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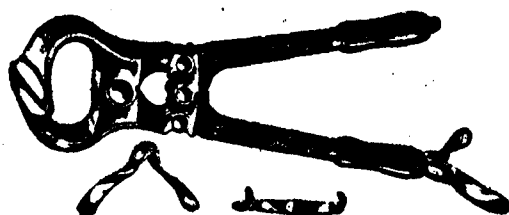
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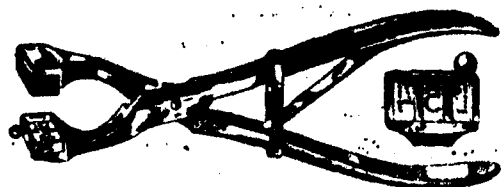
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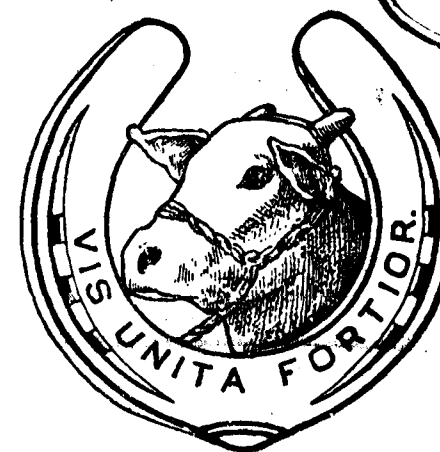
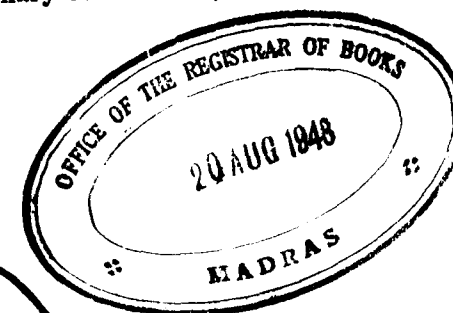
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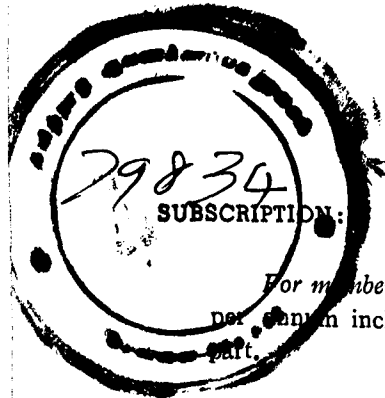
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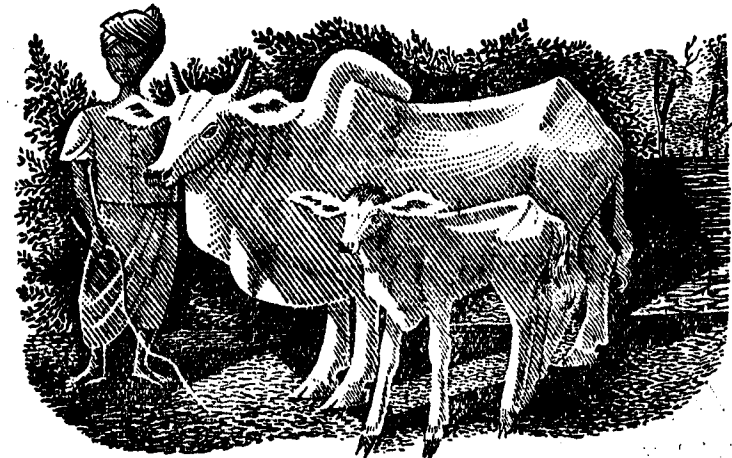
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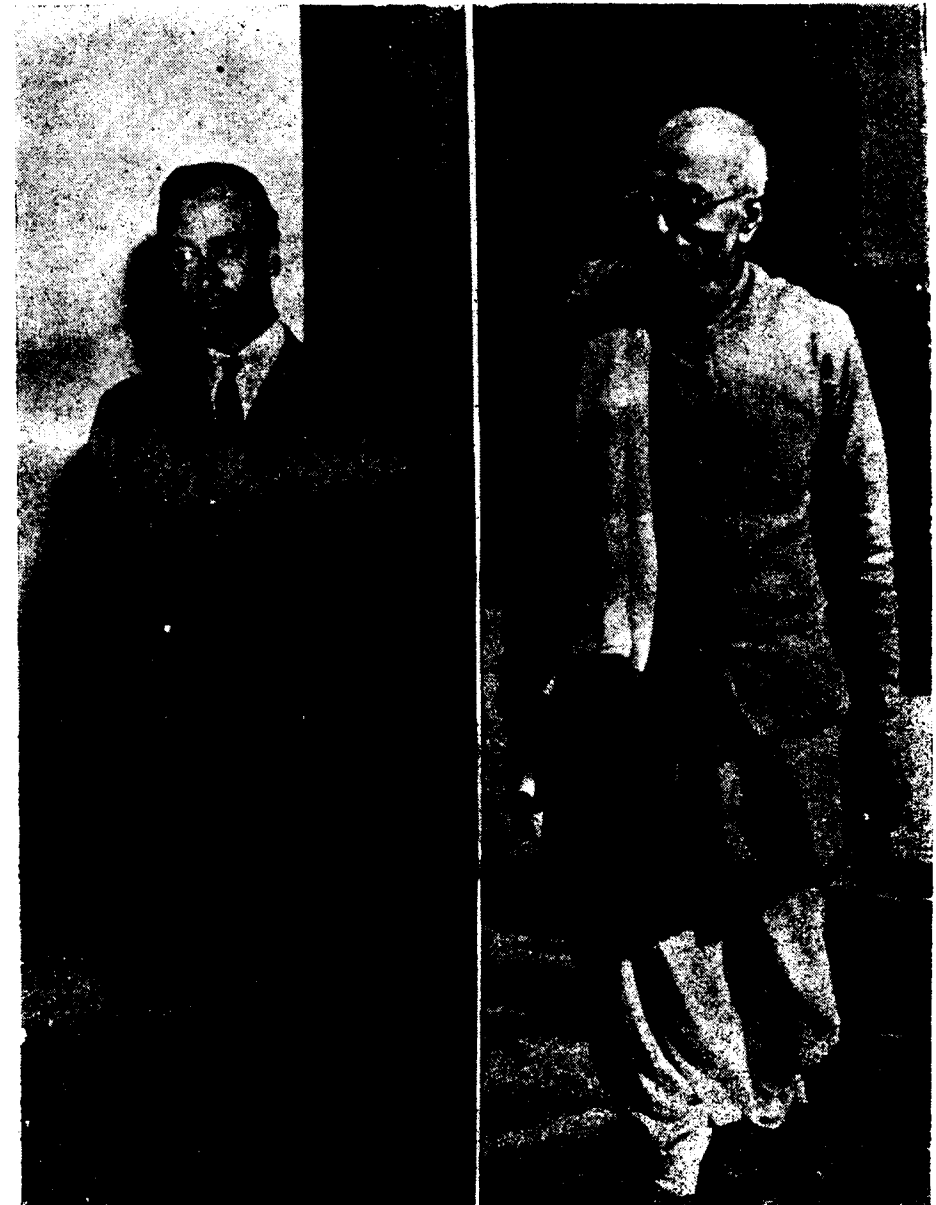
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THE Indian Veterinary Journal

