was, however, demonstrable in the brains of guinea-pigs inoculated with the brains of the dogs.

Forms resembling the parasite in natural rabies.—The possibility of the parasite being a natural infection common to dogs and jackals, unconnected with rabies infection, was investigated. The brains of apparently healthy dogs as well as those which had died of infections other than rabies were carefully examined for the occurrence of the parasite. The brains of two jackals which had been killed because they had strayed into inhabited localities were also studied. The parasite was never encountered in their brains, nor were Negri bodies found.

The brains of one hundred dogs, which died of natural rabies, were studied. These brains were sent to the Institute for examination from outside areas. The hippocampus major and the cerebellum alone were available for examination in eighty-eight cases, while the hippocampus major, the cerebellum, and the mid-brain at the level of the oculomotor nucleus were available for study in only twelve cases. Negri bodies were found in the brains of all these animals. Forms resembling the ring forms and the schizonts of the parasite described above were encountered in the hippocampus major in one case (Plate XXVII fig. 41) and in the mid-brain in another.

A recent epidemic of rabies among the canine population around Coonoor provided a splendid opportunity to investigate the possible occurrence of the parasite in naturally infected animals. So far, it has been possible to isolate twenty strains of rabies virus behaving like the jackal (J) and dog (D) strains. Of these ten were from dogs, nine from jackals and one from a cow-calf. Particulars regarding these strains are summarized in the Table.

TABLE.		RESULT OF EXAMINATION OF THE BRAIN OF THE NATURALLY INFECTED ANIMAL										RESULT OF INOCULATING 0.2 C.C. OF THE CLEAR SUPERNATANT FROM A 10 PER CENT SUSPENSION OF THE BRAIN SUBDURALLY INTO GUINEA-PIGS.									
Animal.		NEGRI BODIES.			Incubation period in days.	Symptoms.	NEGRI BODIES.			PARASITES.											
		Hippocampus.	Cerebellum.	Mid-brain.			Hippocampus.	Cerebellum.	Mid-brain.	Hippocampus.	Cerebellum.	Mid-brain.									
1 Dog	21	++++	++++	++++	8	Furious rabies	++++	++++	++++	++++	++++	++++	++++	++++	++++						
2 "	52	++++	++++	++++	8	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
3 "	98	++++	++++	++++	6	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
4 "	170	++++	++++	++++	8	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
5 "	272	++++	++++	++++	7	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
6 "	297	++++	++++	++++	8	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
7 "	324	++++	++++	++++	8	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
8 "	342	++++	++++	++++	8	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
9 "	344	++++	++++	++++	7	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
10 "	375	++++	++++	++++	13	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
11 Jackal	5	++++	++++	++++	6	Paralytic rabies	++++	++++	++++	++++	++++	++++	++++	++++	++++						
12 "	15	++++	++++	++++	8	Furious rabies	++++	++++	++++	++++	++++	++++	++++	++++	++++						
13 "	18	++++	++++	++++	8	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
14 "	137	++++	++++	++++	6	Paralytic rabies	++++	++++	++++	++++	++++	++++	++++	++++	++++						
15 "	142	++++	++++	++++	6	Furious rabies	++++	++++	++++	++++	++++	++++	++++	++++	++++						
16 "	180	++++	++++	++++	7	Paralytic rabies	++++	++++	++++	++++	++++	++++	++++	++++	++++						
17 "	298	++++	++++	++++	6	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
18 "	333	++++	++++	++++	13	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
19 "	359	++++	++++	++++	8	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						
20 Calf	102	++++	++++	++++	8	"	++++	++++	++++	++++	++++	++++	++++	++++	++++						

Various forms of the parasite, a description of which is given below, were encountered in the mid-brains of these dogs, jackals and calf. They were invariably found in the cytoplasm of nerve cells, particularly those ventral to the central canal of the mid-brain. The parasite was not demonstrable in the liver, spleen, kidneys, lungs, bone-marrow or blood of any of these animals.

The 'spore' forms of the parasite, already described, were found regularly in the mid-brains of all the dogs, jackals and calf (Plate XXIV figs. 1 to 4 and 6 to 8). The 'spores' were encountered in larger numbers in the brains of jackals than of dogs and particularly among jackals in which the incubation period was relatively short.

Ring forms (Plate XXIV fig. 9) and growing forms (Plate XXVI fig. 28) were found only in small numbers. The cytoplasm of the parasite stained red and the chromatin dark blue with Giemsa's stain.

Forms resembling the schizonts of the parasite were commonly found in the mid-brains of the dogs, jackals and calf (Plate XXVII figs. 40 and 42 to 45). These forms were variable in size. They might be found lying on the nuclear membrane (Plate XXVII figs. 42 and 43). Occasionally, the 'spore' forms and the schizonts were encountered in the same cell (Plate XXVII fig. 40). In some cases, a thin wall, which seemed to be formed by the cytoplasm of the cell, was found to surround the schizont-like form either partly (Plate XXVII figs. 43 and 44) or completely (Plate XXVII fig. 45). The appearances of the latter forms were not different from those of Negri bodies.

The incubation period in guinea-pigs inoculated subdurally with the virus from the dogs, jackals and calf generally varied from six to eight days (*vide* Table). In two instances it was thirteen days, but in both these cases the incubation period in the subsequent passage was only six days. The incubation period was generally short (six days) in guinea-pigs inoculated with the brains of jackals showing a predominance of the 'spore' forms. Guinea-pigs usually showed signs of furious rabies, only those inoculated with the brains of jackals 5 and 18 dying of paralytic rabies. The parasite was encountered in the brains of guinea-pigs inoculated with the brains of the dogs, jackals and calf. The incidence and morphology of the parasite were identical with those observed in the brains of guinea-pigs inoculated with the jackal (J) and dog (D) strains.

Berkefeld V and N filtrates of the brains of some of the dogs and jackals included in the Table were inoculated subdurally or intramuscularly into guinea-pigs. Filtration through Berkefeld W candle was not tried because the results with the jackal (J) and dog (D) strains of virus had been negative. The parasite was demonstrable in the brains of guinea-pigs inoculated with the Berkefeld V filtrates of two dogs (297 and 344) and four jackals (15, 18, 298 and 359) and the Berkefeld N filtrate of one dog (342).

V. THE NATURE OF THE PARASITE

Having arrived at the conclusion that the appearances described above represented various stages in the life-cycle of a protozoan parasite, it was suspected that this parasite might be a natural infection either in the animals from which the rabies virus strains were originally derived, or a natural infection in the experimental animals used which was being passed along with rabies virus. A search of the literature revealed no previous record of infection with any parasite the description of which corresponds to that reported in this paper. There is, however, a general resemblance to *Encephalitozoon cuniculi* and to certain species of toxoplasma. The evidence against a coincident infection of this kind is summarized below:—

1. *A natural infection distinct from rabies in dogs and jackals.*—A careful examination of the brains of some apparently healthy dogs as well as those which had died of infections other than rabies did not reveal the presence of the parasite, nor was it encountered in the brains of two jackals which showed no evidence of rabies infection.

2. *A natural infection in laboratory animals used.*—

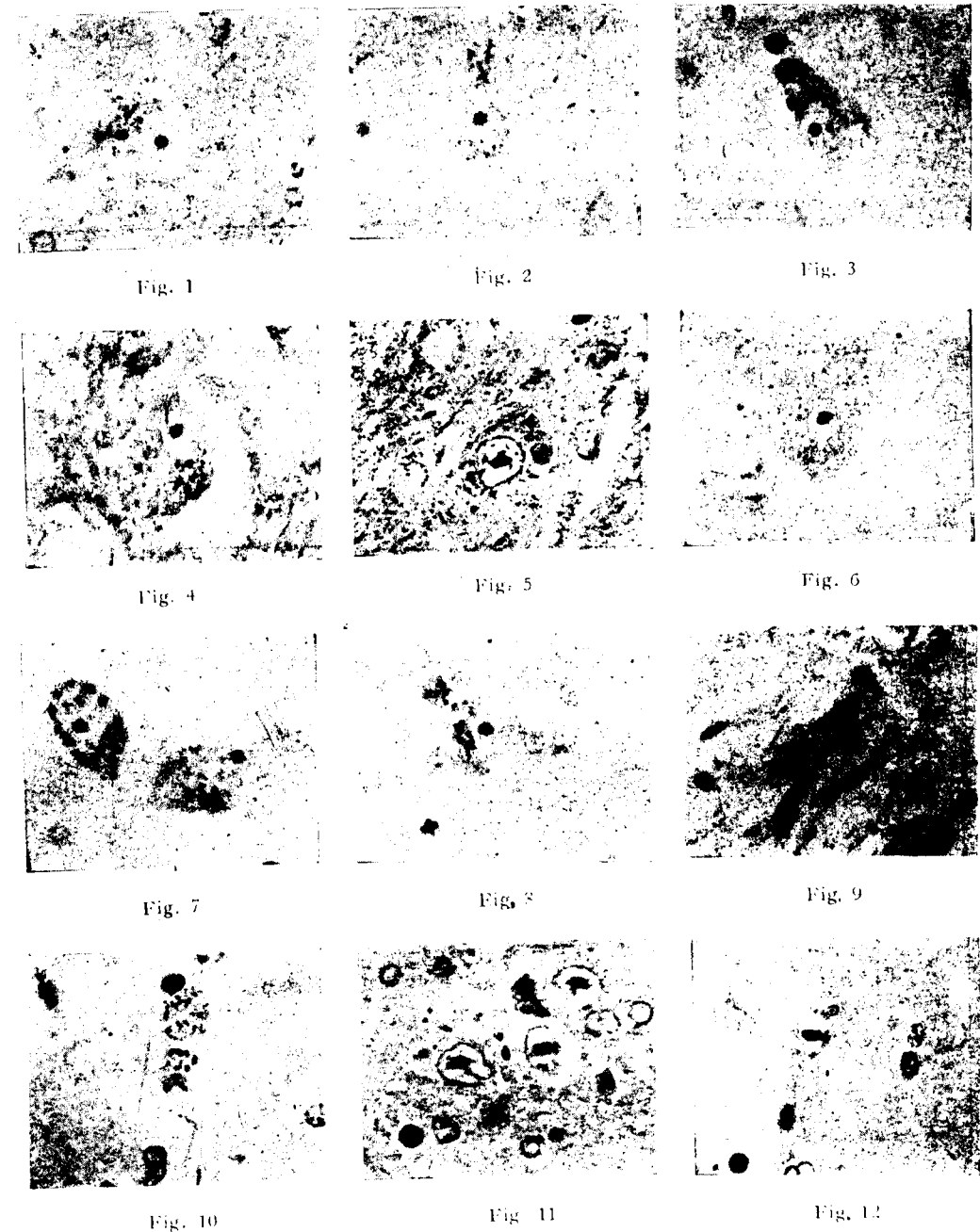
(a) *Encephalitozoon cuniculi.*—The cystic lesions found outside the nerve cells in the brains of guinea-pigs inoculated with the jackal (J) and dog (D) strains of virus bear a resemblance to those found in *E. cuniculi* infection. The chief reasons against a coincident infection with the above parasite are:—

- (i) The cysts were found in the brains of only four guinea-pigs out of the several hundred brains examined. They were never encountered in the brains of dogs and jackals showing the presence of the parasite or in the brains of guinea-pigs inoculated with suspensions of their brains. It is, therefore, difficult to say whether these cysts have any relation to the parasite in question.
- (ii) *E. cuniculi* infection, as far as the author is aware, has not been described in guinea-pigs so far.
- (iii) Although rabbits are very susceptible to *E. cuniculi* infection, the characteristic appearances of this disease were never found in the brains of rabbits inoculated subdurally, intramuscularly, intravenously and intrasciatically with the jackal (J) and dog (D) strain of virus passaged in guinea-pigs.
- (iv) The various stages of the parasite reported in the paper have not been described in *E. cuniculi* infection.
- (v) In *E. cuniculi* infection the parasite can be demonstrated in liver, spleen and kidney but careful examination has not revealed the presence of the parasite described in any of these organs.

Note.—All microphotographs are taken from sections of mid-brains unless otherwise stated.

EXPLANATION OF PLATE XXIV.

- Fig. 1. Nerve cell showing single spores scattered in the cytoplasm. Giemsa. $\times 840$.
 „ 2. Nerve cell showing spores scattered in the cytoplasm. Some of them are in groups of two. Giemsa. $\times 840$.
 „ 3. Nerve cell showing spores in groups of two. Giemsa. $\times 840$.
 „ 4. Nerve cell showing spores arranged in small groups in the cytoplasm. Giemsa. $\times 840$.
 „ 5. Nerve cell showing a collection of spores which appears to be surrounded by a thin wall. Giemsa. $\times 700$.
 „ 6. Nerve cell showing a collection of small spores. Giemsa. $\times 840$.
 „ 7. Figure showing two nerve cells studied with spore forms. Giemsa. $\times 840$.
 „ 8. Nerve cell showing a group of large spores. Giemsa. $\times 840$.
 „ 9. Nerve cell showing a small ring. Giemsa. $\times 840$.
 „ 10. Nerve cell showing several small rings and a typical Negri body. Mann. $\times 700$.
 „ 11. Nerve cells showing rings of different sizes. Mann. $\times 700$.
 „ 12. Nerve cell showing a small ring with a central chromatin. Mann. $\times 700$.



(Blocks by the Courtesy of the Indian Research Fund Association).

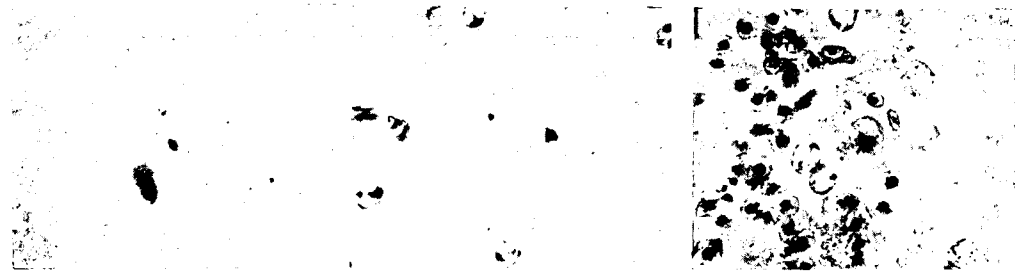


Fig. 13

Fig. 14

Fig. 15

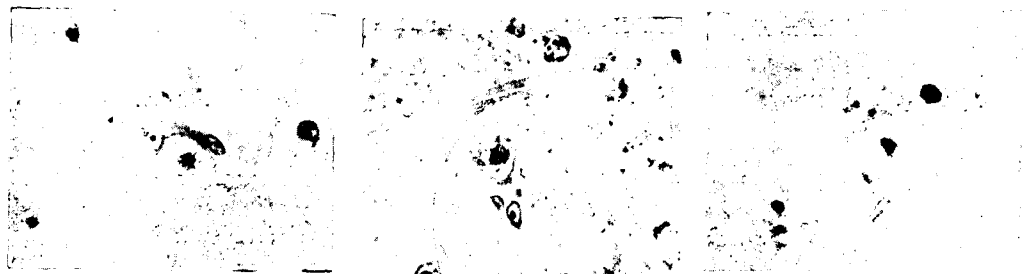


Fig. 16

Fig. 17

Fig. 18

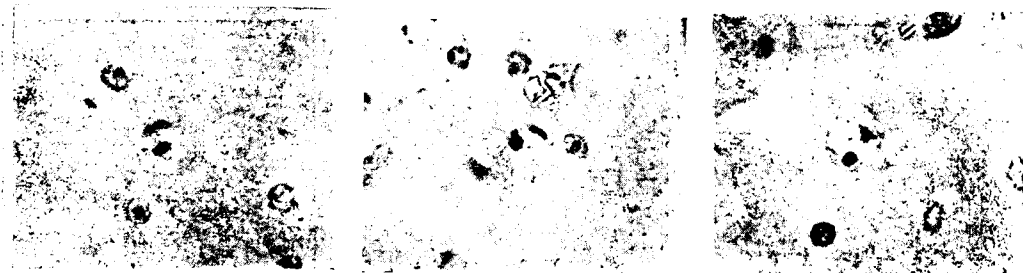


Fig. 19

Fig. 20

Fig. 21

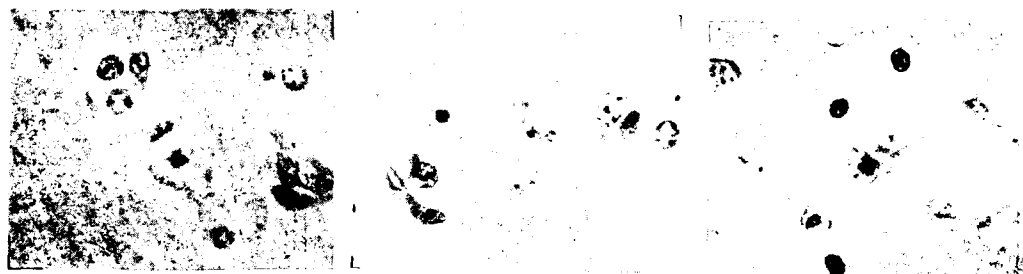


Fig. 22

Fig. 23

Fig. 24

(Blocks by the Courtesy of the Indian Research Fund Association).

Notes.—All microphotographs are taken from sections of mid-brains unless otherwise stated.

EXPLANATION OF PLATE XXV.

- Fig. 13. Nerve cell showing a ring lying on the nuclear margin. Giemsa. $\times 700$.
- „ 14. Nerve cell showing a ring. Giemsa. $\times 700$.
- „ 15. A Purkinje cell of the cerebellum showing a circular and oval ring. Mann. $\times 700$.
- „ 16. Nerve cell showing a large ring from lying on nuclear margin. Giemsa. $\times 700$.
- „ 17. Nerve cell showing a large ring and two smaller ones. Mann. $\times 700$.
- „ 18. Nerve cell showing an *accrole*-like form lying on nuclear margin and a growing form. Giemsa. $\times 700$.
- „ 19. Nerve cell showing an *accrole*-like form with central chromatin lying in the cytoplasm. Mann. $\times 700$.
- „ 20. Nerve cell showing an *accrole*-like form with chromatin at one end and lying on nuclear margin. Mann. $\times 700$.
- „ 21. Nerve cell showing a rounded growing form. Mann. $\times 700$.
- „ 22. Nerve cell showing a growing form lying on nuclear margin. Mann. $\times 700$.
- „ 23. Nerve cell showing two growing forms, one lying on nuclear margin and the other in the cytoplasm of the cell. Mann. $\times 700$.
- „ 24. Nerve cell showing a growing form. Mann. $\times 700$.

Note.—All microphotographs are taken from sections of mid-brains unless otherwise stated.

EXPLANATION OF PLATE XXVI.

- Fig. 25. Nerve cell showing a fan-shaped growing form with chromatin at the periphery. Mann. $\times 700$.
- „ 26. Nerve cell showing a pear-shaped growing form with chromatin at the thicker end. Giemsa. $\times 700$.
- „ 27. Nerve cell showing an elongated growing form with chromatin in the centre. Mann. $\times 700$.
- „ 28. Nerve cell showing an irregular growing form. Giemsa. $\times 840$.
- „ 29. Nerve cell showing a dividing form lying on nuclear margin. The chromatin is divided into two fragments. Giemsa. $\times 700$.
- „ 30. Nerve cell showing a dividing form with chromatin divided into two fragments. Mann. $\times 700$.
- „ 31. Nerve cell showing a dividing form with three fragments of chromatin. Mann. $\times 700$.
- Figs. 32 and 33. Nerve cell showing a dividing form with fragments of chromatin arranged in a linear fashion. Giemsa. $\times 700$.
- Fig. 34. Nerve cell showing a dividing form with five chromatin dots lying on nuclear margin. Giemsa. $\times 700$.
- „ 35. Nerve cell showing a dividing form with several fragments of chromatin arranged in a group. The nucleus of the nerve cell is pushed to one side. Giemsa. $\times 700$.
- „ 36. Nerve cell showing three schizont-like forms occupying major portion of the cytoplasm of the cell. Mann. $\times 700$.

Note.—All microphotographs are taken from sections of mid-brains unless otherwise stated.

EXPLANATION OF PLATE XXVII.

- Fig. 37. Nerve cell showing a form resembling a mature schizont. Giemsa. $\times 700$.
- „ 38. Nerve cell showing oval-shaped bodies, each with a single chromatin resembling merozoites. Giemsa. $\times 700$.
- „ 39. Figure showing disintegration of nerve cell and liberation of merozoite-like forms. Mann. $\times 700$.
- „ 40. Figure showing three nerve cells. The middle cell contains spores and two schizont-like forms. The other two cells contain spores. Giemsa. $\times 840$.
- „ 41. Nerve cell from the hippocampus of a dog showing a schizont-like form. Iron-haematoxylin. $\times 700$.
- „ 42. Nerve cell showing a schizont-like form lying on nuclear margin. Appearances suggest that a wall round the schizont is being formed. Giemsa. $\times 700$.
- „ 43. Nerve cell showing a schizont-like form lying on nuclear margin partly surrounded by a wall. Giemsa. $\times 840$.
- „ 44. Nerve cell showing a schizont-like form surrounded by a definite wall. Giemsa. $\times 840$.
- „ 45. Nerve cell showing a schizont-like form completely surrounded by a wall. Giemsa. $\times 840$.
- „ 46. Figure shows two ganglion cells of the submaxillary gland. The cell at the top shows a form resembling a ring. Mann. $\times 700$.
- „ 47. A cyst containing small spores situated outside the nerve cell in the mid-brain. Mann. $\times 700$.
- „ 48. A large cyst containing spores situated outside the nerve cell in the mid-brain. Mann. $\times 700$.

- (vi) Symptoms associated with *E. cuniculi* infection (da Fano, 1924) were never observed in any of the guinea-pigs or rabbits inoculated with suspensions of the brains showing the parasite. The symptoms observed were always those of rabies.

(b) *Toxoplasma*.—The following evidence is against the possibility of a coincident infection with toxoplasma:—

- (i) In toxoplasma infection of guinea-pigs and rabbits, the parasite has not been described in the brain.
- (ii) The post-mortem appearances in guinea-pigs and rabbits inoculated with the parasitic material did not show the characteristic lesions described in toxoplasma infection.
- (iii) Smears and sections of liver, spleen, kidney, lung and bone-marrow of our experimental animals showed no evidence of parasites of the toxoplasma or other type.

3. *A latent natural infection in laboratory animals excited by superinfection with rabies*.—The following observations indicate that the possibility of an unknown latent infection in the experimental animals, which was activated by rabies infection, is very unlikely.—

- (i) Several guinea-pigs and rabbits caught at random from the runs were killed and their brains and other organs examined. The parasite was never found.
- (ii) Guinea-pigs and rabbits selected from the same runs, which died as a result of subdural infection with Paris strain of rabies 'fixed' virus, did not show the presence of the parasite.
- (iii) The parasite was not encountered in the brains of guinea-pigs inoculated with strains of 'street' virus whose incubation period was fifteen days or more.
- (iv) The demonstration of forms resembling the parasite in the brains of rabid dogs and jackals infected in nature renders the possibility of a latent infection in experimental animals unlikely.

VI. THE RELATIONSHIP OF THE PROTOZOAL PARASITE DESCRIBED TO RABIES

The appearances described above have been observed only in association with rabies infection. While the writer is fully aware of the possibility that the protozoal parasite described may be a coincident infection in no way connected with rabies infection, he has been unable to demonstrate this by any of the experimental procedures employed. On the other hand, such evidence as is available suggests that the protozoal parasite described is not unconnected with the ætiological agent of rabies.

The observations with the jackal (J) and dog (D) strains of virus indicate that the parasite is demonstrable in the brains of animals inoculated with the virus at a certain stage of passage either in nature or in the laboratory, i.e. when the incubation period of the virus given subdurally into guinea-pigs varies from six to eight days. The finding, that the incubation period is the same in guinea-pigs inoculated subdurally with suspensions of the brains of naturally infected dogs and jackals showing the presence of the parasite, supports this view. The parasite is seldom found when the incubation period of the virus by repeated passage in guinea-pigs becomes 'fixed'.