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JULY, 1948

No. 1

General Articles

SOME STUDIES AND OBSERVATIONS ON EPIZOOTIC LYMPHANGITIS

BY

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INTRODUCTION

Epizootic lymphangitis is a contagious equine disease characterized by chronic suppurative inflammation of the superficial lymphatic vessels and regional lymph glands. Its existence and recognition date back to time immemorial and it has been reported all over the world. A review of the literature on this disease show that it comes under a great variety of names and synonyms and was often confused with Glanders or Farcy. In France, it is known as *River farcy*, or *Farcin de riviere*, *Farcin en cul de poule*, *Farcin cryptococcique* and *Lymphangit epizootique*. In Italy, the disease is called *Naples* or *Neapolitan farcy*, *Mal del Verme* and *Farcino criptococchico*. Japanese glanders, Japanese farcy; Pseudo-farcy (*kasei-hiso*), Equine syphilis (*kasa*), Equine pox (*hoso*), Inundation fever (*gogue netsu*), Yakume (*duty*), Dekime (*eruption*), Inochitori (*fatal*), are names given to this singular malady in Japan. While it appears that the Japanese workers have been very active in this line of investigation, the French veterinarians, however, were the first ones to recognize the disease and conduct studies on it as early as 1820. Rivolta in 1873 demonstrated for the first time the causative factor of Epizootic lymphangitis but it was Tokishige, a Japanese, about a quarter of a century later, who isolated it in pure culture which he called "*sacharomyces*". In Sweden, the disease is recognized under the name of *Norlander Rotz*; in Algeria, "*el djedre*"; in Dutch East Indies (Java and Bali), "*patek*". In the Philippines, "*botones*" is what the laity calls the disease especially in the Tagalog

provinces. The other synonyms are Saccharomycosis, Lymphangioitis epizootica, Farcin d'Afrique or African farcy, African glanders and Pseudo-glanders. Besides the countries already mentioned, this form of infection has also been reported or known to exist in India, Burma, China, Poland, the Balkans, Ireland, England, Russia, Gaudaloupe, Finland and the United States.

In the Philippines, particularly in the City of Manila and its environs, the disease assumed alarming proportions during the last few years before the outbreak of the Pacific War to the extent that the Veterinary Hospital of the College of Veterinary Science, University of the Philippines, received for treatment one case of Epizootic lymphangitis for every two of the other equine diseases. The situation was even more appalling during the period of Japanese occupation of the Islands when practically one hundred per cent of the horses treated in that hospital were those of Epizootic lymphangitis. Because of this unprecedented rise in the number of such cases, the writer was assigned to the Veterinary Hospital in addition to his other duties by the Dean of the College to reinforce the Clinical Staff. This unusual increase in the number of Epizootic lymphangitis cases at that time was probably brought about by undernourishment, overwork, ill-management and a combination of other similar causes which lowered the animals' resistance to infection.

A perusal of foreign literature also reveals the fact that much has already been known about this disease since its discovery. Notable among the workers who contributed much invaluable data in this regard are Hutyra and Marek (3), Kelsner (4, 5), Pallin (7) and Udall (8). Locally, however, it appears that Gomez (1), and Gomez and de Jesus (2) and Muñoz (6), were the only ones who conducted some studies on this disease.

OBJECT OF THE PRESENT REPORT

The present paper purports to record certain additional data regarding this important equine malady which in the opinion of the writer are found wanting in the domestic literature. Primarily, the answers to the following queries are being sought:

1. Has breed, sex, age, color, size, use of the animal, etc., any effect or influence on the occurrence of Epizootic lymphangitis among indigenous horses?
2. In what regions or parts of the horse's anatomy are the lesions of this disease most and least frequently observed?
3. How do these present findings and observations compare with those obtained by foreign workers?

MATERIALS AND METHODS

The data used in this report were based on the actual hospital case records of all the animals treated in the Veterinary Hospital, College of Veterinary Science, University of the Philippines from March, 1937 to April, 1938 inclusive. This includes 997 horses of which 504 are Epizootic lymphangitis cases. Individual clinical records of these 504 horses were carefully studied as to the name and address of the owner, date of admission to the hospital, breed, sex, age, color, height and the use of the animal as well as the history and symptoms of the patient. A number of horses diagnosed as "Reserved" (suspicious of glanders) were likewise included in this study. It might be stated in this connection that it has always been the policy of the Veterinary Hospital to have the horses suffering from Epizootic lymphangitis, subjected to mallein or compliment fixation tests before any treatment was instituted. By this routine Gomez and de Jesus in 1931 found that these two diseases co-exist in a great number of our indigenous horses.

From the name and addresses of the owners, the regions or localities harboring the infection can easily be traced, and incidentally, the types of clients to which the Veterinary Hospital caters its services. A record of the dates when each animal was admitted to the hospital affords a basis for the determination of the number of cases received daily and the month or season of the year when infection was heaviest or at its lowest ebb. Many interesting facts may be disclosed as the breed, sex, age, color, height and the use of the animal are studied in relation to the disease. The localization of the disease process in Epizootic lymphangitis was revealed in a careful study of the histories and symptoms of the patients.

A tabulated summary of all data obtained in connection with preparation of this paper are found elsewhere in the following pages. (See Tables I, II, III, IV, V and VI).

OBSERVATIONS AND DISCUSSION

(1) *Prevalence of the Disease*:—As will be noted in Table I, 504 horses out of 997 treated in the Veterinary Hospital in 1937 to 1938 or fifty per cent, were Epizootic lymphangitis cases. Practically, the whole City of Manila and several towns nearby showed evidence of infection. A closer observation of the same table, however, reveals the fact that from the districts of Tondo, Sampaloc, Santa Cruz and Pandacan in Manila as well as the neighbouring towns of San Juan, Pasay and Caloocan, the greatest number of cases were registered. This is to be expected because it is in these places where large number of horses are being maintained for "calesa" and "carretela" business. It is a matter of common knowledge that susceptibility and predisposition to infection is great where animals are kept in overcrowded, insanitary and unhygienic stables, and more so when the horses

are ill-fed, overworked, abused and neglected. Of course, the disease is also found in horses in the best of conditions such as the race and "dakar" animals. Incidentally, this raises the old question of natural transmission, which up to now is apparently unsatisfactorily explained.

(2) *Seasonal Incidence of the Disease*:—A glance at Table II reveals that there were 23 cases registered during the month of March, 1937 which is the lowest and 55 cases in January, 1938, the highest. The seemingly great difference, however, is in reality insignificant since a careful study of the same table will show that the cases are fairly distributed throughout the year. This means that the infection continues uninterrupted all the year round. Gomez also found no significant seasonal fluctuation on the incidence of Epizootic lymphangitis in his work, "A Statistical Analysis of Clinical Cases in Manila". An average of 36 cases monthly or 1.2 cases daily is a fair indication of the common occurrence of the disease in the City of Manila and its environs.

While Epizootic lymphangitis appears to be non-seasonal locally as noted in the foregoing, Tokishige (cited by Pallin) claims that the disease prevails more in rainy seasons than in dry and more in cold weather than in hot. On the other hand, Lingard (also cited by Pallin) states that the disease cannot exist in cold countries and adds that experiments conducted at Muktesar, India, have shown that a cure can be effected by removing animals to a high level, i.e., 7,500 feet. Pallin's own experience, nevertheless, tends to show that neither climate nor season has anything to do with the spread and development of the disease, although he admitted that indirectly, various conditions which are subject to and altered by them (climate and season), may aid or retard the development of the disease.

In Table III, is shown a tabulated summary of observations about Epizootic lymphangitis in relation to breed, sex, age, color, height and the use of the animal.

(3) *Breed*:—The breed of horses affected with Epizootic lymphangitis as observed here are mostly those of the native (478 out of 594 cases or 94.84%), a few grades, 3 Thoroughbreds and 1 Arabian. This indicates that the disease affect horses irrespective of the breed. The percentage of infection in native ponies is naturally great because they constitute the main bulk of the Islands' horse population. The other factors which may also contribute to this high incidence among our horses are ignorance of stable hygiene and sanitation on the part of most horse owners, negligence and improper care, management and feeding of the animals.

In regard to susceptibility to the disease among solipeds, opinions seem to vary. Hutyra and Marek states that horses and mules are equally susceptible whereas donkeys appear to be more resistant. On the other hand, Nocard and Leclainche (cited by Pallin) claim that mules

are more susceptible than horses. Pallin's observations tend to collaborate those of Hutyra and Marek in which he observed that the susceptibility of horses and mules is about equal if given the same conditions and the probability that both are more susceptible than donkeys.