The occurrence of the parasite in the brains of experimental animals inoculated with the jackal (J) or dog (D) strain of virus was independent of the mode of infection. The parasite, with the exception of the cystic lesions already referred to, was generally found in the cytoplasm of nerve cells, particularly those ventral to the central canal of the mid-brain. It was not demonstrable in the liver, spleen, kidney, lung, blood or bone-marrow whatever mode of infection was adopted. The parasite was found in the mid-brain of ten dogs, nine jackals and one calf infected in nature and in the brains of guinea-pigs inoculated with a suspension of the brain of each of these animals. The parasite was not encountered in sections and smears of other organs and tissues of the dogs, jackals and guinea-pigs. These findings indicate that the parasite is specific to the central nervous system.

The following observations suggest that the parasite is ætiologically related to the Negri body: (i) Negri bodies were found with the parasite in the same section or in the same cell. (ii) Negri bodies were regularly encountered in the brains of animals showing the presence of the parasite. (iii) When the virus, by repeated passage in guinea-pigs, become 'fixed' and Negri bodies become scanty, the parasite was also difficult to find. (iv) In the brains of animals killed at the onset of the disease the parasite was found in large numbers but Negri bodies were very scanty. Relatively small numbers of parasites and numerous Negri bodies were encountered in the brains of animals allowed to die of the disease. These observations suggest that Negri bodies may represent a later stage in the development of the parasite. (v) Negri bodies are eosinophilic while the granules they contain are basophilic. The 'spore' forms and the chromatin of the other stages of the parasite are basophilic like the chromatin of the nerve cell, while the cytoplasm of the parasite is eosinophilic. Thus, the internal granules of the Negri body resemble the chromatin of the parasite in their staining reaction, while the rest of the Negri body stains like the cytoplasm of the parasite. The observation is particularly interesting as in some protozoa, such as the malarial parasite, the chromatin is eosinophilic and the cytoplasm basophilic. (vi) Negri bodies, like the parasite, generally do not give the Feulgen reaction for chromatin.

(vii) Observations on naturally infected dogs and jackals and on guinea-pigs inoculated with their brains suggest that Negri bodies may represent: the schizont form of the parasite ensheathed by an envelope, which, possibly, may be formed from the cytoplasm of the cell.

The experimental evidence with the jackal (J) and dog (D) strains of virus shows that the parasite can be demonstrated in the brains of animals inoculated with: (i) suspensions of the brains of guinea-pigs, rabbits and dogs which died of the disease, (ii) suspensions of the peripheral nerves (sciatic nerves) of animals which died of the disease, (iii) suspensions of the salivary glands of animals which died of the disease, (iv) Berkefeld V and N filtrates of the brains of animals which died of the disease, and (v) suspensions of the brains of animals inoculated intrasciatically. The experiments with the other strains of virus isolated from naturally infected dogs and jackals also confirm these findings. The parasite can be demonstrated in the brains of guinea-pigs inoculated with: (i) suspensions of the brains of dogs and jackals, and (ii) Berkefeld V and N filtrates of their brains. The above results are in conformity with the accepted findings in rabies.

The main arguments against the theory that the ætiological agent in rabies is a protozoan are: (i) the developmental cycles described by various workers are based on very inadequate grounds, and (ii) so far as is known, no protozoa exist which have, as part of their life-cycle, invisible filtrable elements.

The observations recorded in this paper show that it is possible to demonstrate, in the brains of animals infected with natural or experimental rabies, a parasite whose morphological appearances and method of multiplication appear to be those of a protozoan.

It is well known that rabies virus can pass through only the coarsest bacterial filters. Glusmann *et al.* (1930) studied the degree of filtrability of rabies virus exhaustively and came to the conclusion that it was not a true filter-passer and that in certain stages it was a visible microbe. The 'spore' forms described in the paper are much smaller than *H. influenzae* which can pass through Berkefeld V candle at high pressure (Dible, 1932). Some of these forms are just visible under high magnification and it is possible that invisible forms also exist. Therefore, it should be possible for these forms to pass through the coarser candles such as Berkefeld V and N. The observation that the 'spore' forms can be demonstrated with the other stages of the parasite in the brains of animals inoculated with Berkefeld V and N filtrates suggest that the 'spore' may represent the filtrable phase of the parasite. The demonstration of the 'spore' and the other stages of the parasite in a single cell lends support to this view.

Levaditi, Nicolau and Schoen (1924, 1924a, 1924b, 1924c) put forward the theory that rabies virus was microsporidium which had a definite life-

cycle with two phases. The first one was a filtrable phase in which the agent resembled spores. The spores passed along the nerves from the site of the wound and reached the central nervous system. There they underwent intracellular proliferation to form pansporoblasts or Negri bodies. The pansporoblasts which represented the visible phase of the organism contained 'plages' each of which was an aggregation of microsporidium spores. Round them the neurone secreted a hyaline substance which formed a capsule, isolating the colony from the rest of the cell. The development of the pansporoblast depended on the virus and the host. If the virus was very virulent it might destroy the nerve cell before the pansporoblast could form. The absence of Negri bodies in 'fixed' virus infections might be explained by the fact that the rate of multiplication of the ultra-microscopic forms is so rapid that the animal dies before the cystic forms are produced. According to the same authors only one phase of the Negri body (pansporoblast) is visible, the spore phase of the organism being invisible and filtrable. There is little or no evidence in support of this plausible theory.

The evidence presented in this paper suggests that the protozoan parasite described might be the ætiological agent in rabies, the 'spore' forms representing the filtrable phase. There seem to be two methods of multiplication of the parasite. Firstly, the 'spores' may undergo intracellular proliferation by repeated division, this possibly being the chief method of multiplication in 'fixed' virus infections. The difficulty of demonstrating Negri bodies and the other stages of the parasite in infections with the Paris strain of rabies virus could be explained by assuming that only the invisible 'spores' capable of passing through candles like Berkefeld N (which prevent the passage of all bacteria) are present. Secondly, the 'spores' may develop into schizonts. From these, forms resembling merozoites are formed and these are set free as a result of the disintegration of the nerve cell. These forms may invade new cells. The Negri body itself may be a mature form of the parasite round which an envelope has been formed from the cytoplasm of the cell.

SUMMARY.

1. A parasite, apparently protozoal in character, originally found in the mid-brains of guinea-pigs experimentally infected with rabies 'street' virus has been studied and a full description of its morphology has been given.
2. An account has been given of the occurrence and behaviour of this protozoal parasite in other animals.
3. Appearances, similar to the various stages in the life-cycle of the parasite described, have been observed in the mid-brain of dogs and jackals suffering from natural rabies infections, and in the brains of experimental animals infected from them.

4. Certain stages in the life-cycle of the protozoal parasite described appear to be 'filtrable'; it has been possible to produce evidence of infection in experimental animals by the inoculation of brain suspensions passed through Berkefeld V and N candles.

5. The protozoal parasite described appears to be a specific infection of the central nervous system, and, in spite of exhaustive searches, it has never been observed in other organs and tissues.

6. This parasite has never been observed except in association with natural or experimental rabies infection.

7. The possibility of the protozoal parasite described being connected with the aetiology of rabies has been discussed.

8. The possible relationship of this parasite to Negri bodies has also been discussed and the suggestion has been put forward that Negri bodies may represent a stage in the life-cycle of the parasite.

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The author desires to express his thanks to Lieut-Colonel K. R. K. Iyengar, O.B.E., I.M.S. (Retd.), Director, Pasteur Institute, Coonoor, for his valuable guidance and kind encouragement. His thanks are also due to his Laboratory Assistant, Mr. M. B. Ajjah, for his technical help during the conduct of this investigation.

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| <i>Idem</i> | (1924b) | ... | | <i>Ibid.</i> , 90, p. 994. |
| <i>Idem</i> | (1924c) | ... | | <i>Ibid.</i> , 91, p. 56. |

Addendum.—The following interesting observations were made after the paper was accepted for publication:—

1. Rajamanickam, aged 10 years, was bitten on the face by a rabid dog on 4th September, 1944. The wounds were cauterized within two hours after the bite and antirabic treatment was started immediately. The patient developed definite signs of hydrophobia on 25th September, 1944, and died two days later. This patient was infected at Kotagiri, Nilgiris District, S. India, where some of the strains of rabies virus reported in the paper had originated. Saliva from this patient was inoculated into the neck muscles of guinea-pigs. One of them showed signs of rabies on the 52nd day and died the next day. Negri bodies and the parasite were found in the brain.

2. The different stages of the parasite described have since been encountered for the first time in the mid-brain of a cat naturally infected with rabies. The brain of a guinea-pig inoculated subdurally with a suspension of the brain of this cat also showed the parasite.

N. VEERARAGHAVAN,
24th November, 1944.

PRODUCTION OF DEHYDRATED GOAT-MEAT FOR THE DEFENCE FORCES

By

MAJOR G. C. JUNEJA, I.A.V.C.

Introduction.—Meat is one of the most important items in the soldier's ration and one of the most difficult to provide in forward areas. Provision of fresh meat in forward areas is an expensive item due to heavy mortality amongst goats during transit, cost of transport and fodder. Moreover it is not possible for obvious reasons to provide fresh meat rations to the non-static front-line soldiers—the persons who require this ration most of all. Tinned meats as generally available are not acceptable to most Indian troops. Hence, in order to implement the Indian soldier's ration, a scheme of dehydrating sliced goats flesh was evolved in India.

Dehydrated meat provides for a considerable saving in weight and volume. Roughly speaking, 100 lbs. live weight gives us about 40 lbs. of dressed carcass, about 20 lbs. of sliced meat and between 4.7 to 5 lbs. of Dehydrated Meat. The number of goats of approximately 50 lbs. live-weight to be slaughtered to produce one ton of dehydrated meat is about 900.

General.—A number of Government Meat Dehydration Factories have been built in various parts of India. There are 'Halal' (Mohammaden) and 'Jhatka' (Hindu) factories according to the method in which the goats are slaughtered in the particular factory. The factories are spacious and well designed. Construction is in pukka brickwork with tiles or asbestos sheeting roofs. The floors and walls, upto a height of 6 feet, of Slaughtering and Processing sections are usually finished in smooth tetrazzo. All doors and windows are carefully fly-proofed.

In cases where municipal filtered water is not available factories have their own specially constructed tube wells, which are inspected at regular intervals by hygiene officers.

The factories work continuously in three shifts of eight hours each, except on either Fridays or Sundays when they are closed for thorough cleaning. Factories are designed to produce half ton or one ton of dehydrated meat a day according to the number of goats available in their areas.

Two Meat Dehydration Factories are run by the Government itself. The remainder are Government owned and supervised, but run by the contractors. A fixed quota of goats from certain specified areas are periodically allocated to each factory by the Department of Food. Contractors' agents have their collecting centres in these areas. The goats from these centres come to the contractors' main centre near the factory by either road or rail, according to the distance. Every morning the required quota of goats is presented by the

contractor for acceptance. Each goat is individually examined by one of the Veterinary Officers, and those that are healthy, non-pregnant, free from disease and fulfil the weight and age specifications as laid down in the terms of the contract are accepted and branded with a distinctive brand. The rejected goats are branded with a different brand so that they cannot again be presented for acceptance in the immediate future.

Segregation:—The accepted goats are admitted into the Segregation Pens where they are kept strictly isolated and under veterinary supervision for four days. This measure is adopted chiefly as a precaution against Anthrax, the accepted incubation period of which is from 24 to 72 hours. Each factory has 2 to 4 lairs (240' X 20'). Each lair is subdivided into four pens which have inter-communicating doors. Goats from each pen are progressively moved forward to the next pen after 24 hours intervals. Goats in these pens are not allowed to intermix or let outside. Half of each pen is covered with a thatched roof to afford shade and shelter. Each pen has water troughs, feeding troughs and drainage arrangements. During the first three days' segregation, the goats are adequately fed and watered. On the 4th day, the goats are starved for 12 hours before being taken up for slaughter. Any goats that get injured or fall sick in these pens are removed for treatment to the Sick Pen, which is at a little distance from the other pens.

Slaughter and Meat Inspection:—As the factories have no refrigeration arrangements—other than for edible offals—the slaughtering of animals is so arranged in batches as to keep pace with the slicing of the flesh and traying of meat for dehydration. Generally speaking, it takes about two hours between the slaying of the animal and placing of meat inside the dehydration tunnel.

Each goat after being individually inspected by the Veterinary Officer on duty in the slaughter house, is killed by either the Hindu (Jhatka) or Moham-maden (Halal) method of slaughter, dependant on the requirements of the factory. This slaughtering is done in the presence of a Viceroy's Commissioned Officer whose duty it is to see that the slaughtering is done in the orthodox religious manner, and who rejects any animals that are not slaughtered in this way. The Veterinary Officer supervises the bleeding of the goats and the flaying of skins, and sees that the latter process is carried out in the prescribed manner with the least possible damage to the skin, which is a very useful by-product. The carcasses are then hung up to complete the flaying of skins which, but for the initial incisions, is mostly carried out by manual manipulation.

After each carcass is dressed the Veterinary Officer carries out Meat Inspection of the carcass and its organs. A carcass or any portion of it found unfit for Dehydration is removed and rejected. All rejected meat is slashed haphazardly and marked with paint so that it cannot be sold in the civil market, and is disposed of by incineration or burial by the contractor. All accepted carcasses are then thoroughly washed, allowed to dry and weighed.

Preparation of Meat:—The carcasses are now passed on to the Deboning and Slicing. Sections of the factory where the meat is eventually cut by hand into slices which are approximately 1/8" in thickness. All visible fat, tendons, gristle, fibre etc., are discarded and removed from the factory premises along with non-edible offal by the contractor. The edible offals are also the property of the contractor who generally sells them in the local market. Sliced meat is then passed on to the Brining Section where meat is immersed in a 10% solution of brine for two minutes. The slices are then spread in a single layer on trays of expanded aluminium mesh. Each tray is 3' x 4' and holds about 12 lbs. of meat at the rate of one lb. of sliced meat per sq. ft. of tray surface. The trays are then stacked one above the other in a specially designed rack mounted on wheels which is known as a trolley. There is a gap of 2½ inches between each tray. Each trolley holds 18 trays.

Dehydration:—Dehydration is effected in a stream of hot air under carefully controlled conditions of temperature and humidity, using a standard type "Recirculating, Forced Draught Tunnel Dehydrator", designed by the Government of India, Food Department.

The drying chamber consists of a brick built tunnel (forty feet long and six feet by five feet in cross-section) into the loading end of which the trolleys can be wheeled in line until the full complement of eight trolleys is in position. Thereafter the method of loading the tunnel is to remove one trolley from the delivery after each hour of the drying operation, and then to push the remaining trucks forward along the tunnel in order to leave sufficient space to receive a fresh trolley. Drying is then continued, and reloading with a fresh trolley repeated at hourly intervals. The upper portion of the tunnel consists of a long brick built air duct, containing at one end a multivane centrifugal fan and at the other end, the heating unit. The latter is a coal fire furnace, from which tubular flue pipes (6" diameter) are led along the air duct. Openings located at each end of the roof of the tunnel connect with the air duct, so that recirculation of the air may take place.

The flow of the air stream is as follows:

Fresh air enters the air duct through louvres at the fan end, and this air is then blown by the fan along the air duct where it is heated during its passage over the hot flue pipes. The hot air then descends to the tunnel and flows in the reverse direction over and between the trays of meat until it reaches the air exit of the tunnel. At this point some air is released through louvres to the atmosphere, and the remainder is directed upwards, passing back through the fan into the air duct. The object of this recirculation is to ensure that the drying power of the air is fully utilised.

Drying is carried out according to the counter-current principle, i.e. the fresh meat encounters the coolest air and, as it dries, meets a hotter and hotter air circulation.

The air passes over the trays in a regular and even flow of about 700 linear feet per minute. The air temperature at the exit or furnace end of the tunnels is maintained as near as possible at 160°F but in no case should it exceed 165°F while the wet bulb temperature at the same end is kept as nearly as possible at 105°F and must not fall below 100°F.

In a properly controlled tunnel the drying time is approximately eight hours. Best results are obtained when the relative humidity is between 30-35%. The relative humidity should not be allowed to increase above 60%.

The tunnel should always contain eight trolleys loaded with trays. In no circumstances is the tunnel worked half empty. If there is not sufficient meat to fill all the trays in all the trolleys in the tunnel, then the trolleys must be filled with empty trays in order to ensure even distribution of hot air.

Packing:—As soon as the trolley is removed from Drying Tunnel samples of meat are taken by the Chemists for chemical analysis for moisture, fat, fibre, gristle content and culinary tests etc., which must be in accordance with the specifications laid down in the terms of contract. All acceptable meat is packed in thoroughly clean dry kerosene oil type tins of 1 or 4 gallon capacity and hermetically sealed. All these tins have previously been tested for air-tightness, washed with hot water and then dried in the 'Hot Air Chamber' for 1 hour at a temperature of not less than 160°F. A certificate signed by the V. C. O. confirming the fact that the meat has been prepared in the orthodox 'Halal' or 'Jhatka' manner is packed inside each tin. The date of production and whether the meat is Halal or Jhatka is then painted on each tin in English and Urdu or Hindi. The tins are then packed in wooden crates.

Generally it takes about 12 hours from the time the goat enters the slaughter house to the time its meat is packed in the tin.

Technical Staff:—There are five Veterinary Officers and three Chemists under an Inspector of Foodstuffs, who is also a Technical Chemist, at each Meat Dehydration Factory. Each factory has a fully equipped laboratory in order to enable the chemists to carry out various chemical analyses. There are two Veterinary Officers and one Chemist on duty during each shift. The whole process, from the acceptance of live goat to packing and despatch, of dehydrated meat is carried out under the personal supervision of these officers, who are guided by standard Rules & Regulations laid down for the working of each stage of the process.

Hygiene:—The highest standard of cleanliness and hygiene is demanded at every stage in the production of dehydrated meat. This includes cleanliness of the surroundings, cleanliness in work-rooms and slaughter house, cleanliness of the personnel and clothing of the individual workers. Every member of the labour staff working inside the factory is cleanly dressed and is medically examined once

a week. Each factory has ablution and changing rooms and workers on entering the factory are provided with clean overalls, and must thoroughly wash their hands before starting work. All sections of the factory are thoroughly scrubbed and washed at the end of each 8-hour shift, and all utensils (knives, basins, buckets) used in Slaughtering, Deboning and Slicing sections are washed and steam sterilised. Trolleys and trays are washed and steam sterilised after each journey through the tunnel. The temperature of the Steam Sterilisation Chamber is kept between 190°F and 212°F. The time allowed for raising the temperature is 5 minutes and this temperature is maintained for 12 minutes in each case.

Conclusion:—Production of Dehydrated Meat in India has been successfully carried out using a straight-forward process well-adapted to the machinery and equipment which was available in India during the early part of the war when there was the greatest difficulty in importing food-processing machinery of any kind from abroad. Despite the extreme climatic conditions of India and the difficulties encountered in providing adequate storage under active service conditions, the product has kept well and proved acceptable to the troops.

MANAGEMENT AND IMPROVEMENT OF GRASSLANDS

By

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Livestock Research Station, Hosur Cattle Farm.

In a country like ours which professes to protect the cow and hold it in reverence, we ought to have an ideal cow but on the contrary we own only an emaciated and diminutive form of it. Unless substantial changes in the existing management of cattle are introduced, a progressive deterioration in quality of the cattle will result. The two important factors in cattle improvement are feeding and breeding.

The grass is the natural food of cattle. When sufficient amount of grass is made available, then only the cow 'becomes economical transformer of foodstuffs.' In this vast country there are extensive natural uncultivated waste-lands which can provide good grazing grounds for our cattle. Efforts should be made to improve these wastes. At present there are few pastures in India worth the name. Of course, the climatic conditions in India may not be quite suitable for the extensive growth of grass but by careful management enough hay could be produced to tide over the two or three difficult months just before the break of the monsoons. In almost every village a common grazing land exists, but it is generally overstocked and it is nobody's concern to improve the grazing land, with the result the whole plot is overgrazed and the grazing area presents an appearance of barren waste.

The following are the more important methods of improving grazing lands:—

1. *Rotational Grazing*:—For this purpose the grazing land should be divided into convenient blocks and these blocks should be grazed alternately. A block should not be grazed continuously; if done the whole area will be overgrazed and soil erosion will result. It will also be beneficial to graze cattle and sheep alternately in a particular plot after giving the plot sufficient rest for the grasses to put forth fresh foliage.

2. *Gutta bunding*:—This is a system of dividing the land into plots by means of earthen banks. While bunding any land, the slope of the land and the general direction of water course should be taken into consideration. On level land, the plots should be larger than on sloping grounds and may vary from 2 to 6 acres. On sloping land the plots should be small according to the steepness of the slope. The bunds should run across at right angles to the water flow so as to dam the rain water and they should be straight. The objects of bunding are:—(a) To conserve moisture, (b) to stop soil erosion, and (c) to prevent manure being washed away. By judicious bunding, a sloping land becomes level in course of years by the processes of silting. Bunds can be laid by passing a deep plough such as the Sabul plough and forming ridges.

3. *Arboriculture*:—This is essential to a certain extent in grass lands. The grazing animals should be given some shade during the hot part of the day to lie down and ruminate. By planting trees in strategic places soil erosion will be checked to a great extent. Too many and too shady trees should not be grown as grasses would not grow under them. Babul and Shisum trees should be grown in grazing grounds. Grasses will grow well under these trees and they also provide good timber. Pods of Babul are relished by sheep and cattle.

4. *Water Supply*:—Animals should be given ready access to wholesome water. A few ponds should be dug out in convenient places and animals can drink the water whenever they want. Every effort should be done to keep the ponds clean and free from snails and weeds.

5. *Manuring*:—After each day's grazing, chain harrows should be passed on the grazed plot. Chain harrow consists of a net-work of wire with a few spikes here and there. Chain harrows break the clods of manure and spread it evenly. It aerates the soil and produces a regular and even distribution of the droppings which results in uniform growth of grass. Dung heaps are generally breeding places of many pests; harrow disturb these breeding places. Grass land will improve considerably if manure is applied even at long intervals as once in 3 or 4 years. If available, manure can be applied systematically to grass lands.

6. *'Grubbing'*:—Deep ploughs should not be used on grass lands as they will uproot all the grasses and they will perish. 'Grubbers' or 'cultivators' should be used for this purpose. Grubbers consist of five or six miniature ploughs attached to a framework. Every rain should be taken advantage of and grubbers

should be passed. These tear up the soil, disturb the root system and allow the rain water to soak well in the soil giving a stimulus for the grass to develop fresh roots. It creates more room for the young grasses to grow.

7. *Weeding*:—It is false economy to neglect weeding even in grazing areas. Grazing areas are generally the reservoir of many small and devastating thorny weeds which ultimately spread into arable lands. Weeds should be systematically removed and disposed off. Weeds throttle the useful grasses and rob them of their light, food and water.

8. *Digging ant-hills, Closing burrows etc.*:—Ant-hills, if any, should be dug out in grazing areas and burrows should be closed. These generally harbour reptiles which are dangerous to animals. Grass lands should be protected from heavy trespass by men and vehicles. In all grazing areas a certain area should be reserved for cutting grass, for converting into hay for use in the hot weather.

PIG DISEASE IN THE ARMY DEVELOPMENT FARMS

BY

Capt. S. B. V. RAO,

E.V.O., Dev. Farms, H. Q. Southern Command.

PART I

The Army Development Farms have included in their programme, raising stocks of pure and crossbred pigs along with other branches of livestock like chickens, ducks, turkeys, rabbits and pigeons. The pig farms are a great success as there are skilled personnel to do the work and large stocks of various kinds of foodstuffs condemned as unfit for human consumption are being rapidly converted into pork.