(4) *Sex*:—This apparently has nothing to do with the disease. The mere fact that a greater number of male horses are affected, as may be gleaned from Table III, do not really mean much since most people prefer males for pulling the "calesa" or the "carretela." This popular choice is based on their belief that the opposite sex is undesirable for the purpose from the point of view of strength, stamina and endurance. In this connection, it may also be pointed out that 475 out of 504 horses referred to in this study are used for "calesa" or "carretela." So far as the writer could ascertain, no mention has been made as to the existence of any relationship between the disease and that of sex, from foreign as well as domestic literature. The preponderance of males being affected in this case may be therefore regarded as purely co-incidental.

(5) *Age*:—The ages of the 504 horses studied range from 1.5 to 20 years, indicating apparently that age also exerts no influence on the occurrence of the disease. However, a closer study of Table III will show that horses at the age from 4 to 8 years are affected in great numbers or most susceptible to the infection. Three hundred eighty one (381) out of 504 horses affected with Epizootic lymphangitis or 75.60% of the total cases fall within this age range. Tokishige's observation in this respect shows that in Japan most cases occur between the age of 3 and 4 years. Why are foals and old horses apparently not so predisposed to the disease, on the other hand, also requires some explanation. In the writer's opinion, the reasons are obvious. The foal is not used under the harness or saddle until it has reached the age of two years or more. Hence, the possibility of contracting the disease through the infected harness or any similar equipment, is very much less. Besides, the foal does not ordinarily come in contact or mingle freely with other horses since most of the time he is with the dam. Moreover, the young animal is not subjected to strenuous exertions like pulling an overloaded "calesa" or "carretela" for hours on the streets which saps the animal's vitality and heightens its susceptibility to the disease. Old horses apparently suffer less from the disease because as they outlive their usefulness, they are usually sold for slaughter, sent to the province or retired on the farm. In this way, the chance of becoming infected is remote. The seemingly less susceptibility of older horses may also be explained by the possibility that they must have been mildly infected and recovered eventually unnoticed at one time or another, thus they acquire some sort of resistance to a subsequent infection. Tokishige states that in Japan an attack diminishes the susceptibility of an animal to the disease,

(6) *Color*.—The colors of the horses observed in this report are bay, gray, roan, chestnut, cream, brown, dun, black, skewbald, buckskin, sorrel, albino and piebald. The two most predominant colors among the indigenous horses, however, are those of bay and gray and these are followed by roan, chestnut and cream. The great variety in the color of the horses affected tends to suggest that color has no influence on the occurrence of the disease. Hence, the fact that more bay and gray horses are affected as may be seen in Table III, is rather co-incidental. It must be noted that these two colors are the most common among the native horses. Beliefs of unscientific nature on the part of most people would also seem to play a dominant role in the selection and preference for certain colors. It is claimed that bay and gray horses are industrious, not easily fatigued and full of stamina. Some believe that horses of mixed colors (piebald and skewbald) are carriers of ill-luck and that a chestnut horse is either a very lazy animal or a highly spirited one. The unpopularity of albinos as work animals is too well-known to necessitate further explanation.

(7) *Height*.—This factor, in some instances is interpreted to mean size. In Table III, it will be noted that the height of the affected horses range from 33 to 62 inches. This includes a few foreign breeds and some grade natives. The fact that horses of all sizes are equally affected by Epizootic lymphangitis, is a conclusive evidence that size has no relation or influence on the incidence of the disease. However, it will be interesting to note that horses from 44 to 49 inches in height are affected in great numbers (363 out of a total of 504 cases or 72%).

(8) *Use of the Animal*.—It has been observed that the nature of the work to which horses are subjected does not influence the incidence of Epizootic lymphangitis. In Table III, it will be noted that the high incidence of the disease falls on the "calesa" and "carretela" horses in which they constitute 475 out of a total of 504 or 94%. The reasons for this observation were already pointed out early in this report.

(9) *Localization of the Disease Process*.—As will be seen in Tables IV, V, and VI, the localization of disease process in Epizootic lymphangitis may be in any part or region of the animal's body. However, the greater frequency with which certain body parts or regions are affected apparently depend upon the primary mode of infection. For example, while Pallin states that lesions may be found on any part of the body, he claims that they are most frequently associated with those parts which are most exposed to wounds from kicks, contusions and harness galls. He therefore found the limbs to be the most commonly affected. Again, Hutyra and Marek believe that the frequent primary affection of the limbs suggests the transmission of the infection through the litter and manure in which the resistant cryptococci may be retained for a long time. The writer's

observations show that such is not the case among the indigenous horses, since the breast, chestwall and abdomen were found to be the commonest seats of the disease process. This undoubtedly suggests the possibility that the most common mode of infection among "calesa" and "carretela" horses is via the harness, since it is common practice with horse owners to use a single harness for every two or more animals.

Observations by Bridre, Negre, Troutte and Velu (all cited by Hutyra and Marek), are also given hereunder for the purpose of comparison.

Out of 365 cases, Bridre et al found that the extremities were involved 304 times; the rump, 42 times; head and neck, 17 times; and generalized cases, 2. Velu, out of 300 cases observed the involvement of the extremities, 58 times; rump, 177 times; head and neck, 57 times; and genital organs, 8 times.