The present average strength on the 6 large farms and units is well over 15,000 animals. The pure breeds weigh 150-200 lbs. at the age of 4-6 months, while the upgrades 100-120 lbs. and the Desi 50-60 lbs. The average food conversion figures for pure stock, (consisting of large and middle-whites and Berkshire) is 7 lbs. while for upgrades 10 lbs. and country 15 lbs. This does not compare favourably with the accepted standards, but it must be remembered that at best the rations cost little being mostly compounded from short-life atta (Wheat Flour), swill from messes with a variable protein content, skim and butter milk and slaughter house offals from the army Butcheries. Greens are raised on the farm while minerals like salt and crushed lime stones are purchased. The cost of producing pork is worked out at As. 12 per pound and is being sold to troops at Re. 1/- a pound. The farms have begun to pay and it is a pity there is no long term policy to keep them, as these are a war time measure for British Troops, pork not being popular as Indian food.

The most common ailments met with are mineral and vitamin deficiencies, pig pneumonia, swine Erycepilas, paratyphoid, pox and foot and mouth. It is proposed to deal here with the first three diseases as they cause serious losses in the farm-stock.

A peculiar form of pneumonia broke out in February 1944 among pigs at Buksagar and Bikashipur farms with a total strength of over 4000 pigs. All breeds were equally susceptible, but young pigs between the ages of 10-14 weeks were most often affected. The disease ran a course of nearly 2 weeks, a crisis being reached about the seventh day when they succumbed or recovered rapidly.

Symptoms:—The premonitory symptom was a rise of temperature 106° to 107° F in animals in apparently good condition, followed in a day or two by dyspnoea characterised by spasmodic expiratory effort (locally known as "bumping"). Friction rales were audible on auscultation. Mortality among the untreated was about 25 per cent.

Post-mortem:—Lesions were confined to the thoracic cavity. Affected lungs showed patchy congestion, emphysema and acute exudative pneumonia, usually of the apical lobes, with large areas of hepatization which may be necrotic. Exudative pleurisy and enlarged mediastinal glands have also been seen.

Laboratory Investigation:—Examination of direct cultures of heart blood on blood/agar revealed gram negative coliform organisms. Guinea pigs and rabbits inoculated with cultures survived. Smears from liver, spleen and lymph glands were negative.

Histological:—Examination of lungs revealed acute catarrhal pneumonia and alveolar exudation and extravasation of polymorpho leucocytes. No evidence of verminous bronchitis could be detected. In general, this examination pointed towards a virus infection of the influenzal type, although culture-filtrates gave no results when inoculated into experimental animals including piglings. The disease, however, could be transmitted naturally when healthy piglings were placed in contact with sick ones for a week or ten days in the sick sties.

Differential Diagnosis:—Atypical acute form of Swine fever has been reported from Australia; where the only constant lesion is pneumonia; but the disease described under reference is not Swine fever as it failed to infect piglings under laboratory conditions; neither did it respond to Anti-Swine fever biologicals. Hence further work is required on the nature of this epizootic.

Control:—Prevention of overcrowding and chilling on cement floor by thick paddy straw beds, culling of weak litters, early detection and segregation of sick, rigid disinfection and hygiene routine. Drenching of anthelmintics on one of the farms was stopped and replaced by capsules.

Treatment.—Affected pigs received 3 doses of M. and B 693. Sulphapyridine at 1 gm. per 20 lb. body weight as an initial dose and thereafter 1 gm. dose to maintain concentration. This gives a blood concentration of 6 to 8 mgms percent. Sulphanilamide proved useless. 1479 piglings were affected and 964 recovered. The disease ran a course of 3 months before a clean bill of health

was declared on the two affected forms. The mortality, which was 25% before adopting the treatment, was reduced to 4% with the introduction of this routine. Laboratory aid given by the Veterinary Research Officer Dr. K. R. Rao, Mysore Government is acknowledged with thanks.

(To be continued)

TRICHOMONIASIS IN YOUNG PIGEONS

BY

Capt. S. B. V. RAO,

E.V.O. Dev. Farms. Southern Command.

It was noticed towards the end of June 1945 that there was a considerable mortality among pigeon squabs in the Southern Army Signal pigeon lofts. 200 young pigeons, 1-2 months of age, were held and the death rate was approximately one daily. Although a few birds died without showing any symptoms the majority of ailing birds showed anorexia, drooping wings, ruffled feathers, rapid emaciation green diarrhoea and death after the disease had run a course of 2-4 days. Mortality was 100%.

On examination it was found that all pigeons, adults as well as squabs were infested with an external parasite, the pigeon fly (*pseudolynchia maura*), which is considered to be a vector for *Hæmoproteus columbæ*.

In the 32 post mortems performed, the following findings were recorded. 17 showed large areas of necrosis in the liver, greyish yellow in colour of cheesy character. 7 showed catarrh of the small intestines and serofibrinous pericarditis with adhesions, 1 showed signs of coccidia.

Microscopic examination showed *Hæmoproteus* in small count and Protozoan flagellates in large numbers in wet preparations of the liver from the necrotic zones.

In two of the cases with necrotic livers gram negative organisms, later shown to be non pathogenic, were found.

While investigations were proceeding, further mortality continued at an increased tempo of 2 daily until the total by mid July was 41. Early diagnosis was confusing and lay between *Trichomonas* and *Hæmoproteus*, and the latter was at first thought to be responsible. Experimental treatment was given to sick squabs with Acetylarsan. Measures to reduce pigeon fly infestation were instituted by dipping adults and young in a warm lotion of sodium fluoride (0.6%) and stricter sanitary measures to eradicate the pupæ of the fly from the nests, lofts, and surroundings by the free use of bleaching powder. An experiment with DDT 5% and 2% in talc was also conducted to assess the tolerance and influence of the drug in a controlled group of 80 squabs. This was inconclusive however as the pupæ of the flies were already destroyed by sanitation. Tolerance of the DDT appeared satisfactory.

Acetylarsan had no effect in reducing mortality. Attention was now focussed on the *Trichomonas*, first considered to be non pathogenic.

The following measures were adopted and they stopped the mortality and checked the outbreak.

- (1) Isolation and destruction of the sick.
- (2) Medication of drinking water.
- (3) Feeding in soil-proof containers and not in litter.
- (4) Scrupulous cleanliness of the lofts and constant removal of droppings.

Discussion:—Hadley (1919) has established that *Trichomonas* which are usually saprophytic in the intestines of most birds assume a pathogenic role under "special circumstances" in young turkeys causing Black Head and produce lesions in the liver not unlike those described above. An obscure disease was recorded in geese in a unit in this Army in Jan. 45 with similar lesions in the liver and 10% mortality, and *Trichomonas* were found in these lesions but was considered non-pathogenic at the time owing to lack of information on the subject. A disease with similar histopathology and the common syndrome of green diarrhoea, serous discharges from the eyes, retention of egg and progressive paralysis of the legs was recorded in ducks in April 1945 in another Army Unit where the sanitary conditions were markedly wanting. According to Bayon, *Trichomonas* are not only saprophytic but beneficial in the intestines of ducks except in rare circumstances when they assume a morbid role. In geese and ducks the disease could be said to be "filth borne" as the mortality ceases with improved hygiene. In pigeons, the *Trichomonas* have been recorded to be pathogenic, the infection spreading through drinking water and contaminated feed, the disease being caused by *Trichomonas columbae* with a mortality of 100%. Under certain conditions, the organisms invade the liver through the bile duct and produce necrotic foci in the liver which have characteristic resemblance to black head. In the chickens, Typhilitis is caused as in turkeys. Transmission is by the cysts of *Trichomonas* in drinking water and feed contaminated by droppings. Parasites can also be recovered from the buccal mucosa of the adult-pigeons which are refractory to infection. Experimental infection is not successful as *Trichomonas* are only pathogenic, under special circumstances. It is of interest to note that the histopathology is identical in turkeys, geese, ducks, chickens and pigeons.

The laboratory help rendered by the Mysore Government Research Officers Drs. Naidu and Ranganatha Rao is acknowledged with thanks.

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Editorial

OUR FOOD PROBLEM

"Clearly the most important task confronting the social reformer who seeks to make India's food supply satisfy decent standards of nutrition is to increase milk production in India..... A doubling of India's milk supply will not only increase the quantity of first class protein available per head but will also increase the element of animal fat in the Indian diet which at present is largely supplied by vegetable oil."

—Economist.

"India is faced with a very serious shortage of food. On top of serious damage caused to some of our best rice growing lands by a cyclone last October, there has been a complete failure of the N. E. Monsoon in S. India and a failure of the winter rains in the wheat lands of the North." In these words, H. E. the Viceroy of India summarised the existing food conditions in this country during his broadcast on February 18, 1946. To meet this crisis, the Government has proposed to adopt a policy of intense procurement of food and its wide distribution by a system of rationing on a large scale. Every one is to be assured of $\frac{3}{4}$ lb. of cereals as against the previously allotted quota of one pound to each adult. In a country where, even in normal times, nearly 30 per cent of the population do not get enough food, this reduction in the ration is bound to cause a certain amount of hardship but, all the same, people have to put up with it if widespread distress is to be avoided. Every one should therefore limit his or her requirements to the barest minimum and manage as best as

possible with the reduced ration. In this connection, we should like to draw attention to a fact which is often ignored viz. that a large section of the population of this country ordinarily consume a diet which is ill balanced and unsatisfactory and which has been the cause of much ill-health and disease. As the Nutrition Advisory Committee has observed, "it has been found in surveys of typical urban and rural groups that the caloric intake of some 30 per cent. of families is below requirements and that even when the diet is quantitatively adequate, it is almost invariably ill-balanced containing a preponderance of cereals and insufficient protective food of higher nutritive value. Intake of milk, pulses, meat, fish, vegetables and fruit is generally insufficient." And, therefore, the Government would not be doing the right and proper thing in restricting their remedial measures to the procurement and distribution of cereals alone. The lowered restricted diet of the people should be sufficiently compensated by the supply of adequate quantities of "protective" foods like milk and milk products, meat, eggs, etc. At present the supply of these "protective" foods is very low and beyond the reach of any one, except the "well-to-do" classes. In a country like ours where the average per capita income is the lowest in the world, the price of milk is the highest. And, therefore, the Government should undertake to bring down the price of milk as far as possible. Subsidising the supply of oil cattle and fodder is the only practical way in which this can be done. Oil cakes, bran, cotton seed and straw are all selling at prohibitive prices and this has increased the cost of production of milk. It should be remedied immediately. Government should purchase cattle fodder and distribute them in adequate quantities at reasonable rates to owners of cattle 'so as to encourage' milk production. If this is done immediately, milk will not remain an article of luxury as it is at present; but will come within easy reach of all people. Supplemented by the import of milk powder for which the Government are said to be making arrangement, this will go a long way in minimising the "cut" in rations and give protection to the people with lowered vitality.

THE NEED FOR MORE VETERINARY COLLEGES

We publish elsewhere in this issue of the Journal two letters from prominent personages about the necessity of opening a Veterinary College in the Andhradesa. We also extract an article stressing the need for two more Veterinary Colleges in Madras Presidency based on a statistical survey of the situation. We need hardly say we heartily and enthusiastically endorse the need for more and more Veterinary Colleges in this country. If a primarily industrial country like Great Britain which is only as big as a major Indian Province can have four Veterinary Colleges, is it necessary to argue out a case for more Veterinary Colleges in this sub-continent of India in the whole of which there are only five Veterinary Colleges? We think not. Still to show at a glance how poorly India is provided with Veterinary aid, we publish the following data showing the number of Veterinarians per million of large domestic animals in the different parts of the world.

U. S. A.	...	60
Great Britain	...	94.4
France	...	98.8
Norway	...	123
Denmark	...	148
Switzerland	...	247.8
British India	...	8.2

These figures, though pre-war ones, show how precarious our position is. And yet, 80% of the people of this land are agriculturists and live by the land!

The existing Veterinary Colleges are striving very hard to turn out more Graduates every year but they simply could not meet the growing demand. As it is, they are just able to meet the replacements in the Departments consequent on superannuations and casualties. And, therefore, more Colleges should be opened in different parts of the country. It should not be forgotten that in as many as six Provinces in India there is not even one Veterinary College.

Rao Sahib K. Kylasamier has done well in exposing the mentality — shall we say the defeatist or easy going mentality of some administrators who will come out with their pet excuse of lack of support even for the existing Veterinary Colleges. We would in all earnestness ask these administrators, what is the cause of these poor admissions in the Veterinary Colleges? And who is responsible for it? We are sure the administrators themselves know it. Even if they did not, it has been dinned into them *ad nauseum* that the poor and low prospects of the passed out Graduates have been the only cause for such poor admissions. But, unfortunately, they did practically nothing in that direction and allowed things to drift. They had neither vision nor faith and simply carried on with a policy of Do Nothing. As the Famine Commission Report says, "Government permeated by the ideas expressed in the aphorisms "safety first" and "*après moi le deluge*" are inevitably stagnant and can achieve little or nothing." We would earnestly advise our administrators to take courage in both hands and go ahead with "Progress" as their watch word. Improve the prospects of the Veterinary profession, open more Veterinary Colleges and produce more Veterinarians to rehabilitate the peasant in his pristine glory.

VERY HEARTENING

It is very heartening to announce that Lt. V. G. Khare, I.A.V.C., has sent us a cheque for one Hundred Rupees as advance subscription for the *Journal* for twenty-five years. How grand! And how we wish we have more Khares to relieve us of the nightmare of "arrears" and "more arrears" of subscription.

While sending the cheque, Lt. Khare has complimented us by saying "I am very proud of our *Indian Veterinary Journal* which is doing so much to protect the interest of our profession". In thanking Lt. Khare for this, we request that this *Journal* is treated as "Our Journal," by each and every Member of the Profession by giving us a helping hand with not only prompt remittances of subscriptions — advance subscriptions are always welcome — but also with articles of professional interest in greater and greater numbers.

THE IMPERIAL VETERINARY RESEARCH INSTITUTE, IZATNAGAR.

Group Photo of the Conference of Disease Investigation Officers & Assistant Disease Investigation Officers of all the Provinces held at Izatnagar under the Chairmanship of Sri G. R. Viswanathan, G.M.V.C.P.G. (Edin. & Mukt) Veterinary Investigation Officer, Madras and in the immediate presence of Major G. Williamson O.B.E., M.R.C.V.S. (Animal Husbandry) Commissioner with the Government of India and Dr. F. C. Minnett D.Sc., M.R.C.V.S. Director, Imperial Veterinary Research Institute, Mukteswar.



1st Row Sitting:—1 Mr. V. R. Rajagopalan, R.O., 2 Mr. Lakshmi Sabai, R.O., 3 Dr. S. N. Ray, R.O. Nutrition Section, 4 Mr. S. Ganapathy Ayyar, R.O., 5 Mr. Battacharji, R.O. Animal Genetics Section, 6 Dr. Bhale Rao, R.O., 7 Dr. F. G. Minnett, Director, 8 Mr. G. R. Viswanathan, V.I.O. Madras, 9 Mr. H. B. Lal, Asst. Animal Husbandry Commissioner with the Govt. of India, 10 Mr. Hassan, R.O., 11 Dr. Kheher, Officer Nutrition Section, 12 Mr. Gajananam Pande, R.O. Nutrition Section, 13 Mr. Balvant Singh, R.O. B.P. Section, 14 Mr. P. S. Kuppuswamy V.I.O. Orissa, 15 Mr. P. R. Krishna Iyer, A.R.O.

2nd Row Standing:—1 Mr. S. P. Deshpande, A.D.I.O. Poultry, Bombay, 2 Mr. Nagena Singh, A.D.I.O. Sheep and Goats, Punjab, 3 Mr. S. A. K. Aktar, A.D.I.O. Poultry, Bihar, 4 Mr. M. Y. Shaikh, A.D.I.O. Poultry, Sind, 5 Mr. K. Raghavachari, V.I.O. Hyderabad, 6 Mr. Gulam Sarwar, V.I.O. N.W.F.P., 7 Mr. S. K. Bhaduri, A.D.I.O. Poultry, Bengal, 8 Mr. N. R. Michael, A.D.I.O. Poultry, U.P., 9 Mr. S. L. Manjrekar, A.D.I.O. Sheep and Goats, Bombay, 10 Mr. C. Venkatasamy, A.D.I.O. Poultry, Mysore State, 11 Mr. Gopal Singh, V.I.O. Punjab.

3rd Row Standing:—1 Mr. K. B. Pillai, V.I.O.C.P., 2 Mr. Karamchand A.D.I.O. Poultry, Punjab, 3 Rao Sahib V. R. Gopalakrishnan, V.I.O. Assam, 4 A.D.I.O. Poultry, Orissa, 5 S. N. Mohteda, A.D.I.O. Poultry, Hyderabad, 6 Mr. S. L. Zargar, A.D.I.O. Poultry, C. P., 7 Mr. D. K. Desai, A.D.I.O. Poultry Baroda, 8 Mr. Gulam Ahmed, A.D.I.O. Poultry, N.W.F.P., 9 Mr. Z. A. Hashmi, V.I.O. Ajmer Merwara, 10 Mr. V. S. Kuppuswamy, A.D.I.O. Sheep and Goats, Mysore State, 11 Mr. P. B. Kuppuswamy, V.I.O. Bihar, 12 Mr. S. N. Sapre, V.I.O. Bombay, 13 Mr. R. N. Mohan, V.I.O. Bengal, 14 Mr. K. C. Sengupta V.I.O. U.P.



Major General A. G. SADEKAR POWAR G.B.V.C. (Bom)
B.H.S., N.S.E., (Cav.) S.F.E., (Inf.) & Q.
Dy. Chief of the Military Staff, Baroda State Forces, Baroda.



Dr. D. N. MULLICK, M.Sc., Ph.D.,
Assistant Research Officer, (Biochemistry) Animal Nutrition Section, I.V.R.I.,
Who has been selected for advanced Training
in Physiological Hygiene.

Major General A. G. SADEKAR POWAR, G.B.V.C. (Bom.)

B. H. S., N. S. E., (Cav.) S. F. E., (Inf.) & Q.

Dy. Chief of the Military Staff, Baroda State Forces, Baroda.

(By an Admirer)

General A. G. Sadekar Powar who was recently honoured by His Highness the Maharaja Saheb of Baroda by conferring on him the Rank of Major General had a varied career in the different Departments of the Baroda State.

He was born of a historical Mahratta family from the village Sada in the year 1885 and had his early education in Belgaum.

He joined the Bombay Veterinary College in 1906 and qualified as a G. B. V. C., in the year 1908. He immediately joined the Bombay C. V. D. and was posted to Belgaum.

During the visit of Late Sir Sayajirao Gaekwar of Baroda to Belgaum in the year 1908 General Sadekar Powar was picked up as a bright Mahratta youth and was asked to join the Baroda State service. On his consent, he was taken up as a probationer in the Baroda State Forces in the year 1909. Since then his career in the State had been of varied nature and his work as a Veterinary Surgeon, Nayab Huzur Kamdar, Nayab Vidyadhikari, Khang, Karbhari and so on, speak for his abilities which have been deservedly remunerated by the most enlightened of the Princes, the Late Sir Sayajirao Gaekwar, by creating him Raja Ratna.

Being continuously attached to the Army he was made a [N] Colonel in the State Forces in the year 1936 after a continuous strenuous work as A. D. C. for over a period of 20 years. Col. His Highness Sir Pratapsinhrao Gaekwar on assumption of the power of the State in 1939 permanently posted him in the Military Depart-

ment as a senior Colonel which career he continues with covetable honours.

General Sadekar possesses amiable and sweet nature and thus commands great respect from the officers down to the rank and file. Being fully acquainted with the administration of the State, General Sadekar Powar proved a very useful hand to his superiors and could help to improve the status of the Baroda State Forces. For the profession to which he belongs he has a special affinity and he has always tried to improve the profession. He was therefore elected first President of the Baroda Veterinary Association in the year 1936. Unfortunately the Association was subsequently dissolved and the General could not do much for the amelioration of the profession. Whatever may be the reasons for the dissolution of the Baroda Veterinary Association the writer would request members to set aside the difficulties and restart the Association with General Sadekar as President.

It will not be out of place here to request the Major General to infuse life and energy into his beloved profession even in his present capacity and to see that an Association which was once opened with great pomp and pageantry is rejuvenated again and its functions and activities conducted satisfactorily. As a senior member of the profession it is his duty to give a lead to the younger generation by reviving the slumbering organisation and making it work as of old.

Lastly we wish him all health and happiness to enjoy his well earned Rank and to be a revered guide to his younger brothers of his profession.

Clinical Articles

A CASE OF CONGENITAL CONTRACTED TENDONS IN A BULL CALF

By

G. SITARAMAMURTI, G.M.V.C.,
Veterinary Assistant Surgeon, Bezwada.

Subject:— Ongole bull calf, one week old from a village in Divi taluk.

History:— The calf was said to have been born with knuckling of both fore-fetlocks; otherwise the animal was quite normal. The sire and dam were said to be quite healthy and as far as could be traced no hereditary pre-disposition could be attached to the case.

The animal was brought for treatment on 29-12-44 and on the advice of Mr. K. Mallikarjuna Rao, District Veterinary Officer, Bezwada, it was decided to operate and set right the condition, as the calf was evincing much pain due to the deformity.

Technique of operation:— One dram (60 mms.) of Liquor Morphine Hydro-chloride given subcutaneously, brought the animal completely under anaesthesia for about 40 minutes. The site of operation, i.e. the centre of the cannon bones (posterior aspect) was clipped and cleaned with the usual aseptic precautions. With a preliminary skin incision, both the superficial and deep flexors of the two fore-limbs were severed through. The incisions were then closed with sutures and sealed with Collodium. The legs were kept extended and fixed in the normal position with cotton wool and splints extending from the bend of the knee to the toe. The wounds healed by first intention and the splints were removed on the 15th day. The cotton wool padding and bandaging alone were continued for a month, when the calf was finally discharged cured on 29-1-45. It was then able to walk and run about like a normal calf without any support and bearing the weight equally on both the limbs.

My thanks are due to Mr. K. Mallikarjuna Rao, G.M.V.C., District Veterinary Officer, Bezwada, for his valuable suggestions regarding the mode of operation and to Mr. B. H. Sarma the then Touring Veterinary Assistant Surgeon for his valuable help during the operation.

PENICILLIN THERAPY IN CANINE PRACTICE

BY

LIEUT. G. V. NARUSU, G.M.V.C.,
Gwalior Kennels, C. I.

Introduction:—Penicillin, the most important medical discovery of the time, has a very wide field of application in human medicine. This anti-bacterial substance is an active principle of exceptional potency derived from the mould "Penicillin Notatum" and is supplied as a Sodium salt for therapeutic purposes. It is highly hygroscopic and loses its potency quickly when exposed to atmospheric air. The Sodium salt of Penicillin occurs as a yellow brown powder and is easily soluble in water. It is supplied as a dry powder in hermetically-sealed rubber-capped vials. These vials are kept in a refrigerator and maintained at temperatures ranging from 40 to 50° F to prevent loss of potency of the drug. The contents of the individual vial are represented in one lac of Oxford units of Penicillin. Injectable solutions are prepared either by adding isotonic normal saline solution or 5% Dextrose solution to the dry substance in the vial. When 10 c.c. N. Saline is added to the sterile container, each c.c. of the drug is equivalent to 10,000 Oxford units; and when 20 c.c. N. Saline is added to the vial, each c.c. will be represented in 5,000 Oxford units. The preparation of the concentration of the solution largely depends upon the nature and severity of the case.

The following cases treated by me with penicillin are thought worthy of record.

Case No. 1:—A snow-white Pomeranian bitch with Broncho-Pneumonia. Temperature 105° F., breathing laboured and accelerated with characteristic 'pursing' of the cheeks, nasal discharge profuse and mucopurulent, appetite diminished and general condition weak.

Treatment:—The bitch was put on a course of Sulphapyridine for a couple of days with no appreciable relief. Then 'Transpulmin' 0.5 c.c. was given intramuscularly which brought down the temperature to 103.2° F. But areas of dullness were still noticed on percussion and auscultation especially along the lower margin of the lungs. 1 c.c. of penicillin (i.e. 10,000 Oxford units) was injected intramuscularly in gluteal muscles. Diuresis was noticed in about half an hour, the colouration of the urine being deep yellow. The animal was also found to exhibit symptoms of great thirst. A second and a third injection was repeated regularly every third hour. The temperature then dropped down to 102° F and the bitch also appeared to have been much relieved of the respiratory distress. When the full course of ten injections of 1 c.c. each at an interval of every three hours was completed all the alarming symptoms of asphyxia and exhaustion

disappeared. The temperature also became normal. The after-treatment consisted in the administration of some cardiac stimulants such as Caffaine, Digitalis and Camphor and also a few drops of brandy in water given at frequent intervals.

Case No. 2:—A wire-haired fox terrier bitch recovering from an attack of distemper. The case developed, during the period of convalescence nervous symptoms, such as turning of head from side to side, walking in circles in one particular direction, slight corneal opacity of both eyes. The gait was unsteady and staggering with great excitement and irritability. The look was vacant and convulsive seizures of short duration were noticed at times. The temperature was never more than 103° F. The appetite was fairly good and the bitch ate the prescribed diet such as chicken soup, custard pudding and finely boiled and well minced mutton.

Treatment:—Sulphapyridine, Sulphadiazine, Vitamin B preparations with a Salicylate and Iodide mixture were all tried. The symptoms quietened down to some extent and the bitch was seen to be standing motionless, keeping her head low down.

As a last resource, Penicillin was given with an initial intramuscular injection of 20,000 Oxford units. The subsequent injections were given regularly at three hour intervals until ten such doses had been given. The animal was greatly benefitted by the treatment and most of the nervous symptoms subsided with the exception of a choreic spasm of the hind limb. This defect of the hind limb could be seen even after two months in spite of all treatment.

Acknowledgment:—I am very much indebted to Lt.-Col. Dr. H. K. Mehara, M.R.C.V.S., A.I.D.I., Director, Veterinary Department, for his help and interest by way of very useful suggestions during the treatment of the two cases.

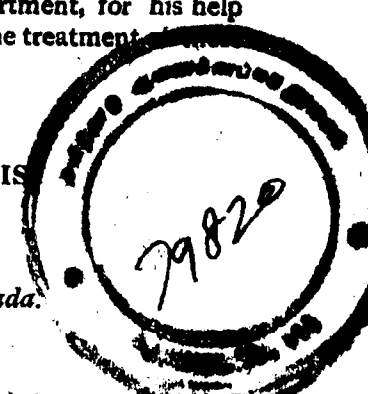
A CASE OF HEPATAZON CANIS

BY

G. SITARAMA MURTI, G.M.V.C.,
Veterinary Assistant Surgeon, Begwada.

Subject:—A Cocker Spaniel dog, age 15 months.

History and Symptoms:—The animal was admitted on 1-7-45 with the history that during the past nearly 3 weeks it was frequently off-feed and losing condition, despite good feeding and careful attention. The dog was dull and listless, the mucous membranes were pale and its temperature was 103.2° F.



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Treatment :—On the first and second day the dog was treated for simple Pyrexia without any improvement. On 3-7-45 the temperature was 104.6°F and the blood smears were found positive for H. Canis. On 4-7-45, 1 c.c. of a 6 per cent. solution of M. & B's Anthiomaline was given intramuscularly and the treatment continued every fourth day till a course of three injections was given. No appreciable change in the condition of the animal was noticed; the temperature and loss of condition remained the same. On 18-7-45 an injection of Quinine Acid Hydrochloride 5 grains in 1 c.c. was given intravenously. On 23-7-45, the temperature was 104° F. and the blood smears were again positive for H. Canis.

At this stage on the advice of Mr. K. Mallikarjuna Rao, District Veterinary Officer, Bezwada, 1 c.c. of M. & B's Acetylarsan (0.05 grains per 1 c.c.) was given intramuscularly on 24-7-45 when the temperature was 104.8° F. The next day the temperature came down to 102.2° F and the animal looked a bit livelier than before. Two more injections of the same drug were given at three days intervals. With the second injection itself, the temperature came down to normal. The dog showed liveliness and increased appetite. After the third injection, blood examination revealed no H. Canis organisms. Samples of blood were examined on subsequent occasions and they were found to be free of the parasites. The dog had no relapse since then, and at the time of writing (27-12-45) it was seen to be in excellent condition.

My thanks are due to Mr. K. Mallikarjuna Rao, G.M.V.C., District Veterinary Officer for his valuable suggestions regarding the treatment of the case and for examining the blood at frequent intervals.

A CASE OF ABNORMAL FOETAL DEVELOPMENT

By

G. SITARAMAMURTY, G.M.V.C.,
Veterinary Assistant Surgeon, Bezwada.

On the evening of 12-10-45, one fully pregnant cow was brought to the hospital with the history that the animal was having labour pains since the morning; there was sero-sanguinous discharge from the genitals, the animal being very restless. The animal was given one oz. of chloral hydras by mouth — cast and secured. On examination, the foetus was felt to be in the breach presentation — only the tail could be felt. On further manipulation the hind limbs could be felt well-flexed under the abdomen; with much difficulty the legs could be extended and brought into the pelvis and the foetus was extracted with great deal of difficulty as the abdomen was too pendulous (Vide photo). The calf died a few minutes after the delivery;



Photo of the Abnormal Foetus

The following peculiarities were noticed in the calf :—

1. The face was compressed antero-posteriorly with the head having a bull-dog appearance.
2. No neck could be felt as the head was almost seen as if fixed to the withers.
3. Abdomen too pendulous.
4. Absence of scrotum.
5. Inability of the animal to stand.
6. Knees could not be extended and the fetlocks were twisted externally.
7. Hind fetlocks twisted externally with the inferior surface of the hoofs turned upwards.

CLINICAL (LEGAL) COMMUNICATIONS *

THE DYED GREYHOUND CASE

BY

HAMILTON KIRK, M.R.C.V.S.

A somewhat unusual case was that which occupied, recently, the attention of a judge and jury, four counsel and a retinue of solicitors for four whole days, the prosecution producing 31 witnesses. It concerned the alleged dyeing with a parapehenyldiamine dye of a white and black greyhound's coat so as to make it appear all black. The essential allegation was that the defendants knew in August, 1944 (at another trial) that the dog had been dyed in the previous January, and had committed perjury. The prosecution based its case upon the discovery of a few dyed hairs (probably less than a dozen) in February, 1945, and October, 1945. The interest for the veterinary reader is that the defence had to prove that individual hairs which were growing in January, 1944, could not still have been found in February or October, 1945. The hairs found by the police in February were said to be 3/16 in. long, 1/16 in. nearest the skin being white and the other 2/16 in. pigmented. The shafts of all had been cut. The October hairs were alleged to have an additional 1/16 inch of unpigmented shaft. The latter statement was made in an attempt to prove that a hair would grow only 1/16 in. in eight months.

The veterinary witness for the defence was asked (1) to account for the presence, in a black and white dog, of individual hairs bearing black and white colours; (2) to give an opinion as to whether the pigmented portion was in fact dye or whether it was natural pigment; and (3) assuming or agreeing that the hairs had been dyed, whether they could have remained on the dog during a period of 22 months.

1. In the absence of the dog, and before the case was heard, the following advice was given to the defence counsel: That numerous members of the Canidae and Felidae were known to grow parti-coloured hairs although it was a matter of great rarity to discover in a black and white dog (fox terrier or greyhound as examples) any single hair bearing both black and white. But two or even three variations of colour could be found in single hairs of brindled dogs, in tabby cats, red cats, brown sheep dogs, wolves, etc.; whilst the silver fox commonly grew hair of two shades. Specimens of such hairs were exhibited, under the microscope, in court. It was not unreasonable therefore to suppose that if one breed of domestic dog or cat could grow parti-coloured hairs, another also could—especially if that other was an animal already growing some black and some white fibres.

Further arguments could have been advanced in explanation of the bi-coloured hairs, e.g. (a) they could have been natural dark hairs which for some local reason had degenerated, causing them to break off short and lose pigment; (b) that local nerve or circulatory defects will produce local de-pigmentation; (c) that a slight deficiency of the vitamin B complex, particularly of pantothenic or nicotonic acids, in the diet, could have been a factor causing greying of the hair, starting at the roots; (d) in explanation of the shortness of the hairs found it could have been advanced that hairs not only may split or break off spontaneously, but may be damaged in the act of stripping, grooming, scratching, etc.

However, counsel for the prosecution was intent upon pursuing another line of interrogation.

2. The veterinary witness for the defence was specifically requested (in cross examination) to assume that the hairs had actually been dyed, and was asked the direct question, "Could hairs dyed in January, 1944, have been still present in February, 1945 and October, 1945? The answer was "Definitely no!" Great pressure was brought to bear to get this reply shaken or reversed, in view of the fact that some previous witness for the prosecution had stated that no dog would lose *all* its hairs under three years. Apparently that was a mere opinion, unsupported by any kind of proof except the testimony of another witness on the same side. Asked why he was so sure that a dog would completely lose its coat at each moulting, the defence expert witness replied that in the course of many years of observation of dogs it was quite obvious how the winter coat which had become shaggy, long and discoloured, would give place gradually to a rather shorter, glossy and perhaps paler coat as the summer drew on. Also that in the Arctic fox (which was a member of the dog tribe or Canidae) the complete change from summer to winter coat, and *vice versa*, was visually apparent because that animal grew a bluish-grey coat for the summer and an all white coat for the winter, and never was a blue hair found among the white, or a white among the dark. It was indeed generally accepted among veterinary surgeons that the complete change of coat was a natural phenomenon common to all hairy mammals, and when we knew, from colour changes, that the shedding was complete in foxes and wolves, there seemed no reason to expect a departure from normal in other members of the dog tribe. Asked if he could quote any authority in support of such an argument, he read the following extracts from literature from the Royal Zoological Society's library and elsewhere:—

"Professor DUERDEN and A. B. WHITNALL, writing in the *South African Journal of Science*, 1930, Vol. XXVII, November, stated: All writers on the horse appear to hold that a *complete* change occurs in the passage of the summer to the winter coat, that is, the fibres of the one are shed and those of the other represent new appearances.....That in the cow the shedding of the coat appeared to be in progress all the year, for loose fibres of all lengths could be brushed from the coat at any time. They concluded: 'The shedding of the

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outer covering of the body is a general phenomenon among animals and is particularly manifest in mammals.....Sometimes it admits of the replacement of an old and worn covering by a fresh and perfect one, often different in form and colour. The process in the three types studied may be regarded as characteristic of hairy animals in which the fibres are all of one type.....It is obvious from the fibre analysis that the long winter fibres are *completely* shed at the beginning of summer.....No marked shedding period occurs in human beings; also in dogs and cats no distinct shedding takes place, but single fibres are continually dropping out and new ones emerging.'"

SUTTON and SUTTON, in their *Introduction to Dermatology*, stated that: "Shedding of hairs is normal and continuous throughout life. *Each* hair (writer's italics) is exchanged at intervals of several months. When a hair is about to be shed, cornification of the root extends down almost to the papilla, the bulb splits into fibrils and the hair separates at the papilla. As the exfoliating hair pushes outwards and falls away, a new papilla develops by outbudding from the side of the old follicle, and the new shaft wedges its way into the follicular lumen, soon reaching the surface."

KIRK, in his "Index of Diagnosis" stated that: "Though all dogs normally shed their coats bi-annually, such moultings may commence early and finish late, with the result that they seem to be moulting all the year round."

R. POCKOCK, F.R.S. (*Proc. Roy. Zool. Soc.*, 1911, November, 7th), writing of the seasonal changes of colour and phases in the moult of an Arctic fox, said; "The white winter coat was retained unchanged until the middle of May, then began to come off and in June a dark summer coat could be seen beneath in its early growth."

In view of all that evidence and experience there seemed no ground for suspecting a departure from a natural and normal physiological process. When pressed further as to how he could account for dye being found in hairs 22 months after application, he said he would first have to be convinced that the pigment seen was actually dye and not natural pigment; secondly that if the presence of dye was proved beyond doubt, then somebody had more recently applied it. (The dog had been in the custody of the police for the last nine months). What evidence had been given by the prosecution witnesses as to chemical tests to establish the presence of dye was not disclosed, as the expert witness of both sides were not permitted in court until required.

3. The next question which arose concerned the rate of growth and normal length of a greyhound's coat. The answer was "Approximately half an inch per month as ascertained by observation after a pre-surgical shaving in many hundreds of cases; and that the usual total growth was about one inch." This represented a rate of 1/16 in. in about three and a half days. It will be remembered that the alleged dyed hairs found in February, 1945, had 1/16 in. of white at the root end; had those same hairs existed in January, 1944, there

would obviously have been continued growth for the following two months, and a good deal more than 1/16 in. of white showing as, of course, dyed hair grows out and needs to be redyed; in fact growth would have stopped when the maximum normal length had been reached, and the hair would gradually die and finally drop out. As against this theory, the prosecution advanced the plea that these hairs had a retarded or stunted growth after they were dyed; but there seemed no evidence or proof of the contention. The prosecution brought forward 31 witnesses, and the hearing lasted four days, but the result was an acquittal of the accused.

The case assumed great interest for the veterinary profession, as questions concerning the of growth and average length of hairs are probably rarely studied by its members; nor are the appearances in the hair of dyes as compared with natural pigmentation, or indeed the structure of hair and its normal microscopical picture.

These are matters, however, which may at any time exercise the members of our profession who are officiating at greyhound racing tracks, and that is the reason for ventilating the case in this journal.

As concerns the micorscopical appearance of pigmented hair, it is the fact that dyed hair shows a more or less sharp line of demarcation between the normal and the coloured cells, whilst natural colour blends gradually into the unpigmented parts. Dye affective mostly the cuticle of the hair, whilst natural pigment invades the cortex. Paraphenyendiamine dyes may be detected by test, described by GRIEBEL and WEISS *Analyst*, 1933, p. 417) and apparently the test depends upon the ability of formaldehyde to decolourise dyed hair but not naturally coloured hair. Hair decolourised in that way readily takes dye again if such be applied.

FITS

BY

V. PARAMESWARA MENON, G.M.V.C.

Veterinary Assistant Surgeon, Trichinopoly.

The term 'Fits' is a common layman's term for Epilepsy. It is also known as 'Falling sickness.' In Tamil it is called as Ezhuppu or Kakkavalippu and in Malayalam as Apasmaram — terms used to signify an analogous condition in human-beings.

This complaint is met with in all classes of domesticated animals and birds of all ages. It runs a chronic course. Sometimes it is also hereditary in its origin. It is characterised by irregular attacks of temporary unconsciousness with muscular twitchings, and convulsions. Weak, anæmic and delicate subjects as well as well-cared for, petted and pampered, strong, vigorous and well-fed animals fall a prey to it equally.

Definite causes of this ailment are still unknown, but the symptoms are usually attributed to one or a combination of two or more of the following factors:—

1. Affections of brain or its meninges.
2. Peripheral nervous irritation.
3. Toxæmia.
4. Worms.
5. Protozoal affections e.g. Tryps and Babesia.
6. Sequelæ to distemper, Influenza and wasting diseases.
7. Trauma.
8. Mineral and vitamin deficiencies.

Symptoms:—The attacks and seizures appear suddenly without any premonitory sign.

In canines, the affected animal runs in an excited manner either in a circle, or side ways, and froths at the mouth. The pupils get dilated, the vision gets blurred and there are twitchings of the facial and masticatory muscles with transitory photophobia. The respirations are hurried, and the animal lies prostrate or stands with legs outstretched panting for breath. Muscular tremors of the fore-quarters are also noticed. This train of symptoms passes off in two or three minutes and the animal returns to normal conditions quickly enough.

In calves, the patient lies down unconscious on its side, particularly on its right side, kicks at its abdomen, and occasionally self-inflicts injuries on its head. Quiverings and muscular twitchings of the fore-quarters are often observed. Pupils get glassy and dilated, and extremities get cold and cramped.

In adult bovines, the condition may start with premonitory symptoms of a drunken gait, loss of control, and falling down on its haunches with muscular twitchings. A few minutes later, the animal is on its limbs again, feeling nervous and shaky, and gazing wildly round. The muscles of the thighs and quarters shiver and quiver. In rare cases, a hypersensitivity to touch and sound is noticed.

In equines the symptoms are those of acute spasmodic colic in an highly exaggerated form, and it is frequently mistaken for it.

In poultry, the bird is seen in a 'limber-neck' condition with locomotor ataxia, with muscular tremors and spasms.

Masticatory muscles are predominantly involved in dogs and calves. Champing of jaws, salivation, and at times biting the tongue unconsciously with consequent injury and staining of saliva with blood during tonic and clonic convulsions and spasms—these are often noted. These spasms which are at first localised to the facial muscles appear to be transmitted to group

after group of muscles of the body from head to foot, in a rhythmic order, and very rarely irregularly. The neck and body are drawn backwards or a little sideways, the legs get stretched out and the ears are twisted and screwed up. The paralytic paroxysm relaxes itself, and clonic spasms commence. At this juncture, the respirations become shallow and reach almost an imperceptible point, as if the animal had ceased to live. However, in a few minutes, these unfavourable symptoms alter; the spasms stop, and the patient lies helpless for a while, doped-like, then rises, and soon recovers consciousness. A certain amount of photophobia persists and the animal shows signs of fear and is afraid of things nearby, preferring quiet solitude for a time. Towards the latter stage of the attack, urine and fæces are voided involuntarily in a few cases. One very conspicuous feature of the seizure is that there is no material alteration in the animal's pulse and temperature during the attack.

Prognosis:—Frequent attacks at short intervals are serious; treatment is of no avail, and the cases often terminate fatally.

The following review of 120 cases that came to my notice during the last six years at different stations, commencing from 1st April 1939 to 31st March 1945 will be found to be interesting.—

Table I

Station	Species of animals treated	Total	Cured	Discontinued	Relieved	Died
Mangalore (S. K. Dt.)	Bovine Calves	14	9	3	1	1

Remarks:—All the fourteen cases were calves. The causes of the complaint were worms, general toxæmia, mineral deficiency and rickets. Specific treatment resulted in the cure of nine of them. Considerable improvement in three cases were noted and they discontinued before the completion of the full course of treatment. A certain amount of relief was noticed in one case, but nothing more could be done for it. One patient died during the course of treatment.

Table II

Station	Species of animals treated	Total	Cured	Discontinued	Relieved	Died
Manjeri (Malabar Dt.)	Bovine (a) Calves	32	23	4	—	5
	„ (b) Adults	7	5	—	—	2
	Canines	1	1	—	—	—
		40	29	4	—	7

Remarks:—In the case of the solitary canine, the cause was traced to reflex irritation from parasitic otitis media and externa. Removal and prevention of these resulted in a radical cure. The 26 calves were of various ages from a month to 8 months. They were all poorly fed and malnourished with extensive alopecia. They were also suffering from a heavy infestation of *Ascaris Vitulorum* and showed signs of severe hepatic disorder and intestinal toxæmia. 18 of these were cured, 4 died, 2 discontinued treatment, and 2 were sold out along with their mothers, when relief was perceptible. In 6 calves the cause was traced to Babesiasis; 5 were cured with specific treatment and 1 died. Of the 7 adult bovines, 3 were due to Trypanosomiasis, 3 to Babesiasis and one due to acute meningitis. One of the Tryp groups and the one due to Meningitis died.

Table III

Station	Species of animals treated	Total	Cured	Discontinued	Relieved	Died
Tanjore (Tanjore Dt.)	Bovine Adults	4	4	—	—	—

Remarks:—The four adult bovines had Trypanosomes in their blood and they recovered with specific treatment. No subsequent attacks were reported.

Table IV

Station	Species of animals treated	Total	Cured	Discontinued	Relieved	Died
Kumbakonam (Tanjore Dt.)	Equines	1	—	—	—	1
	Bovines (a) Calves	38	29	—	—	9
	(b) Adult	14	11	—	—	3
		53	40	—	—	13

Remarks:—1 Equine and 52 bovines (38 calves and 14 adults) were treated at Kumbakonam. Out of these, 14 were new born calves having got the attack within a period of 3 to 10 days of their birth. Tryps were found in blood smears from 2 cases, and Babesia Mutans in five. No definite cause could be found in the others. Calcium intravenously and orally, set right the disorder in these, while specific treatment cleared up the

parasites in blood. The remaining 24 out of 38 developed fits due to worm infestations, intestinal toxæmia and malnutrition. 15 only survived the course of treatment. 9 died chiefly due to gross neglect on the part of owners and their attendants — bad housing, under-feeding and bad weather conditions; these were victims to catarrhal pneumonia. Out of 14 adult bovines, Tryps were responsible for 11 cases; one was due to Abomasitis; brain lesion and morbid growth accounted for one case; and a generalised bone disease in another — the large bones getting swollen, porous and spongy. All the cases due to Tryps recovered and the rest succumbed.

One equine:—Not diagnosed at the initial stage. Symptomatic treatment ended with mortality. Post-mortem examination revealed extensive parasitic enteritis.

Table V

Station	Species of animals treated	Total	Cured	Discontinued	Relieved	Died
Trichinopoly	Bovines (a) Calves	—	—	—	—	—
	(b) Adults	5	4	—	1	—
	Canines	2	2	—	—	—
	Poultry R.I.R. Cock	1	1	—	—	—
	Others-Home Pigeon	1	1	—	—	—
		9	8	—	1	—

Remarks:—Defective, poor and unwholesome food was responsible for the complaint in both the canines. Correction of this cured the complaint in both.

A course of Tricalphos gave beneficial results and cured the ailment in both the Rhode Island Red Cock and the Home Pigeon.

No blood parasite could be detected in any of the five adult bovines. A course of Iodides was prescribed for two of the bovines out of the five, and a course of Tartar Emetic intravenously and orally, for two, relieved them of the attacks. In one case, the results of treatment were baffling. The frequency and duration of the seizure and attack increased considerably in this case, as a result of treatment. Therefore, the patient was recommended a change of place and environments, long rest, discontinuance of all medication, plenty of grazing in the open rural area with good care and management. This has done some good though the animal was not completely rid of its troubles.

SUMMARY OF THE FOREGOING CASES.

Species	No. affected	Cured	Relieved	Discontinued	Died	Percentage of mortality	Percentage of cure
1. Equines	1	—	—	—	1	100%	
2. Bovines	114	85	2	7	20	17-54%	74-56%
3. Canines	3	3	—	—	—	—	100%
4. Birds Poultry & others	2	2	—	—	—	—	—
Total	120	90	2	7	21	17-50%	75-00%

Out of the 120 cases treated, 54 were males and 66 were females.

20 cases were due to Tryps

14 " Babesiosis

68 " Helminths and Deficiencies

3 " Nervous disorders

15 " To unknown causes

Remarks:—The percentage of cures on the total number of attacks, works out to 75.00%. The mortality rate varied from 17-50%.

It is interesting to note here that in the West Coast area where the rainfall is comparatively high, the dominating colour of the affected bovines was either dark brown, fawn or tan, whereas in Tanjore District where the rainfall is not so high, the white colour was predominant in the affected bovines.

Treatment:—In cases of Helminthis origin, the following agents have been found successful.—

1. 01. Chenopodium, 2. Thymol, 3. 01. Terebintheni, 4. Santonin, 5. Spiritus Chloroform.

Cupri Sulphas and Tobacco Decoction have not fared so well as the above. The assessment of the dosage and the fixation of the strength of the tobacco decoction — due to varied kinds of the leaves, with different processes of seasoning and preservation and consequent Nicotine content — were rather a problem. The susceptibility of young calves to these agents was variable and uncertain. Occasionally dangerous results ensued in young stock.

2. In cases of deficiency diseases, proper care and management and correction of diet were effective. Addition of common salt, mineral mixture

and green fodder in the daily ration, with grazing whenever possible, and lastly a liberal supply of mother's milk for the growing young stock — these were responsible for the cure and relief of the cases.

3. Cases of nervous origin were treated by the removal of the causes wherever discernible. Dark room, shady places, quietude, cold packs to the head, blinds, avoidance of noises, glaring light, etc. leading to excitement helped considerably in the alleviation of the suffering. Chloral and Triple Bromides were also found helpful in the initial stages.

4. In those cases of unknown origin, injections of Tartar Emetic, Calcium Gluconate Sodium Iodide, Normal saline, Mag. Sulphas orally in alteranative doses, Iron and Arsenic — these were all tried and found to have varied results. The first three were found beneficial. Normal Saline was not of any use. No appreciable results could be observed with Mag. Sulph, Iron and Arsenic.