It will be noted in Table V that the writer's observations show the following differences: Out of 504 cases, which number is very much greater than that used by either Bridre and co-workers or Velu, the breast and chestwall were involved 337 times; abdomen, 183 times. anterior limbs, 174 times; posterior limbs, 98 times; head and neck, 82 times; genital organs, 4 times; group, 10 times; and generalized cases, 19. The occurrence of generalized cases among the indigenous horses is comparatively higher than that observed by Bridre. The refusal on the part of some owners to submit their animals for early treatment, the interference by the quacks, the inability of some owners to pay for veterinary services, and the naturally low body resistance of the indigenous horses to the infection due to poor nourishment, are some of the reasons which may account for this.

Moreover, further study of the same table will reveal that the left side of the body is decidedly more frequently affected than the right side. This may seem to be mere coincidence but the writer is inclined to believe that such is not the case. The caretaker or whoever puts the horse under harness usually approaches the animal on the left side, hence, the frequency of the primary seat of infection being on that side, can be probably explained.

Finally, on the basis of the writer's past experience in handling Epizootic lymphangitis cases, it has been observed that horses with lesions confined to the breast, chestwall and shoulder respond more satisfactorily to treatment than those whose lesions are found on the abdomen, inner side of the thigh and hock.

SUMMARY AND CONCLUSIONS

1. Studies and observations on Epizootic lymphangitis, the most common disease affecting native horses in the Philippines are reported in this paper.

2. Five hundred four (504) cases of Epizootic lymphangitis treated in the Veterinary Hospital, College of Veterinary Science, University of the Philippines, during the year 1937-1938 inclusive, are herein recorded.

3. Epizootic lymphangitis is very common among "calesa" and "carretela" horses in the City of Manila and nearby localities. The districts of Tondo, Sampaloc, Santa Cruz and Pandacan, Manila and the nearby towns of San Juan, Pasay and Caloocan, Rizal, showed the most number of cases.

4. The disease occurs throughout the year with no significant seasonal fluctuations in the number of cases unlike in temperate countries as observed by foreign workers.

5. Breed has nothing to do with the occurrence of the disease. All breeds of horses are susceptible. The fact that native horses are affected in great numbers is purely co-incidental since they constitute the main bulk of the horse population here.

6. Both sexes are equally affected. The preponderance of males being infected, however, is due to the fact that they represent the majority of the "calesa" and "carretela" animals commonly used.

7. Young as well as old animals suffer from the disease. However, horses ranging from 4 to 8 years old were found to be commonly affected.

8. Bay and gray represent the most common colors among the animals studied. The preponderance of these two colors in Epizootic lymphangitis cases is coincidental in as much as these colors are popular with most horse owners.

9. While size and the use of the animal exert no material influence on the occurrence of the disease, it has been found that "calesa" and "carretela" horses constitute the majority of the victims.

10. The most common seats of the lesions of Epizootic lymphangitis among native horses are the breast, chestwall, abdomen, anterior and posterior limbs and the neck. Less frequently involved are the back and loins, croup, head, mucosa and genital organs. The left side of the body is more frequently affected than the right.

11. There appears to be a greater percentage of generalized cases of Epizootic lymphangitis among native horses, about 3%, compared with some foreign observations.

ACKNOWLEDGMENT

The writer is greatly indebted to Dr. Angel K. Gomez, Dean of the College of Veterinary Science, University of the Philippines and Dr. Tomas T. David, Assistant Professor In-charge, Department of Veterinary Anatomy and Secretary of the same institution for going over this manuscript.

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MEDICAL SCIENCE AND THE LONGER LIFE:— BY ESMOND R. LONG. During the last 50 years preventive medicine grew as rapidly as did curative medicine. Much of it was mediated through sanitary engineering and veterinary science. The filtration and chlorination of water, the pasteurization of milk, and the inspection and proper handling of meat and other food products enormously reduced the incidence of typhoid fever and food poisoning eliminated the hazard of bovine tuberculosis in children, and went far to prevent the milk borne diseases, brucellosis and septic sore throat. Veterinary medicine eradicated or brought under control. Texas fever and foot and mouth disease in cattle, hog cholera in swine and glanders in horses outstanding achievements in the livestock industry.

"Science - March 26, 1948"

TABLE I

Showing the distribution of Epizootic lymphangitis cases in Manila and its environs, treated in the Veterinary Hospital, College of Veterinary Science, University of the Philippines. (1937-1938)

Locality (Manila)	No. of Cases	Locality (Rizal)	No. of Cases
Tondo	105	San Juan	40
Sampaloc	93	Pasay	33
Santa Cruz	62	Caloocan	23
Pandacan	59	Parafiaque	15
Singalong	16	San Pedro Makati	10
Santa Ana	7	Navotas	7
Santa Mesa	4	Camp Murphy	1
Paco	4	Pasig	1
Intramuros	1	Mandaluyong	1
Malate	1	No address	19
Polo, Bulacan	1	TOTAL	504
Malolos, Bulacan	1		

Total Number of Cases Treated in the Hospital irrespective of the Disease 997

TABLE II

Showing the monthly number of cases of Epizootic lymphangitis treated in the Veterinary Hospital, College of Veterinary Science, University of the Philippines. (1937-1938)