SUMMARY.

A record of 120 cases of the so-called " Fits " is given with a classified causal factors.

Further observations with experimental data and the record of results appear to be necessary to throw more light and illumination in the elucidation of the real causes governing the onset of symptoms in this complaint, and their effective control and prevention.

ACKNOWLEDGEMENT.

I am much indebted to Mr. K. R. Lakshiminarayana Aiyar, District Veterinary Officer, Trichinopoly, for his helpful guidance in writing this note for publication.

REFERENCE.

Muller and Glass, [1938.] ... Diseases of the dog.

TREATMENT OF PAPILOMA IN DOGS

By

S. J. KHAMBETE, G.B.V.C.

Hospital Surgeon, Bombay Veterinary College, Parel.

Papiloma or warts are common in dogs and they are found on the lips, gums, hard palate and even on the tongue. They appear like a bunch of small grapes in the mouth. The affected animal appears, otherwise, quite healthy and does not experience any difficulty either in drinking or swallowing. This ailment has been treated up till now by the following methods:—

- (a) by surgical interference;
- (b) by a course of injections of Bismuth Salicylate (P. D. & Co.).
- (c) by giving yeast preparations.

Owners of dogs are generally reluctant to have the tedious treatment of injections or even the surgical interference. A treatment which has been found satisfactory by me is the administration of Calcium Sulphide Tablets (Burroughs Wellcome & Co.) every day for a period of three weeks to a month. The dose of this drug should be adjusted according to the size of the dog; usually it varies from $\frac{1}{2}$ to 2 grains per day. Twelve cases have been treated by this method and in all of them the treatment was successful.

[Note:—A peculiar feature of these warts which we have noted in our practice is that they appear quite suddenly and disappear equally suddenly after a time with or without treatment. Ed. I. V. J.]

A CAESAREAN SECTION IN A COW AND AFTER

BY

S. J. KHAMBEDE, G.B.V.C.,

Hospital Surgeon, Bombay Veterinary College, Parel.

On Sunday the 2nd September 1945 at about 3.30 p.m., a small local bred (Deccani) cow brought to the Bai Sakarbai Dinshah Petit Hospital from Versova (Bombay suburb) with the following history:—

History:—The cow in full gestation period started straining the previous morning i.e. 1st September 1945. After about 24 hours of ineffective labour, some local cattlemen or Gowalis attempted to remove the foetus but being unsuccessful brought the animal to the hospital.

Clinical Examination:—On examining, it was found that the case was one of maternal dystocia consequent on a deformed pelvis and leg (near hind), probably as the result of an old accident, the sacrum had become depressed and constituted an obstacle for every parturition. A caesarian section was immediately decided.

Operation:—The left flank instead of the right was selected for the operation as the left lateral recumbent position caused great discomfort to the patient due to the deformed leg and pelvis. Chloras Hydras, one ounce in water, was given per mouth, the seat of operation was shaved, cleaned with soap and water, painted with Tr. Iodine and 10 c.c. of Planocaine

(M. & B.) was injected subcutaneously. When the animal was under the effect of Chloras Hydras, an incision was made on the left flank starting 4 inches below the transverse lumbar process and extending downwards about 14 inches. The muscles were incised and then the peritoneum. All the incisions were made in the same direction. The haemorrhage was very slight. When the uterus was exposed, a bold incision about 10" long was made quickly and the foetus was removed by seizing the head and fore limbs. The foetal membranes also were removed. The uterus was washed with Dettol lotion and dusted with Sulphanilamide powder and sutured with catgut (continued sutures). Then the peritoneum and the muscles were then sutured separately with catgut, and lastly the skin with twine (in the absence of suturing silk).

Treatment:—The operation was completed with the application of Tr. Iodine on the sutures. The animal made no attempts to move till 10.30 p.m. It being a rainy day was very cold and therefore a stimulant drench was given at about 11 p.m. The cow then got up but as it was uneasy, it was left undisturbed. On the 3rd September 1945, i.e., on the second day of the operation, the temperature was 104.4°. The animal was sitting and took some lukewarm water. At about 11.30 A.M. the same day the temperature was 102.8°F. Soluseptasine (M. & B.) was injected intravenously (50 c.c. of 20% solution). The cow was becoming restless and therefore a dose of Chloras Hydras (4 drams) was given by the mouth. Temperature was 102.0°F. throughout the day. She was given milk and jaggery.

4th September 1945.—The animal appeared lively; took some water and tried to eat green grass and little hay. Soluseptasine was given intravenously, morning and evening. The wound was dressed with Tr. Iodine.

6th September 1945.—There was a slight discharge from the uterus and so it was douched with Acriflavine Glycerine (1-500). The animal was found eating green grass.

7th to 11th September 1945.—Nothing particular was noticed, except a swelling at the seat of operation, (which had increased).

12th September 1945.—Sutures were removed. It was noticed that a small collection of fluid had taken place between the muscle and the skin. A counter opening was made and the wound was cleaned with Sulphanilamide.

From 13th September 1945, this wound was dressed with Sulphanilamide powder. By the 3rd October the skin wound had nearly healed up. The temperature remained normal from the 19th September till 3rd October during which time the animal was moving about freely and the animal was fit to be taken home. (Vide photo attached).

Plate No. 1



The cow as it was photographed in the 4th week after the Caesarean Section.

Suddenly on 3rd October, the animal was found listless. It was off feed and the temperature was 103.4°F , (blood was examined). Blood examination revealed nothing particular. On 4th October 1945, the animal was still restless, the temperature was 102.4° , was off feed, so was hand-fed.

On 5th October though the temperature was 102.4° , the appearance was very dull and listless. In spite of every treatment, the animal died on the morning of the 6th of October.

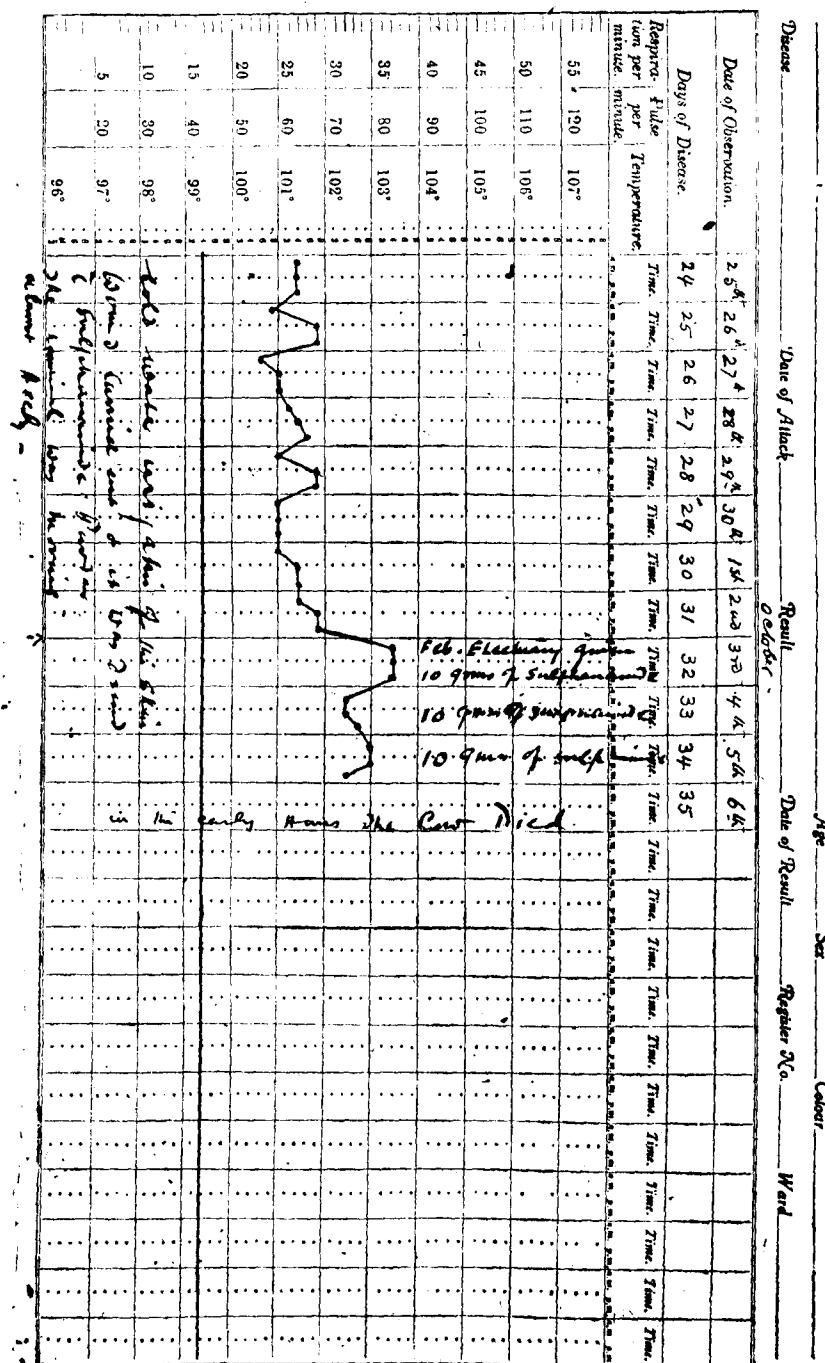
Post-mortem findings.—The wound at the flank was quite healthy. On opening the abdomen, all organs were found to be normal. Uterus had healed completely leaving no trace of the operation. On opening the uterus, a little pus was seen.

Cause of death.—Pyometra

Acknowledgement.—Thanks are due to the Principal Mr. S. R. Chadha, B.Sc., M.R.C.V.S., for his guidance and also to Professor K. R. S. Aiyar and Mr. Alur, Lecturers, for their needful help in treating the case. Thanks are also due to Dr. R. G. Sathe and Mr. Shirsath of the Haffkine Institute for taking the photo of the cow.

The Bai Sakarbai Dinshaw Petit Hospital for Animals, Parel.

RECORDS OF TEMPERATURE, PULSE AND RESPIRATION.									
Disease: Caesarean Section Date of Onset: 2.10.45 Date of Result: 6.10.45									
Name: Bai Sakarbai Age: 3 years Sex: Female Colour: Black									
Date of Observation	Time	Temp.	Pulse	Respiration	Remarks	Time	Temp.	Pulse	Respiration
2.10.45	1	102.4	100	30	Normal	18.10.45	102.4	100	30
3.10.45	2	102.4	100	30	Normal	19.10.45	102.4	100	30
4.10.45	3	102.4	100	30	Normal	20.10.45	102.4	100	30
5.10.45	4	102.4	100	30	Normal	21.10.45	102.4	100	30
6.10.45	5	102.4	100	30	Normal	22.10.45	102.4	100	30
7.10.45	6	102.4	100	30	Normal	23.10.45	102.4	100	30
8.10.45	7	102.4	100	30	Normal	24.10.45	102.4	100	30
9.10.45	8	102.4	100	30	Normal	25.10.45	102.4	100	30
10.10.45	9	102.4	100	30	Normal	26.10.45	102.4	100	30
11.10.45	10	102.4	100	30	Normal	27.10.45	102.4	100	30
12.10.45	11	102.4	100	30	Normal	28.10.45	102.4	100	30
13.10.45	12	102.4	100	30	Normal	29.10.45	102.4	100	30
14.10.45	13	102.4	100	30	Normal	30.10.45	102.4	100	30
15.10.45	14	102.4	100	30	Normal	31.10.45	102.4	100	30
16.10.45	15	102.4	100	30	Normal	1.11.45	102.4	100	30
17.10.45	16	102.4	100	30	Normal	2.11.45	102.4	100	30
18.10.45	17	102.4	100	30	Normal	3.11.45	102.4	100	30
19.10.45	18	102.4	100	30	Normal	4.11.45	102.4	100	30
20.10.45	19	102.4	100	30	Normal	5.11.45	102.4	100	30
21.10.45	20	102.4	100	30	Normal	6.11.45	102.4	100	30
22.10.45	21	102.4	100	30	Normal	7.11.45	102.4	100	30
23.10.45	22	102.4	100	30	Normal	8.11.45	102.4	100	30
24.10.45	23	102.4	100	30	Normal	9.11.45	102.4	100	30
25.10.45	24	102.4	100	30	Normal	10.11.45	102.4	100	30
26.10.45	25	102.4	100	30	Normal	11.11.45	102.4	100	30
27.10.45	26	102.4	100	30	Normal	12.11.45	102.4	100	30
28.10.45	27	102.4	100	30	Normal	13.11.45	102.4	100	30
29.10.45	28	102.4	100	30	Normal	14.11.45	102.4	100	30
30.10.45	29	102.4	100	30	Normal	15.11.45	102.4	100	30
31.10.45	30	102.4	100	30	Normal	16.11.45	102.4	100	30
1.11.45	31	102.4	100	30	Normal	17.11.45	102.4	100	30
2.11.45	32	102.4	100	30	Normal	18.11.45	102.4	100	30
3.11.45	33	102.4	100	30	Normal	19.11.45	102.4	100	30
4.11.45	34	102.4	100	30	Normal	20.11.45	102.4	100	30
5.11.45	35	102.4	100	30	Normal	21.11.45	102.4	100	30
6.11.45	36	102.4	100	30	Normal	22.11.45	102.4	100	30
7.11.45	37	102.4	100	30	Normal	23.11.45	102.4	100	30
8.11.45	38	102.4	100	30	Normal	24.11.45	102.4	100	30
9.11.45	39	102.4	100	30	Normal	25.11.45	102.4	100	30
10.11.45	40	102.4	100	30	Normal	26.11.45	102.4	100	30
11.11.45	41	102.4	100	30	Normal	27.11.45	102.4	100	30
12.11.45	42	102.4	100	30	Normal	28.11.45	102.4	100	30
13.11.45	43	102.4	100	30	Normal	29.11.45	102.4	100	30
14.11.45	44	102.4	100	30	Normal	30.11.45	102.4	100	30
15.11.45	45	102.4	100	30	Normal	31.11.45	102.4	100	30
16.11.45	46	102.4	100	30	Normal	1.12.45	102.4	100	30
17.11.45	47	102.4	100	30	Normal	2.12.45	102.4	100	30
18.11.45	48	102.4	100	30	Normal	3.12.45	102.4	100	30
19.11.45	49	102.4	100	30	Normal	4.12.45	102.4	100	30
20.11.45	50	102.4	100	30	Normal	5.12.45	102.4	100	30
21.11.45	51	102.4	100	30	Normal	6.12.45	102.4	100	30
22.11.45	52	102.4	100	30	Normal	7.12.45	102.4	100	30
23.11.45	53	102.4	100	30	Normal	8.12.45	102.4	100	30
24.11.45	54	102.4	100	30	Normal	9.12.45	102.4	100	30
25.11.45	55	102.4	100	30	Normal	10.12.45	102.4	100	30
26.11.45	56	102.4	100	30	Normal	11.12.45	102.4	100	30
27.11.45	57	102.4	100	30	Normal	12.12.45	102.4	100	30
28.11.45	58	102.4	100	30	Normal	13.12.45	102.4	100	30
29.11.45	59	102.4	100	30	Normal	14.12.45	102.4	100	30
30.11.45	60	102.4	100	30	Normal	15.12.45	102.4	100	30
31.11.45	61	102.4	100	30	Normal	16.12.45	102.4	100	30
1.12.45	62	102.4	100	30	Normal	17.12.45	102.4	100	30
2.12.45	63	102.4	100	30	Normal	18.12.45	102.4	100	30
3.12.45	64	102.4	100	30	Normal	19.12.45	102.4	100	30
4.12.45	65	102.4	100	30	Normal	20.12.45	102.4	100	30
5.12.45	66	102.4	100	30	Normal	21.12.45	102.4	100	30
6.12.45	67	102.4	100	30	Normal	22.12.45	102.4	100	30
7.12.45	68	102.4	100	30	Normal	23.12.45	102.4	100	30
8.12.45	69	102.4	100	30	Normal	24.12.45	102.4	100	30
9.12.45	70	102.4	100	30	Normal	25.12.45	102.4	100	30
10.12.45	71	102.4	100	30	Normal	26.12.45	102.4	100	30
11.12.45	72	102.4	100	30	Normal	27.12.45	102.4	100	30
12.12.45	73	102.4	100	30	Normal	28.12.45	102.4	100	30
13.12.45	74	102.4	100	30	Normal	29.12.45	102.4	100	30
14.12.45	75	102.4	100	30	Normal	30.12.45	102.4	100	30
15.12.45	76	102.4	100	30	Normal	31.12.45	102.4	100	30
16.12.45	77	102.4	100	30	Normal	1.1.46	102.4	100	30
17.12.45	78	102.4	100	30	Normal	2.1.46	102.4	100	30
18.12.45	79	102.4	100	30	Normal	3.1.46	102.4	100	30
19.12.45	80	102.4	100	30	Normal	4.1.46	102.4	100	30
20.12.45	81	102.4	100	30	Normal	5.1.46	102.4	100	30
21.12.45	82	102.4	100	30	Normal	6.1.46	102.4	100	30
22.12.45	83	102.4	100	30	Normal	7.1.46	102.4	100	30
23.12.45	84	102.4	100	30	Normal	8.1.46	102.4	100	30
24.12.45	85	102.4	100	30	Normal	9.1.46	102.4	100	30
25.12.45	86	102.4	100	30	Normal	10.1.46	102.4	100	30
26.12.45	87	102.4	100	30	Normal	11.1.46	102.4	100	30
27.12.45	88	102.4	100	30	Normal	12.1.46	102.4	100	30
28.12.45	89	102.4	100	30	Normal	13.1.46	102.4	100	30
29.12.45	90	102.4	100	30	Normal	14.1.46	102.4	100	30
30.12.45	91	102.4	100	30	Normal	15.1.46	102.4	100	30
31.12.45	92	102.4	100	30	Normal	16.1.46	102.4	100	30
1.1.46	93	102.4	100	30	Normal	17.1.46	102.4	100	30
2.1.46	94	102.4	100	30	Normal	18.1.46	102.4	100	30
3.1.46	95	102.4	100	30	Normal	19.1.46	102.4	100	30
4.1.46	96	102.4	100	30	Normal	20.1.46	102.4	100	30
5.1.46	97	102.4	100	30	Normal	21.1.46	102.4	100	30
6.1.46	98	102.4	100	30	Normal	22.1.46	102.4	100	30
7.1.46	99	102.4	100	30	Normal	23.1.46	102.4	100	30
8.1.46	100	102.4	100	30	Normal	24.1.46	102.4	100	30
9.1.46	101	102.4	100	30	Normal	25.1.46	102.4	100	30
10.1.46	102	102.4	100	30	Normal	26.1.46	102.4	100	30
11.1.46	103	102.4	100	30	Normal	27.1.46	102.4	100	30
12.1.46	104	102.4	100	30	Normal	28.1.46	102.4	100	30
13.1.46	105	102.4	100	30	Normal	29.1.46	102.4	100	30
14.1.46	106	102.4	100	30	Normal	30.1.46	102.4	100	30
15.1.46	107	102.4	100	30	Normal	31.1.46	102.4	100	30
16.1.46	108	102.4	100	30	Normal	1.2.46	102.4	100	30
17.1.46	109	102.4	100	30	Normal	2.2.46	102.4	100	30
18.1.46	110	102.4	100	30	Normal	3.2.46	102.4	100	30
19.1.46	111	102.4	100	30	Normal	4.2.46	102.4	100	30
20.1.46	112	102.4	100	30	Normal	5.2.46	102.4	100	30
21.1.46	113	102.4	100	30	Normal	6.2.46	102.4	100	30
22.1.46	114	102.4	100	30	Normal	7.2.46	102.4	100	30
23.1.46	115	102.4	100	30	Normal	8.2.46	102.4	100	30
24.1.46	116	102.4	100	30	Normal	9.2.46	102.4	100	30
25.1.46	117	102.4	100	30	Normal	10.2.46	102.4	100	30
26.1.46	118	102.4	100	30	Normal	11.2.46	102.4	100	30</



Association News

THE BOMBAY VETERINARY MEDICAL ASSOCIATION TWENTY-FIFTH ANNUAL CONFERENCE, DECEMBER, 1945.

PROCEEDINGS.

28th and 29th December, 1945. First Day 28th December, 1945.

Proceedings of the Annual General Conference of the Bombay Veterinary Medical Association, held on 28th and 29th December, 1945, at the Veterinary College, Bombay.

AGENDA

- 1 p.m. to 4 p.m.—Election of office bearers, accounts and Resolutions.
4 p.m. —Welcome speech by S.R. Chadha, B.Sc., M.R.C.V.S.
Secretary's Report.
President's Speech.
Chief Guest's Speech.
Thanks giving by D. B. Khole, G.B.V.C., P.G.

SATURDAY.

- 9 a.m. to 12 noon—Reading and discussion on professional papers.
Resolutions unfinished the previous day.
Any other business approved by the President.

The following members were present:

- | | |
|-------------------------------|--------------------------|
| 1 Mr. S. J. Khambete | 28 Mr. V. N. Navangul |
| 2 " G. K. Khasagiwala | 29 " V. B. Kharate |
| 3 " A. H. Khan | 30 " M. R. Tagare |
| 4 " R. N. Naik | 31 " B. T. Chital |
| 5 " D. S. Laud | 32 " G. B. Shahaney |
| 6 " K. R. Alur | 33 " D. K. Desai |
| 7 Rao Bahadur V. R. Phadke | 34 " V. N. Kulkarni |
| 8 Khan Sahib N.D. Dhakmarwala | 35 " R. K. Raikar |
| 9 Mr. S. R. Chadha | 36 " G. G. Palnitkar |
| 10 " E. R. Kulkarni | 37 " K. R. S. Aiyar |
| 11 " T. R. Khaladkar | 38 " M. M. Kurlisenapati |
| 12 " R. R. Tavargeri | 39 " M. D. Vaishnav |
| 13 " G. A. Hardikar | 40 " D. B. Khole |
| 14 " S. P. Deshapande | 41 " V. N. Vaishnav |
| 15 " P. G. Date | 42 " Gulam Mohamad |
| 16 " P. C. Bapat | 43 " S. N. Gadag |
| 17 " K. M. Vaidya | 44 " P. T. Nabar |
| 18 " L. R. Patankar | 45 " P. B. Card Master |
| 19 " F. S. Khambata | 46 " G. H. Joshi |
| 20 " R. G. Dharwadkar | 47 " Uttanwalla |
| 21 " H. R. Chandrasekharaiah | 48 " Unerkar |
| 22 " D. R. Gokhale | 49 " Victor Perian |
| 23 " D. H. Bendigeri | 50 " Revandekar |
| 24 " R. N. Naik | 51 " K. B. Nair |
| 25 " R. N. Moghe | 52 " J. N. Baruwa |
| 26 " A. E. Kulkarni | 53 " Y. S. Wakhankar |
| 27 " M. R. Redkar | 54 " V. B. Nabar. |

GUESTS

1. Mr. Peth, Veterinary Officer, Ceylon.
2. Dr. S. R. Rad, Parasitologist, Bombay Veterinary College, Bombay.
3. Mr. Kangude, Veterinary Surgeon, Gwalior.
4. Mr. Decruz Fernando, Veterinary Surgeon, Bombay Municipality

The President, before starting with deliberations informed the house that due to unavoidable circumstances a full month's notice could not be given to the members as per rule 22 of the Association, and they are requested to waive the same this time.

The house agreed with the remarks of the President and deliberations continued.

1. Election of office bearers:—

President: Mr. D. S. Laud

Secretaries { " G. A. Hardikar
" M. R. Redkar

Treasurer: " S. R. Chadha

Members { " H. R. Chandrasekharaiah
Khan Sahib N. D. Dhakmarwala
Mr. S. J. Khambete
" D. K. Desai
" B. T. Chitre

Auditors: Messrs. R. N. Naik and D. B. Khole.