Month	No. of Cases	Month	No. of Cases
1937		1937	
March	23	October	32
April	42	November	33
May	27	December	29
June	44	1938	
July	42	January	55
August	44	February	30
September	35	March	35
		April	33
Monthly Average	36	Daily Average	1.2
Total Number of Cases = 504			

TABLE III

Showing the Breed, Sex, Age Color, Height, Etc., of 504 Epizootic lymphangitis horses

I BREED					II SEX				
Breed	Native	Grade	Thorough bred	Arabian	Sex	Male	Female	Gelding	Undetermined
No. of Horses	478	22	3	1	No. of Horses	407	91	1	5

III USE OF THE ANIMAL					
Use of the Animal	Calesa or Carretela	Race	Breeding	Cavalry	Undetermined
No. of Horses	475	12	5	1	11

IV AGE										
Age in Years	1.5	2.0	2.5	3.0	3.5	4.0	5.0	5.5	6.0	6.5
No. of Horses	2	5	5	7	3	40	78	7	98	11
Age in Years	7.0	7.5	8.0	9.0	10.0	11.0	12.0	13.0	20.0	Undetermined
No. of Horses	96	1	48	18	14	2	6	2	1	60

V COLOR							
Color	Albino	Bay	Black	Brown	Buckskin	Chestnut	Cream
No. of Horses	2	192	11	17	4	39	35
Color	Dun	Gray	Piebald	Roan	Skewbald	Sorrell	Undetermined
No. of Horses	17	111	1	48	9	2	16

VI HEIGHT										
Height (inches)	33.0	34.0	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0
No. of Horses	1	1	4	1	8	6	18	3	21	11
Height (inches)	44.0	45.0	45.5	46.0	47.0	47.5	48.0	49.0	49.5	50.0
No. of Horses	32	42	3	80	81	2	78	45	3	11
Height (inches)	51.0	51.5	52.0	53.0	54.0	56.0	57.0	61.0	62.0	Undetermined
No. of Horses	6	1	10	2	1	1	1	2	2	27

TABLE IV
Showing the frequency of involvement of the different regions of the animal body in 504 cases of Epizootic lymphangitis. Figures indicate the number of times each region is affected.

Generalized	Head	Neck	Chest	Anterior limb	Posterior limb	Abdomen	Back	Genitals	Region unspecified
Cases 19	Muzzle 3	Left Side 22	Left Side 198	Left Shoulder 55	Left Thigh 20	Left Side 105	Withers 2	Prepuce 2	Cases 15
	Apple of lips 4	Right Side 12	Right Side 74	Right Shoulder 32	Right Thigh 16	Right Side 48	Back 16	Penis 1	
	Upper lip 2	Ventral 1	Side unspecified 38	Shoulder 21	Thigh 11	Side unspecified 30	Loins 3	Mammary gland 1	
	Nostrils 4	Dorsal 1	Breast 67	Shoulder joint 2	Hip 2		Group 10		
	Nasal cavity 2	Side unspecified 17		Arm 11	Stifle 2				
	Face 10			Fore arm 23	Leg 12				
	Ears 2			Knee 1	Hock 4				
	Submaxillary region 2			Manus 2	Pes 2				
				Region unspecified 27	Region unspecified 29				
X 19	29	53	377	174	98	183	31	4	15

X Totals

TABLE V

Showing a comparative study of the frequency of involvement of the different regions of the horse's anatomy as observed by various workers.

Regions of the animal body involved in Epizootic lymphangitis	Bridre, Negre and Troutte	Velu	Solis
Head and Neck	17 times	57 times	82 times
Breast and Chest walls	—	—	377 times
Abdomen	—	—	183 times
Anterior limb	304 times	58 times	174 times
Posterior limb			98 times
Rump	42 times	177 times	10 times
Genitals	—	8 times	4 times
Generalized	3 cases	—	19 cases
Total number of cases used	365	300	504

CURE FOR SLEEPING SICKNESS

The British Biologist Dr. D. G. Davey, today announced the discovery of a new drug known as M. 7555, which has proved effective against sleeping sickness in tests on cattle.

Field tests of the drug which is cheap and easy to manufacture are expected to prove that it not only cures sleeping sickness but also gives immunity for at least six months—Final results of this are expected in August.

Dr. Davey's name is also associated with the discovery in 1945 of Plaudrine, a drug claimed to be a complete cure for malaria.

Khartoum,

(Reuter.) June 12,

TABLE VI

Showing the general distribution of the lesions in Epizootic lymphangitis as observed by different workers.

HUTYRA-MAREK	PALLIN	KELSER	UDALL	SOLIS
Most common in the extremities (especially fore-legs), back, withers and side of the thorax.	Eyes, muzzle, nose, face, lips, cheeks, submaxillary space, orbital process, and inside of the external ear.	Common in the legs, chestwall and neck.	Usual location is on the limbs (hind) in the vicinity of the hocks.	Most frequently observed in the breast, chest-wall, abdomen, anterior limbs and neck.
More rarely on the scrotum, mammary glands neck or head.	Neck Various parts	Less frequent in other parts of the body.	Lesions may appear anywhere in the body or limbs.	
Also on those parts frequently exposed to injuries.	Trunk Wither, shoulder, back, loins, chest, flank, croup, quarters, hips, tail, anus, vulva, perineum, scrotum and health.		Occasionally, ulcers or nodules may appear in the nasal mucosa.	Loss frequently in the back, loins, croup, mucosa and genital organs.
	Fore and Hind limbs Commonest (various parts). Mucous membrane of the nostrils, sinuses, pharynx, larynx and trachea.			

THE HISTORY OF THE CONTROL AND ERADICATION OF RINDERPEST IN THE PHILIPPINE ISLANDS*

By

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(ABSTRACT)

Rinderpest which is still prevalent in the Asiatic mainland had been successfully eradicated in the Philippine Islands, where it had gained a foothold after its introduction between the years 1882 and 1889 through the importation of cattle and water buffaloes from certain endemic places in the southeastern part of Asia. This highly virulent and infectious communicable disease of ruminants once threatened the flourishing livestock industry of the Philippines. Its outbreak in different islands of the archipelago was followed by very high mortality. The Philippine Government was so concerned with the great losses of livestock due to rinderpest, that for over a quarter of a century, millions of pesos were spent in the campaign for its control and eradication. Various methods were tried with varying results. The first was the glycerinated bile process of immunization tried by Koch in South Africa. As this soon proved to be impractical, it was substituted with the serum alone inoculation together with quarantine. By this method, the disease would disappear from one place, only to reappear in another. For a brief period, the classical method of slaughter of the sick animal was tried but it had to be stopped soon after it was practiced as the Filipino farmer could not bear to see his animals killed and would therefore, hide his animal in the mountains and thereby, bring the infection to the wild pigs and deer. These wild animals would come down at night and spread the disease to other distant places.

It was then, attempted to concentrate on the enforcement of strict quarantine sanitary measures in campaigns progressively covering entire provinces in the hope that the infection would die out when properly prevented from spreading. The Philippine Scouts of the United States Army and some Philippine Constabulary soldiers cooperated with the veterinarians and livestock inspectors of the then Bureau of Agriculture in these campaigns. At one time, there were detailed for this work 30 officers and 1,390 enlisted men belonging to 13 companies of the Philippine Scouts together with 6 officers and 147 enlisted men of the Philippine Constabulary. The veterinary force of the Bureau of Agriculture at that time consisted of 47 American veterinarians; 1 veterinary pathologist;

* Original article will be published in the *Journal of the American Veterinary Medical Association*.

1 veterinary entomologist; 56 American and 300 Filipino livestock inspectors. All animals in a territory were tied up for a 15-day period. During this time, a census of all cattle and carabaos was taken and the foci of infection were thus located. These infected places were quarantined by a sufficient force which was left behind while the rest of the force proceeded to other territories. At the same time, the importation of cattle was permitted subject to a 90-day quarantine of all animals coming from countries known to be infected. This plan was met with strong popular opposition culminating in the passage of an Act by the Philippine Legislature in 1913 transferring the control of rinderpest campaign from the Bureau of Agriculture to the provincial governors.

Since simultaneous inoculation gave lasting immunity, the next attempt to combat rinderpest was to establish immunizing stations beginning the year 1914. But as this method proved to be too expensive and slow to prevent the spread of the disease throughout the country, it had to be discontinued after several years of operation.

In 1909 the Philippine Legislature in founding the University of the Philippines provided for the establishment of a College of Veterinary Science as one of the first units of this University. It was hoped that following the example of many countries of Central Europe, the training of Filipino veterinarians was the only effective means by which the ravages of rinderpest and other infectious diseases of animals could be eradicated or at least, properly controlled. As graduates in veterinary medicine emerged from this institution and gradually replaced the American veterinarians in the field service of the Government, the antagonistic attitude of the people to the campaigns against rinderpest changed for the better and the final results fully justified the expectations.

About this time, a search for a vaccine was undertaken which culminated in the development of Boynton's (1923) wet tissue vaccine. This vaccine was improved by Kelser et al, (1928) and subsequently modified by Robles and Generoso (1934) in the form of a dried powder which could be carried to remote places without refrigeration. The incidence of rinderpest rapidly decreased with the extensive use of the vaccine until it finally disappeared for a period of three years before the Philippines was officially declared free from the disease in 1941.

THE HISTORY AND CONTROL OF AN OUTBREAK OF CONTAGIOUS ABORTION*

BY

CAPTAIN C. A. BUTLER, R.A.V.C.

Contagious abortion in cattle, a disease of world-wide distribution, occurs throughout India and sometimes assumes serious proportions on the military dairy farms. The outbreak reported in this article occurred on the Military Dairy Farm at Jubbulpore, C. P. The farm was established in about 1905 and it is known that cases of abortion were occurring as early as 1925. The herd at the time comprised about 600 animals, of which the majority were buffaloes.

From 1923 up to the outbreak of war little is known of the progress of the disease, but it is probable that the abortion rate remained low. The war time increase in the number of military personnel in the station, however, resulted in a much bigger demand for dairy produce and consequently a big increase in herd strength became necessary. This was brought about by the purchase of adult buffaloes and by 1944 the herd strength was approximately 300 cross-bred Friesian cattle and 1,500 buffaloes. Most of these purchased animals were susceptible to *brucella abortus* infection, a factor which was largely responsible for the rapid increase in the abortion rate from 1940 to 1945.