The retiring members were thanked by Khan Saheb N. D. Dhakmarwala. The chief guest Mr. M. J. Desai, M.A., LL.B., Secretary, Revenue Department arrived at the college at 4 p.m., when he was received by the President Rao Bahadur V. R. Phadke. He introduced him to the members of the managing committee and then led him to dias amidst loud cheers. Principal S. R. Chadha welcomed the chief guest (Appendix A) on behalf of the Association and introduced him to the house in fitting words and garlanded the chief guest and the President. He was followed by Secretary K. R. Alur, who read the annual report (Appendix B) for the year ending 1945. Names of those, who could not attend but wished the conference a great success was read out to the audience. Then Rao Bahadur V. R. Phadke delivered the Presidential address (Appendix C). Mr. M. J. Desai, Secretary, Revenue Department, addressing the members of the Bombay Veterinary Medical Association (Appendix D) advised them to show their utility to the community and keep their demands going till they are fulfilled; at the end, he declared the conference open. Mr. D. B. Khole, thanked the chief guest for having spared his valuable time amidst busy hours and the day's sessions came to a close. All the members and the guests gathered at the college compound for light refreshments.

SECOND DAY, DECEMBER 29TH, 1945.

9 a.m. The following professional papers were read and lively discussions took place on each of them:—

1. Resumé on the use of Sulphanilamide in Bacterial diseases. By R. N. Naik, Bacteriologist, B. V. College.
2. Post operative complications in a Caesarean section.—By S. J. Khambete, Hospital Surgeon, B. V. College.
3. Treatment of Papilloma in Dog.—By F. S. Khambata.
4. Resumé on the use of Penicillin in Bacterial diseases.—By R. N. Naik, Bacteriologist, B. V. College.

Two More papers could not be read for want of time.

RESOLUTIONS

1. It was proposed to appoint a committee consisting of five members to make the necessary alterations in the rules of the Bombay Veterinary Medical Association.

The following names were proposed and accepted.

Messrs. K. B. Nair, R. N. Naik, V. N. Kulkarni, P. G. Date and Rao Bahadur V. R. Phadke.

2. Resolved that a deputation of three members of the Veterinary Medical Association should wait upon the Standing Committee to explain and impress about the grievances of Veterinary Graduates employed in the Bombay Municipality regarding pay, allowances and conditions of services etc. The deputation will consist of Messrs. D. S. Laud, S. R. Chadha with the Secretary, Bombay Veterinary Medical Association.

3. Resolved that the Association observes with regret the policy of granting extensions to retired members of the service is still continued, thus depriving the chances to members in service to selection grades and higher posts.

4. Resolved that the policy of appointing the re-employed officers to the same post, previously occupied, which carry certain allowances and benefits, is detrimental to the interest of the juniors and thus deprives them of the benefits of services. This has caused great discontent and hence the re-employed personnel should not be re-posted to the original posts held by them.

5. Resolved that the facilities for higher education and specialised training be given to members of the Veterinary profession in equality with those of the sister departments, in schemes of post-war reconstruction. Last year only two candidates were spared to go for higher training abroad, which is a very meagre number looking to the urgent requirements of the

department. Under these circumstances the Association strongly recommends to depute atleast ten candidates for higher training to overseas so that we may not fall short of suitably qualified personnel in organising schemes of post-war reconstruction.

6. Resolved that the present revision of the scales of pay of the Veterinary Assistant Surgeon in Bombay Province from Rs. 60/- to Rs. 80/- is quite inadequate and is fomenting the already existing discontentment amongst Veterinary Assistant Surgeons, who have put in many years of approved service. The present revision still maintains the disparity in pay and gives an advance of five years seniority in service to new graduates. Moreover, new entrants cross the efficiency bar in two years while those who started on Rs. 80/- cross in six years. Those unfortunate Veterinary Assistant Surgeons, who started their service in the scale of Rs. 50.4-90/5.125 cross the bar after sixteen years. This is an invidious distinction without justification, as those, who crossed the efficiency bar become eligible for higher promotion for no faults of those. All veterinary graduates are employed to identical posts of responsibility as they possess the same professional qualifications. Under these circumstances, the Association strongly recommends and urges the Government to remove the disparity in pay of graduates under old and new curriculum and requests to sanction uniform scale of pay with a minimum start of Rs. 100/-

7. It is further resolved that a deputation consisting of three members should first wait upon the Director of Veterinary Services, Bombay, and acquaint him with the grievances and growing discontent amongst the members of the subordinate staff.

Deputation will consist of Rao Bahadur V. R. Phadke, Mr. S. R. Chadha and the Secretary, Bombay Veterinary Medical Association.

8. In spite of repeated requests made previously by this Association, it is still seen that graduates employed in the Civil Veterinary Department are still designated as Veterinary Assistant Surgeons. An assistant is one who helps some body else in discharge of duties. In the Veterinary Department the Assistant holds the charge of the dispensary without an immediate superior and so combines in himself the position of Veterinary Officer in-charge of the dispensary.

The designation of Veterinary Officer will be in conformity with others in sister departments as Agricultural Officer, Medical Officer etc.

Under these circumstances the Association strongly requests the government to change the designation of Veterinary Assistant Surgeon to Veterinary Officer.

9. Resolved that in fixing the pay of the Veterinary Assistant Surgeons in the department under the revised scale of pay of Rs. 80-5-110-5-160

each Veterinary Assistant Surgeon should be granted increments in rates of their years of approved service they have put in fixing the basic pay as Rs. 80 and it should not in any way be detrimental to their interest.

The President All-India Veterinary Association requested the Principal S. R. Chadha to undertake to celebrate the Diamond Jubilee of the Veterinary College in 1946, on behalf of the staff and students of the Veterinary College with the co-operation of the past graduates. Principal S. R. Chadha replied that he will decide and will duly inform those concerned.

The following members' and gentlemen have expressed their inability to attend but have wished for the success of the conference.

- (1) W. G. Hulland I.C.S.,
Joint Secretary, Reconstruction Department, Bombay.
- (2) P. G. Joshi, G.B.V.C.,
Veterinary Assistant Surgeon, Newasa.
- (3) S. B. Hanchlikar, G.B.V.C.,
Divisional Veterinary Officer, Satara.
- (4) The Principal, National Medical College, Bombay.
- (5) N. H. Laxmeshwar, G.B.V.C.,
Veterinary Assistant Surgeon, Ratnagiri.
- (6) D. R. Chavan, G.B.V.C., P.G.,
(Life Member V. M. Association.)
Veterinary Surgeon Uttreshwar (Kolhapur.)
- (7) C. N. Desai, G.B.V.C.,
Retired Deputy Director of Veterinary Services, Ahmedabad.
- (8) R. K. Maralihalli, G.B.V.C.,
Veterinary Surgeon, (Hubli.)
- (9) Lieut V. G. Khare, I.A.V.C., Calcutta.
- (10) K. L. Shiggoan, G.B.V.C., V.A.S., Halyal.
- (11) N. C. Buch, G.B.V.C., V.A.S., Jambusar.

Mr. V. N. Navangul thanked the President Rao Bahadur V.R. Phadke for having spared time to preside over the deliberations and discussion on professional papers.

The meeting then terminated.

(Appendix A)

WELCOME SPEECH BY Mr. S. R. CHADHA

MR. PRESIDENT AND GENTLEMEN,

I have a very pleasant duty to perform this evening and that is to introduce to you, our chief guest of the day, Mr. M. J. Desai, I.C.S., Secretary, Revenue Department. Mr. Desai is not new to us. As Secretary, Revenue Department, he is known to us since 1942. But, I am sure you would be interested to know something more about him. Mr. Desai graduated from Wilson College, Bombay and after passing law proceeded to England where he competed for I.C.S., examination. After selection and undergoing requisite training he returned to Bombay and was appointed as Assistant Collector at Sholapur in 1928. He worked in different capacities, holding very responsible position in the Government of Bombay, till he was appointed Deputy Secretary, Revenue Department in 1938. He was away from the Secretariat for some time, partly on leave ex-India and for some time as Settlement Commissioner till he returned to Secretariat in 1942 as Secretary, Revenue Department and he is at present in charge of Reconstruction Department in addition to Revenue Department. Gentlemen, I know Mr. Desai since 1942. After my first meeting with him, I gained so much confidence that whatever proposal I took to him, he would certainly support because I had convinced him that in whatever case I wanted his help, it was in the interest of the Department. And I am pleased to tell you that I cannot recall a single occasion when I returned from him disappointed. Gentlemen, it is during Mr. Desai's regime that several developments have taken place in the Civil Veterinary Department. I will quote a few instances. Appointment of Assistant Director of Veterinary Services, increase in the number of Divisional Veterinary officers and their salary from 170 to 220. Creation of a new post of Goat virus Officer in the Bombay Veterinary Service Class II.

It appears to me that Mr. Desai personally studied the requirements of the Civil Veterinary Department and made suggestions for the expansion of the Director's office, appointment of a Propaganda Officer, which unfortunately did not materialise in its original form but subsequently was converted into a preparation of a propaganda film. Those of you, who are in the College, know this though you have not seen the complete film.

Most important of all is the latest prompt action taken by Mr. Desai at my request to sanction a large sum of money for the purchase of apparatus for fitting up physiology and biochemistry laboratory, purchase of books locally and sanction of the appointment of a Demonstrator for Physiology.

As you are aware, these were the conditions to be fulfilled in order to have the college affiliated to the University of Bombay this year. The

University Commission inspected the college about the middle of this month and were satisfied with the arrangements made, and I now hope that our long standing desire will be fulfilled at last. I take this opportunity to thank all those, who helped towards this end, particularly Dr. B. N. Uppal of the Agricultural College, Poona, R. B. Sahasrabudhe and Dr. Erulkar, Mr. Perry, I.C.S., the late Secretary, Reconstruction Department for his encouragement, and above all Mr. Desai the Chief guest of today for his giving a practical shape to all proposals by having the money sanctioned. I would be failing in my duty if I did not mention Rao Bahadur V. R. Phadke our worthy President in this connection, for his keen interest, suggestions, and the enthusiasm he displayed in getting the college affiliated. During my attempt to get the college affiliated to the University, I was repeatedly told that Government did not like to incur any expenditure towards construction of additional buildings as it was contemplated to shift the college from Bombay. I do not propose to go into details of this question but I would, however, suggest that before Government takes a final decision in the matter, the question should be discussed with the college staff and the Director of Veterinary Services.

Before I take your leave I would like to thank the Chief guest for his encouraging us by his presence among us this evening and all those who have taken the trouble of coming over here, to attend the function. I thank you, gentlemen, for giving me a patient hearing.

(Appendix B)

*Report of the Secretary, Bombay Veterinary Medical Association,
Bombay, for the year 1945*

MR. PRESIDENT, GENTLEMEN AND PROFESSIONAL BROTHERS,

I am herewith submitting the annual report of the Veterinary Medical Association for the year ending 1945 for your information. During the year under report, Mr. K. B. Nair, who was the duly elected Honorary Secretary, resigned his post on grounds of ill health and so I was nominated as Secretary to carry on the work during the rest of the year.

It is a pity that we are not able to gather here today in sufficient numbers as many of our professional brothers are held up for want of leave, as their presence is required by Collectors and Prant Officers, who are to draw up schemes urgently in connection with Post-War Reconstruction during the X'mas holidays.

After the last annual conference, an urgent meeting of the local members of the managing committee was held on March 22, 1945 at the Bombay Veterinary College. After necessary preliminary discussions,

it was resolved that Rao Bahadur V. R. Phadke should take personal interest in getting the College affiliated to the University and that the committee authorised the President to take necessary steps to see that the College is affiliated to the University of Bombay this year i.e., 1945."

The managing committee of the Association met again on September 14th, at the Veterinary College, Bombay. In course of this meeting the following business was transacted.

"Resolved that the managing committee of the Bombay Veterinary Medical Association records with great appreciation the services rendered by Mr. K. B. Nair as Honorary Secretary of the Association."

"Resolved that the Animal Utilisation Officer Sir Datar Singh may be approached to recommend to Government the appointment of a Veterinarian to assist him in connection with the management of Pinjrapole and Goshalas in this province." Sir Datar Singh, has replied as follows:—

"I am already keeping this in view, because I think that big Goshalas must have a qualified Veterinary Surgeon if improvements are to be effected. I have also forwarded a scheme to the provincial Government for the appointment of a Class II Officer for helping and advising the Goshalas and Pinjrapoles in the Bombay Presidency and it will be up to Provincial Government to appoint a suitable man."

The matter is now under correspondence with the Government and I hope with the kind sympathies of the Chief guest of today, it will not be long before we see a qualified Veterinary Surgeon holding that post.

The following resolutions pending action from last year, were brought before the house for discussion.

"The Diamond Jubilee of the Veterinary College which we resolved to celebrate during the X'mas holidays of 1946, was objected to, by the President, All-India Veterinary Association on the ground that the Bombay Veterinary Medical Association is not the competent body to celebrate the Diamond Jubilee of the College. He emphasized that the present staff and students of the College should take up this work. We have written to the Director of Veterinary Services, in this connection to which I have not yet received the reply. In this connection, we had approached the Principal of the Veterinary College, Bombay requesting him to kindly permit the Association to celebrate the Diamond Jubilee and to co-operate with the Association with his staff and students. To this I have been informed that "Principal, members of the staff and students will most willingly do whatever is possible for them to do to make the Diamond Jubilee of the College a success." The Editor of the *Indian Veterinary Journal* has promised to publish a special Diamond Jubilee number of the

College. As the question still remains undecided we are unable to proceed in the matter.

Last year we approached the Government for revision of the scales of pay and I have very recently seen a press note stating that the pay of Veterinary graduates employed in the Civil Veterinary Department is raised from Rs. 60 to Rs. 80. On behalf of the members employed in the Bombay Municipality, we approached the Officer for the Revision of grades of pay who recommended a scale of Rs. 100 to Rs. 160. We have now approached the Chairman, Standing Committee and the Municipal Commissioner to revise the same from Rs. 125-10-275 and I hope our recommendations will be carried out.

In regard to higher training to present Veterinary graduates, we approached the Director of Veterinary Services to provide facilities for training in India and abroad, so that we will not fall short of suitably qualified candidates in connection with the Post-War Reconstruction work.

Further, the Association is keeping itself in touch with the activities of the sister associations in other provinces. We have very recently read that Mysore and Hyderabad states are launching very ambitious schemes in connection with the improvement of cattle. They have approved all the 26 schemes for improving veterinary and livestock for five years at an estimated cost of Rs. 100,00,000 (one crore) and this includes training of veterinary personnel at a cost of seven lacs of Rupees. The details of this scheme are called for adoption in this province.

We wanted to associate ourselves with the Humanitarian Work done by the League under the able guidance of Rao Bahadur Mankad. The work done in connection with the salvage of cattle in famine areas is very laudable. The Humanitarian League have acknowledged the help given by members of veterinary profession to them, and now I desire we should enter the organisation as panel of veterinary services, for which we have now made our approach. The present membership of the association is 179 as against 170 last year. During the year under report six new members have joined the association and three more as Life Members. In spite of appeals there are still heavy arrears from members.

Gentlemen, I thank you all for the kind opportunity given to me to serve the cause of my profession by being on the Committee and now as Secretary, and before I close for the year, I thank all those who have cooperated with me in the discharge of my duties.

Statement of Receipts and Expenses for 1945

RECEIPTS.	RS.	A.	P.	EXPENDITURE.	RS.	A.	P.
Opening Balance ...	1661	11	1	T. A. to members for attending meeting ...	29	8	0
Subscription during the year.	405	0	0	Printing Charges ...	23	0	0
Cash received from Mr. Khaladkar as balance on hand ...	38	6	9	Conveyance Charges ...	3	10	0
				Purchase of Office files, Registers etc. ...	15	1	0
				Purchase of 1 Trunk ...	10	4	0
				Entertainment Charges of guests & Members during Conference ...	164	3	9
				Hire of Chairs for Conference ...	35	0	0
				Postage during the year ...	25	9	0
				Amount in Imperial Bank ...	1670	4	7
				Balance on hand ...	128	9	6
	2105	1	10		2105	1	10

Dated 1-3-45.

V. N. KULKARNI,
Hon. Treasurer.

(Appendix C)

PRESIDENTIAL ADDRESS BY RAO BAHADUR V. R. PHADKE,
PRESIDENT, BOMBAY VETERINARY MEDICAL ASSOCIATION.*Gentlemen, My Professional Brothers and Students,*

It is a great pleasure indeed to me to cordially and heartily welcome you all on behalf of the Members of the Bombay Veterinary Medical Association to our Annual Conference.

Last year we assembled in this very hall when Mr. E. W. Perry, C.I.E., I.C.S., presided. It was the sixth year of the second calamitous world war. We were fortunate then in being saved from the actual ravages of war due to the success of the Allied and Indian arms in all the theatres of war, although we in Bombay had the unfortunate experience of seeing what suffering and havoc are by the two explosions in the Bombay Docks on the 14th April 1944. Now, by the Grace of God, the Atom Bomb has brought the final victory to the allied arms. It should be the pious wish of mankind that we should live in a world of plenty and peace where there will be no wars. This, however, can only be achieved, if the whole psychology of the human mind is made to change. I hope the peace we are going to have does not lay the foundation stone of another and a third greater and bitter war.

Mr. Chadha has already introduced to you our chief guest of this evening in glorious terms and I fully associate myself with all that he has said.

We are fortunate in having Mr. M. J. Desai, I.C.S., Secretary to Government, to inaugurate our Conference and I wish to express my sincere thanks to Mr. Desai on behalf of you all for having readily accepted our invitation. I have known Mr. Desai since 1937 and I have no doubt you will agree that during the period of his regime he has done much for the advancement of the Veterinary Department. I am sure that if only we know how to knock at his door he would certainly try his best and put the "morsel" in our mouth.

Now a word about our Association. It is a matter of regret that Mr. Nair could not continue to assist us as Secretary of the Association on grounds of ill-health; but I am sure, his advice and help was available to Mr. Alur, in carrying out the onerous duties as our new Secretary of the Association. Mr. Alur has already acquainted you with the various activities of the Association and the progress made during the year in his report and I need not dilate upon the same.

Affiliation of the College:—Since 1940 the standard of admission to the College was raised to that of Inter Science B-Group. The course of studies also was improved with a three years' course of advanced curriculum. It has all along been our desire that with the raising of the standard of education, both in the entrance qualification and in the course of studies, we should request the University to affiliate our College for awarding a B.Sc., degree in Veterinary Science. We therefore approached the University of Bombay with our proposal and we are glad it has accepted it subject to certain additions etc. in the staff and buildings. It was also agreed that the College could be affiliated this year itself provided immediate arrangements were made for giving higher standard of training to the first year students in accordance with the revised curriculum approved by the University. Looking to the urgency of the matter, Government were pleased to sanction all that was required and the Principal informed the University that he has fulfilled the conditions in the way of equipment, etc. Thereupon the Bombay University appointed a second Commission to inspect the Bombay Veterinary College and to report. The Commission has recently inspected the College and, I am sure, must have reported favourably. We may therefore take it for granted that the first year students will now be able to appear for the University Examination. In this connection, I would like to acknowledge my sincere gratitude to all who helped us towards our goal—particularly Dr. B. N. Uppal, R.B., D. L. Sahasrabudhe and Dr. Erulkar. I may point out to you here that had it not been for Mr. E. W. Perry, I.C.S., sanctioning all that was required coupled with Mr. Chadha's enthusiasm and quick action, the College would not have been affiliated this year.

Livestock.—The proposal to amalgamate Animal Husbandry Section with the Veterinary Department has already been adopted and I hope this will be soon given effect to by the Government.

Employment of Stockmen.—As stated by me last year, I would emphasise the fact that the immediate need of the Province is the increase in number of posts of stockmen to assist the Veterinary Assistant Surgeons in the field in carrying out inoculations and castrations and in attending to minor ailments of animals etc. When an epizootic assumes a virulent form in an area, the availability of these trained men on the spot would save the loss of valuable livestock by timely adoption of preventive measures. According to my estimation, a minimum of three such men per taluka is required. Therefore, immediate increase in the present strength of stockmen is necessary, especially at present, when we are faced with the problem of acute shortage of qualified Veterinary Assistant Surgeons which renders concentration of enough men in the affected areas impossible. I feel that the minimum educational qualification of vernacular *pass* with working knowledge of English will have to be insisted upon in selecting men for such posts and a regular course of training for a period of about a year be given. A scale of pay of Rs. 40 to Rs. 80 will, I presume, be necessary to attract the right type of men to fill the posts and to enthusiastically stick up to their jobs in these days in villages.

Recruitment to higher posts.—In the matter of recruitment to higher and specialised posts, I feel, the claims of members of the Department to such posts should be zealously guarded. The plea of lack of training to suit particular posts should as far as possible be overcome by imparting necessary training to suitable members of the Department by deputation abroad if necessary, rather than recruiting such men from outside. This is an absolute necessity in this Department to avoid discontent and loss of interest in the Service by the staff, because there are very few prize posts in the Department and there is no opening for the staff in any other sphere.

Scale of pay.—I would like to stress the need for not only increasing the scale of pay but also for bettering the prospects of the Veterinary Service. Unlike other Services this is a specialised service which has to look for prospects and promotions in the Veterinary Department itself and not outside. The want of attention to this factor has been already reflected on the number of admissions to the Bombay Veterinary College. We have been able to secure only 25 students from this province with so much advertisement about free studentship, increase in the number and value of scholarships, and other concessions. A question one would naturally ask oneself before joining the Veterinary College would be what prospect does the Service hold out? I am very sorry to say that the scale of pay is not at all tempting, neither the future prospects of promotion, as compared with

those in any other Department of Government. I quote the instance of the Agricultural Department. There, an average Graduate can expect to get much more in the Service and at the same time can hope to retire on Rs. 300 at least. But in the Veterinary Department, if one is lucky enough to get one of the ten per cent selection posts, one can hope to retire only on Rs. 200; else on a paltry sum of Rs. 160. This, I am afraid, is not what a man, having spent six years in a College after Matriculation, can aspire to get, when in other spheres he can, with lower qualifications earn more.

Unfortunately, again, the revision of pay recently sanctioned by the Government overlooks the length of service put in by a Veterinary Assistant Surgeon and brings him neck to neck with a new recruit. Not only that, but by making an invidious distinction between old and new curriculum it gives an inferiority complex to several men, who have put in several years of service and who have been useful members of the Department. They are not considered fit enough to get even the sum of Rs. 100 which is the starting pay allowed to a young graduate passing out with new curriculum. This must create discontent and loss of interest in the service which I am afraid is not a healthy feature especially now when we expect everyone to persuade young youths to join the Bombay Veterinary College. As it is, the discontent is rampant and four young Graduates have already resigned their services. I will not be surprised if more follow suit. The obvious solution to this difficulty (*viz* fixing the pay in the revised scale) is to give the older service men advance increments in view of their past service so that their pay can compare favourably with a new Graduate (under the old curriculum) who is given Rs. 80, to start with. This should go at least some way in making up the past neglect of these officers.

As already stated above, the prospects in the Department are poor. The higher posts must be immediately increased to meet the increased demand on our profession. It is my firm belief that, then and only then, can we, with any certainty, hope to attract greater admission to the Bombay Veterinary College though I do not expect that by these measures the College would be flooded with men beyond our requirements.

Preventable Diseases of Livestock.—Now that the war has ended, I think, it is time that immediate steps are taken for providing an up-to-date and well-equipped Laboratory and a Serum Institute not only for imparting instruction to the students but for manufacturing Sera, Vaccines and other Biological Products for supplying the needs of the Province. Want of adequate and prompt supply of these products from the Imperial Veterinary Research Institute and other sources has been a serious handicap, in the control of various contagious diseases in the province resulting in serious loss of valuable animals.

In the light of our present knowledge about Rinderpest, Goat-Virus and Sera vaccination are the only remedies for combating it. Unfortunately, only one Goat Virus Depot has been established in the Bombay Veterinary College to supply the demand for the whole Province since 1935. It is now known that the Virus despatched to distant places, by the time it reaches the hands of the inoculator, gets discoloured and inert and as such has to be discarded. It is more so in the hot season. It is, therefore, imperative that at least two more Sub-Depots if not three, are opened permanently at suitable centres so that preventive vaccination could be carried out on a large scale. This will ensure the supply of potent virus also. The utility of such Sub-Depots has been amply proved when such seasonal depots were recently opened at Dharwar and Dhulia. Further experimental work in connection with the production of desiccated Spleen Tissue needs to be undertaken. It is presumed that dried spleen tissue would remain viable for a longer period. If so, the same could be more easily transported, and would in the long run be more economical than Blood-virus. Further, the sooner we have a well-equipped and an up to date Laboratory the better will we be able to employ the present research staff working in the Province, such as the Disease Investigation Officer and the Assistant Disease Investigation Officers. I am sure that at present these Officers must be seriously handicapped as they are required to submit materials to the Imperial Veterinary Research Institute.

Transport of Animals and Birds.—The present system of transport of animals is highly unsatisfactory and objectionable, except in the case of Race Horses. Animals are not allowed sufficient space, they are not properly fed or watered on the way and as a result of this many of the animals, especially sheep, goat and poultry, die of suffocation, exhaustion and injuries. It is a pitiable and horrid sight at various stations to see a number of fowls being huddled in crates like a packed tin of sardines. Inspection of such animals is highly essential at the starting points as there is every likelihood of disease being carried by these animals. This necessitates the adoption of stringent measures in the mode of transport, disinfection of wagons, etc.

Post-Graduate Training.—I think it is high time that every District Dispensary is equipped as in Madras with a Microscope, stains, slides, etc., for immediate diagnosis of diseases. At present, the material is sent to the Bombay Veterinary College for diagnosis and until the time the results are received, say after about a week, the treatment of the patient becomes expectant and unsatisfactory. This is a serious handicap for the progress and popularity of this institution and must be rectified soon. This naturally necessitates a course of Post-Graduate training of the District Veterinary Assistant Surgeons in Laboratory technique and it will have to be provided

for at the Bombay Veterinary College by instituting a course of about six months' duration for Graduates who may not have received the requisite training.

I am glad to say that the Bombay Province contributed its quota for the war effort. As many as eleven men from the Department volunteered for military service and many of them have proved their merit by earning King's Commission. There were many more applicants who volunteered their services for war service, but they could not be spared by the Department due to shortage of hands. If these men are absorbed in the army it will be a loss to the Department, but we cannot stand in their way unless we can offer them higher posts in the Department. In the Post-War Reconstruction programme, elaborate schemes have been named such as the Opening of the Livestock Research Station, Manufacture of Sera and Vaccine in the Province and expansion of the Bombay Veterinary College. These schemes involve the employment of specialist staff and it would therefore, be appropriate that some of these men, who are competent enough, be deputed for specialised courses to suit our requirements.

Registration of Graduates.—I would like to draw the attention of the Director of Veterinary Services to take up the question of Registration of Graduates. I need not go into the details of this necessity, but it will suffice to state that it is a serious handicap to us in a variety of ways. We need not wait for an All-India Register.

Diamond Jubilee.—You are already aware that the Diamond Jubilee of our College is going to be celebrated some time in December next year. A start is already made in the way of giving publicity to it in our *Veterinary Journal*. I earnestly request you all to contribute your mite and also take active part in celebrating the function in a befitting manner.

I will not try your patience any more. However, you will allow a few minutes more for doing my duty of thanking all those that have helped me in carrying out the work of the Association especially the members of the Managing Committee for their whole-hearted support. I am also very much thankful to all the guests, who have graced the occasion by their presence this evening.

Now that I am laying down my arms, as President, I feel it my duty both as President and once a teacher and a trainer, to speak a few words as a piece of advice to youngsters and budding Graduates. You have taken a noble profession in which you do not get direct reward from the animals you treat, but I am sure these dumb creatures do understand your clinical touch. You are not only the saviours of animals but you are intimately connected with preventible diseases communicable to man—a service not appreciated as yet. Also you are the best friend of the *Kisans*.

Gentlemen, I would like you to think always that your worth is not in Rupees, Annas, Pies, and as such your actions must be directed to ennoble your profession.

Remember that gentleness in manner and firmness in action goes a long way in helping one in life. Science is advancing and Veterinary Science is no exception, and therefore, I earnestly wish you all to keep abreast of the times. Your contributions to the *Indian Veterinary Journal* will be greatly appreciated. In the end, I would request those that have not become members of the Association to join immediately.

I once again thank our chief guest Mr. Desai for having spared his valuable time and graced the occasion and I now request him to declare the Conference open.

(Appendix D)

SPEECH BY CHIEF GUEST.

Mr. M. J. DESAI, B.A., LL.B., C.I.E., I.C.S.,
Secretary to the Government of Bombay, Revenue Department.

Mr. President, Members of the Bombay Veterinary Medical Association and Guests,

I have been praised to the skies by the Principal, Chadha and the President of your Association, Rao Bahadur V. R. Phadke. If I did any service to the Veterinary Department, it is in my capacity as Secretary to Government for which I am fully paid and the credit for any work done must go to your representatives who pressed your case.

It is difficult for a layman to make any useful contribution to the deliberations of an Association of professional men like yours; but I would take my cue from the opening remarks in the presidential address delivered by Rao Bahadur Phadke. While I am in no position to say anything on the technical points raised by your President, I am very happy to note that the affiliation of the Veterinary College to the Bombay University and the preparation of the students of the College for a University degree in Veterinary Science is now more or less an accomplished fact. Your President has in his careful survey referred to the scales of pay and prospects of Veterinary Surgeons in Government Service, and also stressed the need to consider the claims of these officers while making promotions to Gazetted posts. I hope you will agree with me that the position to-day, as compared with that in 1943, in both these matters is certainly encouraging, though it may not be such as to satisfy the members of the Association. That your Association should not be satisfied with the results is only natural. That the Association recognizes the existence of discontent with the pay and prospects at present and expresses this in the form

of resolutions at its annual meetings need not offend anybody. After all discontent is the source of all progress. A contented person or Association is as good as dead and it is the existence of discontent and the putting forth of further efforts with a view to realize one's higher ambitions that makes for progress whether it be in the case of an individual or an Association. This has, however, to be tempered with a touch of realism and the intrinsic qualities and equipment of the person or Association concerned: and in so far as such discontent helps to secure better equipment and training and a desire to put forth more vigorous efforts for the benefit of the general community, such discontent is always welcome. The extent to which any Association or individual can get its demands fulfilled ultimately depends upon the services that the members of the Association render to the community as a whole and their contribution in the production of wealth—I do not mean wealth in terms of money but in terms of commodities and services required by the community. It may be that in a highly complex civilization the sense of basic values may temporarily get perverted due to the operation of certain factors like the laws of supply and demand, but ultimately the balance is always adjusted, provided the Association concerned keeps on striving hard. The basic test to be applied in judging the usefulness of a particular profession should in my opinion be the contribution that that profession makes to the community's well being and welfare. It may be that a highly successful speculator on the stock exchange who has amassed money may be considered to be the most important man in view of the command he has got over money, but when the basic test of the value of the profession is applied, it should be clear that the contribution of a successful speculator to the community's welfare is almost nil; and while he may prosper for a time, the basic values should in a well-run community ultimately assert themselves. Applying this test to your profession, it is obvious that you hold a high place in the hierarchy of professions that contribute to the welfare of the community. In an old country like ours where virgin land is non-existent and where small farms and small holdings are the rule, mechanical cultivation will for a long time remain an exception and cultivation with the help of the plough and a pair of bullocks will remain the rule, your profession which helps in increasing the effectiveness of the existing cattle by preventing avoidable losses due to disease and epidemic mortality makes a direct contribution to the production of wealth by enabling the community to exploit the resources of land and nature more successfully. It is necessary, however, for the community to realise your important contribution in this matter and that realization can only come through your long and patient efforts. The extent to which members of your profession can win the confidence of the rural community and render them assistance and maintain their cattle in health will ultimately be reflected in the esteem in which any Government holds the veterinary profession, because Government for the time being is after all a section of the community considered by the general community to be fit to run the administration in the best interests of the community.

I apologize for this long sermon. I am extremely grateful to Rao Bahadur Phadke and Mr. Chadha for having given me this opportunity of remaining present at the deliberations of your Conference and, while wishing a very successful session, I would once again emphasise that provided you keep on striving hard and putting the maximum effort, energy and initiative in your professional work, your merit is ultimately bound to be recognized and your great contribution in the wellbeing and welfare of the community can never go unnoticed.

College News

BOMBAY VETERINARY COLLEGE

Diamond Jubilee Celebrations

Proceedings of the Preliminary Meeting held on 12-2-1946.

Dr. S. R. Chadha, B.Sc., M.R.C.V.S., Principal, Bombay Veterinary College presided.

The following members were present :—

Dr. S. Ram Mohan Rao	Dr. K. R. S. Aiyar
" G. G. Chebbi	" A. H. Khan
" K. R. Alur	" G. A. Hardikar
" S. L. Manjrekar	" M. M. Murgod
" M. R. Redkar	" K. B. Nair
" W. H. Welankar	Rao Bahadur V. R. Phadke
" S. J. Khambete	Khan Saheb N. D. Dhakmarwala
" S. P. Deshpande	Dr. R. N. Naik
" D. B. Khole	" V. B. Desai
" R. G. Sathe	

The following transactions were carried out :—

Unanimously resolved that :—

1. The Diamond Jubilee of the Bombay Veterinary College be celebrated during the last week of December 1946 for a period of four days out of which one day be allotted for holding the General Body Meeting of the All-India Veterinary Association.

2. An amount of Rs. 5000/- is required for celebrating the function and this amount be raised by collecting from the past Graduates and other members of the Veterinary Profession a contribution of 10% of pay, pension or monthly income.

3. The following be the office bearers of the Diamond Jubilee Celebration Committee;—

Dr. S. R. Chadha, *Chairman*.

Drs. R. N. Naik and K. B. Nair, *Joint Secretaries*.

Dr. K. R. S. Aiyar, *Treasurer*.

MEMBERS

Rao Bahadur V. R. Phadke	Khan Saheb N. D. Dhakmarwala
Dr. D. S. Laud	Dr. V. N. Kulkarni
" Y. N. Marathe	" B. B. Joshi
" M. K. Garudachar	" A. H. Khan
" J. P. Damri	" D. B. Khole
" S. R. Rao	" K. R. Alur
" S. J. Khambete	" V. B. Desai
" M. R. Redkar	" G. A. Hardikar
" R. G. Moghe	" S. N. Sapre
" S. P. Deshpande	" S. L. Manjrekar
" R. C. Nathani	" D. H. Welankar
" P. G. Date	" V. N. Vaishnav
" B. A. Contractor	" J. P. Pereira
" Gulam Mohamad	" M. Mohey Deen
" R. R. Tavargiri	" U. Y. Gadag
" G. G. Chebbi	" S. G. Balekundri
" S. B. Hanchilikar	" P. S. Rao, Editor, Indian Vety. Journal, Madras
" M. S. Shastri	" M. D. Vaishnav
Principal, Grant Medical College.	
" Royal Institute of Science.	
Dean, G. S. Medical College.	
" National Medical College.	
Two Representatives from Mysore State.	
" " " Baroda State.	
" " " Indore State.	
" " " Hyderabad, Nizam State.	
" " " Gwalior State.	
" " " Kolhapur States.	
" " " Sind Province.	
" " " Kathiawar State.	
" " " Travancore State.	
" " " Cochin State.	

4. An appeal be sent to all past Graduates and other members of the Veterinary profession in India, Ceylon, Burma, Malaya, Siam, South

Africa and Aden and elsewhere on war service to remit their contribution either in cash, by money order or by cheque to Dr. K. R. S. Aiyar, Hon. Treasurer, Bombay Veterinary College, Parel, who should open an account in the Imperial Bank of India, Bombay.

5. A meeting of the Diamond Jubilee Celebration Committee be called on April 8, 1946.

Dated	}	R. N. NAIK,	K. B. NAIR,	S. R. CHADHA,
7th March '46.		Joint Secretaries, Diamond Jubilee Celebration Committee.		Chairman, Diamond Jubilee Celebration Committee.

BOMBAY VETERINARY COLLEGE

Diamond Jubilee Celebrations

AN APPEAL

The Bombay Veterinary College attains its 60th year on August 2, 1946. It is the pioneer Institute of Veterinary Science in India and its Graduates are spread far and wide in India and abroad. This *Alma-mater* is an apostle of Veterinary Profession and its members are the living monuments of humanity. The progenitors of many more sister institutions which have now established reputation are members of this *Alma-mater*. The College which was founded first in India by the Government of Bombay in the year 1896 under the Principal, Col. Steel has turned out 997 Graduates and now emerges out with great pride and honour on its 60th year as an Institution affiliated to the University of Bombay. Not being shaken by gale and storm, it is but natural that celebrations befitting the occasion should be held to commemorate its attainment of the 60th year.

We beg to announce that for all of us this is the only opportunity available to perform the celebrations of our *Alma-mater* during the active period of our life as the Centenary of the College will come 40 years hence and, therefore this is the only occasion we are able to secure to contribute towards the celebration of the Diamond Jubilee and perpetuate the names of those near and dear to us by founding scholarships for Research and medals to the students who score highest marks in any subjects under the control of Government and of the University. Lovers of Veterinary Profession and past students of the College are requested to subscribe liberally.

The programme of the Diamond Jubilee will include, among many other items, reading of scientific papers, magic lantern shows, lectures, drama and singing, and exhibition of specimens on different branches of

Veterinary Science, instruments and appliances, Pharmacological and Biological preparations, animal nutrition and preservation methods etc.

Subscriptions should be sent to Dr. K. R. S. Aiyar, Honorary Treasurer, Veterinary College, Parel, Bombay and as decided by the Celebration Committee every Graduate is requested to contribute 10 per cent. of his monthly salary, pension or income. Members of the Veterinary Profession who are not Graduates of this College may also send their quota. All receipts will be gratefully acknowledged and will be published in the *Indian Veterinary Journal*.

Correspondence in respect of founding research scholarships and medals should be addressed to the Joint Secretaries.

Dated 7th March, 1946.

R. N. NAIK,	K. B. NAIR,	S. R. CHADHA,
G.B.V.C.,	G.B.V.C., V.S.,	B.Sc., M.R.C.V.S.,
Bacteriologist	B.V.Sc. (Toronto),	Principal and Chairman,
and	Asstt. Professor and	Diamond Jubilee
Joint Secretaries,		Celebrations.
Diamond Jubilee Celebrations.		

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.

MEND IT OR END IT

SIR,

It is often "a cry in wilderness" that the Veterinary Assistant Surgeons are not given proper treatment. There are so many resolutions, representations, appeals etc., for their better treatment but the result is nothing. The authorities add insult to injury in that they do not often even care to reply to the resolutions sent to them. This is the state of affairs in this development department and the Government is said to be working hard to help the agriculturists! It is not realised that the policy adopted towards the members of one of the most useful professions is shortsighted and suicidal.

Schemes of several crores of rupees are being planned for post war development, but up till now I have not heard of any body who thought of giving the Vets anything more than the present "wages". "Grow More Food" is the slogan every where but, without fit animals, what to grow and how? Without "just" treatment to the Vets how to expect fit animals?

The Vets have to attend the outbreaks of contagious diseases, conduct inoculations, treat the animals, inspect the slaughter houses, visit fairs and markets, advertise that the Government is doing everything for the benefit of the kisans, inspect tonga ponies, breed better animals, castrate the scrub bulls, sometimes destroy useless animals, attend to correspondence, maintain registers and files and do every sort of work right from a scientific Vet down to a clerk and dresser—all this for a ridiculous two figure salary!

Several learned authorities write that every Province should have a Veterinary College. I agree that in the interests of the Science this is necessary but in the interests of the young scientists that come out of these colleges I think this is too superfluous *at present*. More Veterinary Colleges only breed more dejected Graduates. When this is the remuneration given to them at a time when there is a scarcity of Vets it is foolish optimism to think that Government would think better of them when they are in abundance.

The difficulty in securing sufficient applicants for scholarships in the Bombay Veterinary College from the C. P. Government in recent years is well known to all, more to the C. P. Government itself. They could not get the proper type of students. Why is this? It is only because of the fact that the profession is not attractive. What is the remedy prescribed for this? The C. P. Government is, I hear, planning to open a Veterinary College in the Province after war. When they could not get 4 or 5 students, even with a scholarship, how can they expect to get 40 or 50 students every year without that? But they never considered either this or the fate of the students after passing out of the college.

There is only one Forest College at Dehra Dun and students from all parts of India flock to join it. Why? There are so many Medical Colleges and Schools in every Province and every one of them is crowded. Why? There are several Engineering Colleges and Schools in each Province and students do not get admission for want of seats. Why? There are only five Veterinary Colleges in the whole of India, and yet there are not enough students to take up the course. Why is this? If a student gets a seat in a Veterinary College as well as in any other college, he often prefers to join the latter and I know of many such instances. Why is this? There is no unemployment in the Veterinary profession in India, the course is not longer than the Medical or the Engineering course, the course is not more difficult than the training in the forestry, the course is not costlier than at the Medical or the Forest College and yet why should the student stand aloof from the Veterinary Colleges. The one and only one answer to all these questions is quite simple—the authorities know it very well, though they pretend ignorance—and *that is the Pay and Prospects*. Did the authorities anywhere consider this? *The*

status, prestige, and pay of the Vets is the only thing that decides the whole affair. The first two depend on the third and the third depends on the authorities concerned; and in the veterinary profession unfortunately all the three are painfully lacking and the authorities are solely responsible for this.

Sooner or later the rights of the Vets have to be recognised, of course the sooner the better, and this is the time for the Vets to demand their rights. Before opening so many Colleges and this and that saying that this is improvement of the Veterinary profession—which sort of cheating the Vets are too intelligent and scientific to understand—it is wisdom, first to consider the possibility of making the profession attractive. 'Swelling' is neither an additional strength to a part nor an improvement but is something pathological; so also a swollen number of dissatisfied Vets is not an improvement to the profession but is only introducing more pathological elements into an already morbid group. It is therefore no use opening more Colleges without correcting the defects in the profession. I am afraid if nothing is done in the right direction, the existing Veterinary Colleges may have to be closed down in the nearest future not to talk of opening more—and the Veterinary science and profession handed over back again to the quacks. If such a fatal mistake is committed it is only the Government that has to explain its conduct to the public and not the Veterinary Graduates.

There should be an All-India Veterinary Council and separate registers for each Province and States for the present and every Vet must be a registered graduate. There should be uniform scales of pay, the start *never less than* Rs. 100/-, the rate of increment not less than Rs. 10/- annual, and the maximum not less than Rs. 250/-. There should be reasonable promotions to the higher grades according to merit and seniority. There should be no nauseating departmental tests for a few chips of increment. The Vets should be treated as scientists and utilised as such. There should be adequate staff for every tahsil (taluka). It is no use asking a Vet to run about in different directions aimlessly. After compliance of the above terms the question of opening more Colleges, Research Institutes, Breeding Farms etc., may all be taken up. I feel that then there will be a rush of students to join Veterinary Colleges and any improvement can be expected in due course. In the Colleges also there should be uniformity in the course, say of 4 years after Inter Science, with admission open to *both sexes*. It should be a degree course; there should be no mess of a double course as in Madras—degree and diploma—with practically not much of differences but with much of ill-feeling. The fate of the profession should not depend on the personal whims of an individual. It should look to the Indian Veterinary Council for guidance. The scales pay of the teaching and research staff should be *decent*. If the

Vets are not to get a Nobel prize—I do not know why they should not—they should get at least the prize they deserve for the useful work they turn out.

[The above is one of many letters of "despair" received by us which we publish for the enlightenment of the Governments and the heads of Departments concerned. *Ed. I. V. J.*]

Yours faithfully,
V. M. DAKSHINAMURTHY,
Veterinary Inspector, Kanker State.

ONE DAY CATTLE SHOW IN TIRUTURAIPUNDI, TANJORE Dt.

A "one day cattle show" was held under the auspices of the Civil Veterinary Department in the compound of the Veterinary Dispensary, Tiruturaipundi, on December 21, 1945. Janab Syed Ibrahim, M.A., B.L., Tiruturaipundi, opened the Show and Sri. H. Anantanarayana Iyer, I.C.S., District & Sessions Judge, East Tanjore, presided over the day's function and distributed the prizes.

There were 73 entries of pure bred Umbalacheri cattle of which 21 were breeding bulls. The cattle show Committee made elaborate arrangements under the expert guidance of Sri. S. Ramaswamy Iyer G.M.V.C., District Veterinary Officer, Tanjore, and evinced great interest.

Sri. S. Ramaswamy Iyer, District Veterinary Officer, Tanjore, Sri V. Shanmugasundaram, Veterinary Assistant Surgeon, Mannargudy Sri D. Vaidyanathan, Veterinary Assistant Surgeon, Mayavaram, Sri A. A. Subramanyam, Veterinary Assistant Surgeon, Tiruvarur and Sri A. Kalyanasundaram Mudaliar, B.A., B.L., Secretary, S.P.C.A., Tiruturaipundi, acted as judges.

Tiruturaipundi, }
25-12-45. }

K. R. PADMASUNDARAM,
Tg. Veterinary Assistant Surgeon.

Extracts

LIVESTOCK AND VETERINARY AID IN THE MADRAS PRESIDENCY

By

D. V. RAJALAKSHMAN,
University of Madras.

The problem of providing sufficient food for the population never received any serious consideration, in India, before 1943, and even the later control exercised by the Government on the supply and distribution of foodstuffs is the outcome of an inevitable necessity to relieve the acute scarcity rather than a planned policy of war economy. But the Government of India, after the recent experiences, has decided to pursue the policy of increasing the production of foodstuffs even in the post-war period to attain the object of providing sufficient food, both in quality and quantity, to all people. When the production of proper food is considered as a vital aspect of any reconstruction programme by countries which had enough food for the population even before the war, there is no need to emphasise the importance of this problem for a country like India where "at least 30 per cent of the population are habitually underfed in normal times." Though the measures adopted for the last few years are mainly intended to relieve the acute scarcity, for attaining the object of providing sufficient and proper food for the population in the post-war period, it is necessary to fix targets for production based on the nutritional requirements and formulate a plan for increasing the production of foodstuffs to reach the specified levels. The recent All-India Food Conference also recommended that "it is essential to improve the diet of the people and to this end all Governments will undertake an examination of diets in their area, to determine in what respect they are defective and how the defects can best be removed." "The existing production of cereals will cover the requirements" of the population in India "provided the supplementary non-cereal foods needed for a well-balanced diet can be produced." Since milk is next in importance to cereals and is essential both as a protective and as a nutritive food for a balanced diet, any plan to improve the diet should aim at increasing the production of milk to attain the level of sufficiency. Though a widespread scarcity of milk is felt in many parts of India recently, still, the daily per capita consumption of milk, even in normal times, is only 7 oz. whereas most countries reached a level of 35 oz. (1,000 grammes) which is recommended by the League of Nations as the proper requirement of a balanced diet.

The necessity of increasing the milk production in the post-war years is even more important for the Madras Presidency where the daily per capita production of milk in normal times is estimated to be so low as 3.6 oz. The cereal production in this province is sufficient to meet the requirements of the population as specified in the balanced diet and only a shift in the production of millets to paddy may be necessary to adjust for the increasing demand of the

Dr. Wright: Report on the development of Cattle and Dairy Industries in India, 1937.

Reprinted from the "Madras Journal of Co-operation" Vol. XXXVI No. 12, June 1945 pp. 258-268.

population for rice which can be achieved by providing adequate irrigation facilities. So a rapid increase in the production of milk which depends on the livestock development, must be the vital aspect of any reconstruction programme for the adequate provision of proper food. Since there is a sufficient number of livestock in this province,¹ the main problem reduces to that of maintaining the existing livestock in good health and evolve from them a generation yielding enough milk to satisfy the dietetic requirements of the population. The preliminary requisite of any such programme is to obtain an adequate number of trained personnel in the shortest time. After fixing the requirement, it is necessary to evolve a scheme for training that number in a reasonable time keeping in view the problem of preventing the production of excess number, after reaching the optimum level. According to the Royal Commission on Agriculture (1927), "the aim should be to provide on an average at least one veterinary assistant surgeon for every 25,000 cattle" and even this is inadequate but it "can be regarded as providing a frame work round which a more complete service can grow up." Based on the livestock census of 1940, 885 trained assistant surgeons are necessary for this province, but this requirement is only the essential minimum envisaged for the prevention and treatment of diseases. Consequent on the transfer of the livestock section to the Veterinary Department and keeping in view the possible increase in the number of trained people needed for livestock development in the post-war period, the minimum requirement of this province may be regarded as 1,000. The following table indicates that even this provision, compared with other countries, is inadequate.

TABLE I.*

Country.		Veterinary surgeons per	
		25,000 cattle.	Millions of cattle.
Britain	...	8.7	94.4
France	...	5.5	98.8
Germany	...	9.6	149.0
Holland	...	7.1	140.0
Switzerland	...	10.9	247.8
India—Proposed ²	...	1.0	26.7
Existing	...	0.3	7.9
Madras—Proposed ³	...	1.0	19.4
Existing	...	0.3	6.6

The Madras Veterinary College is the only institution imparting veterinary education in this Province. On an average the college is admitting 40 students every year and 20 emerge after the successful completion of the course. The administration reports of the Civil Veterinary Department indicate an annual increase of 5 in the provincial service, although it can be assumed that all the trained personnel are joining the Department after completing the course every

*Compiled from the Report of the Committee on Veterinary Education in Great Britain, 1938.

¹ The total number of cows and buffaloes over three years kept for breeding or milk production, according to 1940 livestock is 7,867,782, and taking the census of 1941 the population is 49,341,810, there are 16 milch cattle for 100 of human population.

² Obtained from Dr. Wright's Report.

³ Calculated from the Indian Livestock Statistics (1940) and the Administration Reports of the Civil Veterinary Department.

year. As such 15 per annum or about 5 per cent of the existing strength of the Department may be taken to be the annual reduction due to retirements and other exigencies. So the plan should be to obtain the required number of 1,000, from the existing figure of about 300 veterinary assistant surgeons who are in charge of institutions and touring billets. To relieve the scarcity felt for trained people, the admissions to the college are increased to 60 this year, and, as the duration of the course extends over five years, the first batch will complete their training only in 1949. Consistent with the results of the examinations, the maximum annual output of the college may be assumed to be 40 after 1949, and till then the college can produce only 20 every year. Assuming that all these join the provincial service, the strength of the cadre will be 318 by 1949, after allowing for the annual reduction of 5 per cent. If the existing college continues to admit 60 students every year, it will take 44 years for the number of veterinary assistant surgeons to become 750, and 76 years to reach a figure of 790, and 800 can never be attained, assuming that there will be 40 successful candidates annually and all of them join the service. This clearly indicates the necessity of starting new colleges for training the required number of veterinary surgeons.

Since the opening of new institutions involve some delay and keeping in view the duration of the course which is 5 years, it can be assumed that fresh colleges can be started at regular intervals of five years. A period of 20 years may be taken as a reasonable time limit for completing this programme of training the adequate number of veterinary surgeons. Assuming that it is not possible to admit more than 60 students in one institution, if a new college is started in 1949, the first batch of trained people will emerge in 1954 and a third college started in that year will produce veterinary surgeons from 1959. Till 1954 the existing college alone produces annually 40 surgeons, after which two colleges will function giving at the rate of 80 and from 1959 all the three colleges will train 120 veterinary graduates every year. If all those trained personnel enter the Government service soon after completing the course; then the total number in the Department, after allowing for the annual decrease of 5 per cent of the existing strength, will reach a figure of 1079 by 1964, that is, in another quinquennium. The required number of about 1,000 veterinary surgeons will thus be available in about 20 years if two more colleges, each admitting the full strength of 60 every year, are started at an interval of five years. Since the above estimate is based on the minimum requirement and the maximum possible successful candidates that can emerge from the colleges, the plan can safely be taken to cover even more than 20 years.

If all the three colleges continue to train veterinary surgeons after reaching the required level, it may be necessary to regulate the admissions into the colleges to prevent the excess production of trained personnel. To maintain the strength of the department at a level of about 1,000, it will be necessary to train at least 50 veterinary surgeons every year. Considering the increasing need for livestock improvement and keeping in view the results of the college examination which, on an average, are noted not to exceed 50 per cent of the annual admissions, the maximum reduction that may be necessary will be to limit the admissions to 40 into every college which will then produce only 60 trained surgeons annually.

The possibility of regulating the admissions to the existing college alone for producing the required number of trained surgeons in the given period, instead of starting new colleges, presents certain difficulties. Since it is not

possible to provide adequate facilities for practical training to any number of students in a single institution, a considerable increase in the number of admissions will deteriorate the efficiency of the trained people. Further, the veterinary surgeons require an intensive training to handle efficiently the various problems that are connected with the livestock development, and as such, it is advisable to start new colleges in the tracts where the important breeds exist in this province. Since the general policy of livestock development is to improve the local breeds, it is essential to locate one of the proposed colleges in the Coimbatore area where the Kangayam and Halikar breeds are prominent and the other in the Guntur tract where the Ongole breed is predominant, to train veterinary surgeons suitable to aid the improvement of these three main breeds of this Presidency which the Government of Madras have decided recently to improve in the post-war period. The selection of students from the contiguous areas for the respective colleges also helps to obtain trained surgeons acquainted with the local conditions.

A reduction in the duration of the course may be suggested as a plausible solution to accelerate the production of veterinary doctors. Even if the course reduced by one year, the only effect will be to obtain an extra batch of 40, instead of 20 surgeons, which is quite negligible compared with the requirement. Further, the course was enhanced to five years only in 1938, after considering the necessity of imparting intensive training to produce efficient veterinary surgeons. In view of the growing importance of veterinary aid for livestock improvement, a measure to reduce the course, which affects the efficiency with no reasonable benefit of speeding up the production, should not be advised especially for this Presidency, which is the first to recognise the need for properly trained veterinary surgeons in India.

In view of the recent fall in the admissions to the college, a doubt may arise that the new colleges will not be able to attract a sufficient number of proper students as visualized in the scheme. When the entire problem of providing adequate and proper food for the population is considered as the primary responsibility of the Government for any reconstruction programme, the training of necessary personnel to attain this objective is of such a fundamental importance that adequate facilities must be provided to obtain sufficient number of proper students to undergo the training. Considering the number of qualified students who are failing to secure admission into other professions like medicine and engineering, it is not possible to consider that there will be dearth of proper students for this profession. Possibly the existing conditions may not be attractive to divert sufficient number of qualified students to undertake this professional training extending over five years, and any such obstacles must be immediately removed to achieve the object of securing sufficient number of trained veterinary surgeons.

The recent five-year plan of development in this Presidency provides a scheme for adequate public and medical health relief which will be completed in a period of 20 years. Closely associated and equally important is to plan for the elimination of the fundamental causes of ill-health and disease in this Province, namely, underfeeding and malnutrition. To achieve this objective a rapid increase in the available quantity of protective foods, particularly milk is essential. This involves the training of efficient veterinary surgeons whose responsible duty is to retain the existing livestock in good health and breed from them a generation which will yield sufficient milk to meet the requirements of the population. But the five-year plan only suggests "extensions to the

Veterinary College at Madras" and no provision is made for starting new institutions to impart veterinary education. With a scheme for a rapid improvement of livestock it is necessary to plan for the training of an adequate number of veterinary surgeons, which can only be attained by starting two more colleges one of which should commence from 1949, and the other five years hence, for providing a sufficient number of trained graduates in a period of about 20 years to undertake the reconstruction programme. It is also essential to provide conditions that are congenial to attract a sufficient number of qualified and able students to join this profession. Measures to attain these objectives will help to improve the diet of the population in this province.

NEED FOR AN ANDHRA VETERINARY COLLEGE

Waltair, Feb. 15

Dr. Sir C. R. Reddy, M.A. (Cantab), Vice-Chancellor of the Andhra University writes :—

His Excellency the Governor and his Advisers deserve the warmest congratulations of the Presidency in general and Andhra in particular for some of the post-war reconstruction schemes; more particularly the three great works viz., (1) the Tungabhadra Project, (2) the Godavary Project and (7) Machkund Project, which between them will solve the twin problems of food and industry and give our Presidency a well-balanced economy, in which the manufacturers and raw materials will receive equal promotion.

There is a new spirit of correlation to these schemes not often witnessed before. These irrigation-power projects require a very large staff in the Engineering, Electrical and Agricultural Services. Water and Malaria seem to go together and a Medical College is also necessary. It is gratifying to note that an Agricultural College has been started; an Engineering College will be started, some polytechnics are under institution; and an additional Medical College in the Andhra is also a part of the correlated programme of ancillary and consequential institution.

There is one serious omission, the lack of a Veterinary College. I trust that Government will soon go ahead with the inauguration of a Veterinary College in the Andhra.

NEED FOR VETERINARY COLLEGE

The need for another Veterinary College in this Province is urgent and I am glad that Sir C. R. Reddy has drawn the attention of Government to the omission to make provision on this behalf in the post-war development plan. I am not unmindful of the fact that superficial critics may put forward the objection that when there is dearth of candidates seeking admission to the existing Veterinary College, yet another institution of the kind would be superfluous. The answer is that the pay and prospects of the Veterinary graduates have suffered in comparison and are not sufficiently attractive to induce young men of the right type to take to this profession. So long as there is no scope for an independent Veterinary profession, apart from Government service, it should be the duty of Government to make the service attractive enough for

young men, to join the Veterinary Colleges to meet the requirements of the country. It is no secret that most of the schemes in furtherance of Animal Husbandry in the Province in recent years, could not be put through owing to paucity of trained Veterinary personnel. The position is not likely to improve in the near or distant future unless the annual output of Veterinary graduates is doubled or trebled, which is definitely beyond the capacity of the Veterinary College at Madras, or of any one College for that matter.

I would therefore earnestly plead for the establishment of a Veterinary College, under the auspices of the Andhra University in a suitable locality.

K. KYLASAMIER,
Madras Veterinary Service (Retired),
Hindu 24-2-'46.

Madras.

MILK PRICE IN INDIA

Highest in the World

MR. PEPPERALL'S Survey of Present Position

Plans to Improve Dairy Industry

London, Feb. 20.

Thirteen evils in India's present system of milk production are catalogued by Mr. Robert Pepperall, the Chief Regional Marketing Officer to Britain's Milk Marketing Board. He has also submitted his Report to the Government of India on the improvement of milk industry.

Mr. Pepperall has recently made an investigation lasting four months into the production and distribution of milk in India, and his report was submitted to Sardar Sir Jogendra Singh, Member for Education, Health and Lands in the Government of India.

His statement—his official report is still to be published—comes at a time when experts have predicted that India is once more facing famine and that this year's production of rice will be one and a half million tons less than the pre-war average.

Thirteen Evils of Milk Supply

The thirteen evils confronting India according to Mr. Pepperall, are:

Livestock is in a state of semi-starvation; animal management very poor; milk production is steadily decreasing; human population is increasing rapidly; producers are mostly illiterate, indebted and poverty-stricken; the price of milk is the highest in the world; the average income of the population is amongst the lowest in the world; there is widespread adulteration of milk; the total ignorance of sanitation and complete indifference to hygienic standards; corruption and a low standard of integrity is very common in India; the general public is apathetic; there is serious neglect of their duties by the public bodies; and dairy equipment is almost non-existent.

Mr. Pepperall's report to the Government of India gives a clear policy by which these evils can be cured. They are summarised under six principal headings:

Better management of cattle by the provision of adequate fodder; the fixation of a reasonable price for the producer, which will be as low as possible for the consumer; a considerable improvement in hygienic standards; a ban on the export of oil seeds to provide more food for Indian cattle; the immediate provision of administrative machinery under a Director of milk in each Province, with a central body making decisions for India as a whole; and the concentration of milk production in the fertile areas of India, and those scheduled for irrigation schemes.

Problem of Marketing

Mr. Pepperall amplified these points to Ronald Bedford—*Reuter's* correspondent. He said: "If anything is to be done to safeguard the country's milk supply and the nation's health, there must be an immediate pronouncement on the lines suggested in my report. At present, there is no one in India capable of supervising the proposed reforms, but someone might be loaned from England for this purpose. England is the only country in the world where the marketing of milk has been carried out on a national scale, and to make a temporary appointment of a Director from England would mean that India would avoid all the mistakes made in milk-marketing in this country during the past twelve years.

It would not be a good policy to send Indians to this country to be taught the theory of our methods because of the delay and the profound difference in the methods which would be involved. It would be far better for them to learn the principles of milk marketing in their own country under the supervision of an Englishman.

"One of the first essentials to a healthy milk industry in India is to reduce the cattle population from 219 million—the present figure—to 140 million within ten years. Obviously this must be a job for an Englishman, who would not have to contend with religious prejudices.

"However, politics are largely governed by economics, and if partition of India became a reality, there would have to be exports from Pakistan to Hindustan, and it might prove that milk would be one of the principal commodities to be exported. Here is, however, no reason why the areas of India where milk can best be produced should be governed by political problems alone; or why the development of sound milk industry for India should be governed by political problems alone, or hindered by political considerations." Mr. Gandhi's outlook was that, because of my particular mission. It was at least one Englishman who could do something which would benefit all Indians, and contribute a service to India upon which all Indians would agree.

Report to India Government

The report submitted by Mr. Pepperall to the Government of India contains some outspoken comments about conditions to the country's dairy industry.

"When I arrived in New Delhi, I was asked to give an honest opinion on the present-day conditions, irrespective of whether these opinions were critical of the Government or individuals." Mr. Pepperall told me, "I endeavoured to be absolutely honest in my remarks."

The Report begins by criticising the practice of keeping cattle in confined places in India's large cities.

"The city stables offend every principle of hygiene," it says, "and upon humanitarian ground, amongst a community with so tender a conscience towards the preservation of life they should, but do not, evoke the utmost horror. Starvation of stock, squalor, filth, ignorance or indifference towards hygienic principles, revolting personal habits allied to official apathy combine to produce in a Western mind feelings of disgust, and possibly of despair, at the prospect of affecting any appreciable improvement."

Of a visit to a Bombay stable, housing the stock of several owners, the Report says that there were large manure heaps inside the shed and a dead buffalo outside being picked by crows, and adds: "Standing with his back to this incident was an official of the Dairy Department."

Asked whether it was not his business to ban the sale of the milk, he replied: "No, I have no jurisdiction over such matters. The purpose of my visit is to count the animals for a rationing scheme." During the absence of a milker, the crows flew from the carcass they were picking and slaked their thirst with milk.

In Calcutta, conditions are no better, they may even be worse. The Corporation of Calcutta do not treat milk as highly valuable food subject to easy contamination.

Of milk adulteration, the Report states: "Integrity is not unfortunately a feature of Indian commercial or social practice."

Schemes for Development

Outlining schemes for development, the Report reads: "Before the Bombay stables can be eliminated, it will be necessary to tap fresh areas of supply. Gujarat and the Tapti Valley between Bhusawal and Chaliagaon are suitable for immediate development and areas for milk production on a large scale should be allocated in irrigation tracts at Nasik, Amednagar, Poona and Baramati. The one serious drawback at present is the lack of railway facilities to transport milk from production areas to the city and success will depend entirely upon the provision of a special rail service to lessen the time occupied on the journey."

Another opinion expressed by the Report is that it would be highly dangerous to place the slightest dependence on the protection deprived from so-called pasteurised milk even when delivered in a sealed bottle in a country like India.

The Report recommends that simple items of dairy equipment should be produced in India with standardised churns and milking pails to keep costs at a minimum.

The other recommendation is that the Punjab should retain its cattle and arrange to send evaporated milk in tins to Bombay or Calcutta rather than export cattle that are usually slaughtered within a few months and replaced at great cost.

"Hindu" 20-2-46.

INDIA'S MILK INDUSTRY

Cities to Have Modern Dairies

GOVERNMENT ACTS ON PEPPERALL REPORT

New Delhi, Feb. 27.

The Government of India have drawn the attention of Provincial Governments to the recommendations in the Pepperall Report on the dairy industry in India, and have stressed the need to expedite action on such measures as have not received adequate attention so far.

Schemes have already been drawn up in some Provinces for the setting-up of a Milk Control Board, and appointing Dairy Development Officers. But the suggestion for the importation of Dairy Directors has not been endorsed.

The Imperial Council of Agricultural Research and the Imperial Veterinary Research Institute at the Centre, and the various Provincial Governments have already taken measures to tackle the problem of milk supply and further action is being taken to achieve the desired results. Several Provinces have started separate Departments for Dairy Development. The Technique of artificial insemination under Indian conditions is being perfected, and work on a full scale has been started at a few centres, both on farms and in city cattle stables.

The policy of developing the cow for the dual purposes of milk and draught has been followed by the Provinces wherever possible. The dislodging of cattle from city stables and colonising them in more natural environments, it is stated, is the accepted policy of the Government, and specific steps are being taken by some of the large cities like Bombay, Calcutta and Madras to give effect to it.

RE-EXAMINATION OF LEGAL STANDARDS

The question of the re-examination of the existing legal standards for pure milk is being considered. The manufacture of milk products in the rural areas is the accepted policy of the Government.

The suggestion in the report that butter should not be manufactured in India, is being further examined, as it is feared that such a course might adversely affect the development of a Dairy Industry.

Schemes for the supply of cheap milk to priority consumers have been in operation in several large towns since the outbreak of the war, under the guidance of the Food Department.

Concrete schemes to organise producers into co-operative societies are being taken up by the Provinces. The establishment of modern dairies in cities forms part of the Provincial schemes.

Mr. Pepperall's suggestion that experiments should be conducted on the feeding of fish to cattle, to supplement existing available cattle feeds, is turned down, as fish is required for human consumption and cannot be made available for cattle.

"Madras Mail", 28-2-46.

FOOD PRODUCTION DRIVE IN C.P.

Nagpur, Feb. 16

Expenditure incurred in connection with the Provincial Assembly elections, electricity power development schemes, food production drive and additional housing for Government officers at Nagpur and Jubbulpore has been included in supplementary estimates for the year 1945-46 authorised by the Governor of the Central Provinces, exercising his powers under Section 93 of the India Act.

These additional grants total over Rs. 54 lakhs in the year 1945-46.

To intensify the food production drive in the province a sum of Rs. 92,000 has been earmarked in the additional expenditure. Government officers will distribute among the cultivators improved paddy seeds in all districts.

Establishment of a veterinary college and live stock research institute at Nagpur as part of the post-war schemes has been decided by the Governor. A five-year scheme of poultry research costing the Government Rs. 22,000, which is essentially a part of the "grow-more-food" campaign, has been introduced. The Government have also sanctioned Rs. 2,24,000 for the purchases of vegetable seeds for distributing the same at cost price to cultivators, for purchase of onions at Nagpur for civilian consumption, continuance of the scheme for purchase of potato seeds and distribution of the same to cultivators either on cash or takkavi advances in order to increase the area under potato in the province to cater adequately to the needs of the increasing population.

"Hindu" 19-2-46.

American Scientists are planning a number of expeditions to different parts of the world to find out something more about the herb medicines of primitive peoples. In these days of advanced scientific knowledge chemists are increasingly aware of the part that old-time native remedies may play in new medical 'discoveries'. One of the reasons for the renewed interest in herb medicine is the realisation of the value of vegetable matter in the battle against disease; such discoveries as penicillin and streptomycin have proved that modern essential drugs are yielded by the same process that produced the vegetable cures of our distant ancestors.

"Hindu", 6-12-46.

FREE DISTRIBUTION OF MILK

Additional 1,000 Measures Provided

Madras, March 4th.

The Government have approved the proposal of the Registrar of Co-operative Societies that an additional quantity of 1,000 measures of milk per day diverted from the city milk supply towards the scheme for free distribution to priority consumers, namely, children under two years of age, expectant and nursing mothers and toddlers, by the Corporation of Madras, so that the supply of milk under the Priority scheme may be increased to 3,000 measures per day. The Government have stated that separate orders will be issued on the question of the continuance of the scheme beyond Mar. 31, 1946.

The Government have, in consultation with the Board of Revenue and the Registrar of Co-operative Societies, accepted the proposal of the Commissioner, Madras Corporation, to include, under the scheme, children up to 5 years of age.

Regarding the proposal of the Commissioner that poor Tuberculosis patients who attended the Corporation T. B. Clinic, Pulianthope, and those certified by the Medical Officer of the Clinic as deserving (including contact children up to 7 years of age) be supplied at the rate of half a measure of milk per day, the Government have stated that it would be invidious on the part of the Government to include T. B. patients of the Corporation clinic alone among priority consumers. They consider, therefore, that the Corporation should make its own arrangements to supply milk to the Tuberculosis patients and meet the cost from its own funds.

"Mail" 4-3-46

SLAUGHTER OF SHEEP AND GOATS

Madras, Feb. 20.

Slaughter of sheep and goats in the provinces, have been restricted by an Order of the Governor of Madras, dated February 12 and taking effect forthwith.

The Order states:

1. No person shall, after the date of publication of this order, whether by himself or by his agent, slaughter or cause to be slaughtered for purposes of consumption, civil or military, or sell or purchase or cause to be sold or purchased for purposes of such consumption, any of the following categories of sheep and goats, namely:

- (1) Ewes below 2½ years, when they possess six permanent incisors, all in wear.
- (2) Female goats below two years, when they possess four permanent incisors: all in wear.
- (3) Male goats and sheep (castrated or entire) below 1½ years when they possess two permanent incisors and the sixth permanent molars are also erupted.

2. (1) Any civil Veterinary authority whether of gazetted or non-gazetted rank, may object to the slaughter of a particular animal falling under any of the categories mentioned in clause 1. For this purpose such authority may enter the military butchery pens (except military dehydrated meat factories) after intimation to the officer in charge of the butchery pen concerned enter slaughter-houses and inspect any premises in which he has reason to believe that slaughter of any sheep or goat in contravention of the provisions of this order is taking place.

(2) In the case of slaughter for civil consumption, if any doubt arises as to whether an animal falls within any of the categories mentioned in clause 1 or not it shall be presumed that the animal falls within such category and it shall not be slaughtered unless a declaration is obtained from a Veterinary Officer not below the rank of Veterinary Assistant Surgeon, certifying that the animal does not fall within such category.

(3) In the case of military butchery pens an animal to which objection is taken by the civil Veterinary authority shall not be slaughtered, provided that in the case of the civil Veterinary authority being a non-gazetted officer, the officer in charge of the butchery pen concerned shall have a right to make a reference to a local civil gazetted officer of the Veterinary department whose decision shall be final.

Hindu, Feb. 21.

Errata

We regret this by mistake in Plate No. XX, Vol. XXII, No. 4, under 'Training Abroad' the names of Mr. V. Mahadevan and Mr. M. Dharmarajan have been wrongly printed.

Instead of V. Mahadevan, please read:—M. Dharmarajan, M.A., M.Sc., Madras Veterinary College.

Instead of M. Dharmarajan, please read:—V. Mahadevan, M.A., Madras Veterinary College.

On page 387 of this issue of the *Journal* add the name of Dr. E.R. Kulkarni under Dr. M. D. Vaishnav, in the list of members. In page 388 of this issue of the *Journal* under 'An Appeal' in line No. 8, read 1886 for 1896.

Obituary

MOHAMMED RAHIM-UDDIN SAHIB BAHADUR,
G.M.V.C., P.G. (Edin.).

It is with feelings of deep regret that we record the sad and untimely demise of Mr. Mohammed Rahim-Uddin Sahib Bahadur, G.M.V.C., P.G. (Edin.) District Veterinary Officer, Vizagapatam, on the 20th of February 1946, after a short illness. His end was sudden and unexpected. We offer our heartfelt condolences to the members of the bereaved family.

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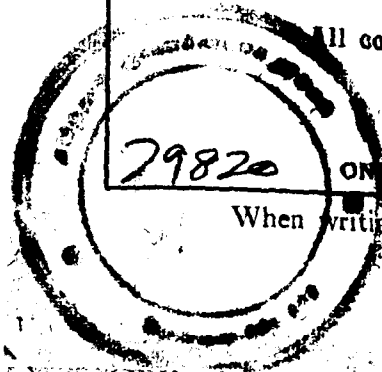
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