During the year 1st April, 1941 to 31st March 1942, there were nineteen cases of abortion, the majority of which proved positive to the agglutination test. Brigadier C. M. Stewart (then Lieutenant-Colonel, D. D. V. S., Southern Command) foresaw the possibility of a serious outbreak occurring and gave orders for the agglutination test to be carried out on the whole adult herd. The test was carried out in December 1941 to January 1942 with the following results:—

		Positive,	Negative,	Total,
Cows	...	47	147	194
Buffaloes	...	52	383	435

These figures show that the disease was well established in the herd at that time (1941—42).

As a result of this test, an attempt was made to control the outbreak by segregation of reactors, particularly at the time of calving, and the usual measures to prevent spread of infection. This, however, did not prove effective and the number of abortions continued to increase, as is shown in the table below:

*Journal of R. A. V. C., Vol. XVIII, No. 4.

	Abortions*	Normal Calvings.
1939-40 (from 1st April).	11	309
1940-41	7	350 (approx)
1941-42	19	366
1942-43	28	360
1943-44	86	758
1944-45	267	722
1945-46	243	798
1936 (1st April-30th Nov.)	47	573

*Includes all premature births.

It will be seen that the outbreak reached its peak in 1944-45, when the number of abortions constituted 27 per cent of the total number of calvings. The abortion rate continued high throughout 1945, the worst month being June, when there were 18 abortions against 21 normal calvings. This was followed by a steady decline in the percentage of abortions for the next few months. An increase was again observed in March, 1946 followed by a further decrease. From July up to the time of writing (December, 1946) the number of abortions was negligible in comparison with the figures for the previous two years. During the four months August to November, 1945, there were 120 abortions and 592 normal calvings, while in the same months of 1946 the figures were 13 and 452, respectively.

It will be realised that this high abortion rate involved a very great economic loss, since the majority of aborters did not come into milk or gave only a small quantity. In addition, abortion was frequently followed by metritis with temporary or permanent sterility. Cases of retention of placenta were also common, and in early 1945 were occurring at the rate of twenty-five to thirty per month.

The present very satisfactory position is ascribed to a combination of factors, the chief of which were:

1. In common with most outbreaks of disease, this outbreak reached a peak (1944-45) which was then followed by a natural decline in the number of new cases. This process was assisted by the decrease in herd strength which took place after the war. Under the orders of the Military Farms Department all uneconomical animals were disposed of. Several hundred animals, chiefly buffaloes, were weeded out on this farm, a large percentage of which had a history of abortion.

2. Strict measures were imposed to prevent spread of the disease. Animals which aborted or which showed signs of impending abortion were immediately removed from the herd and placed in isolation, as were all cases of metritis and retention of placenta. Standings where animals had aborted were thoroughly disinfected and fetuses were burnt.

Blood samples from all affected animals were taken three to four weeks after abortion and submitted to the Indian Military Veterinary Laboratory, Lahore, for the agglutination test. Full details for the past few years are not available, but out of 289 samples tested in 1944-45, 160 (55.5 per cent) were positive, 119 (41 per cent.) were negative and 10 (3.5 per cent.) were doubtful. In view of the large number found negative, the possibility of some other causal agent being present was considered. Trichomoniasis was suspected, but although many fresh specimens of uterine discharge from recent aborters, foetal stomach contents and discharge from metritis cases were examined microscopically, this organism was not found.

3. In the abortion lines, a special routine was laid down. All animals admitted were kept there for a minimum period of three weeks. At the end of this period rectal and vaginal examinations were carried out. If the uterus was then found to be normal and free from discharge, cows were returned to the main herd while buffaloes were retained for a further month and kept in a paddock separate from recent cases, with a bull used solely in this paddock.

4. Various authorities have observed that mineral deficiencies can either cause abortion or predispose to infection by *brucella abortus*. It was known that there was a deficiency of minerals in the fodder on this farm, since it was produced from land which was washed by more than 60 inches of rain per year and which was not treated in any way to replace minerals. The manager of the farm stated that he had previously seen good results in outbreaks of abortion following the administration of lime in the drinking water, and so, under his supervision, this was carried out daily from February 1946. 0.5 lb. of lime was added to each 100 gallons of drinking water. While it is not known to what extent this was responsible for the decrease in abortions, it is considered that it definitely helped to improve the position. In addition, the amount of green fodder fed during 1946 was considerably greater than in previous years.

5. As an experiment, vaccination with strain 19 was commenced in February, 1945. This was at first confined to buffaloes, but in December 1945, all cross-bred young stock over the age of 4 months were vaccinated.

In addition to buffalo and cross-bred young stock, a number of adult buffaloes were vaccinated. These included non-pregnant animals and a number in various stages of pregnancy up to eight months, making a total of approximately 550 vaccinated.

While it is beyond the scope of this article to give the full results of the experiment, the following points are of interest:

(i) In adult animals, vaccination did not appear to be of much value in preventing abortion, and, in fact, more abortions occurred among vaccinated animals than in the control groups.

(ii) Although a considerable number of pregnant buffaloes were vaccinated, there was only one case of abortion which could be directly ascribed to the reaction produced by the vaccine. This was from a group of 21 animals between five and eight months pregnant. Out of the remainder of this group, four aborted more than a month after inoculation, while sixteen calved normally.

Vaccination in early pregnancy did not appear to have any ill-effects even when, as occurred in a number of cases, it was carried out within a few days of service.

(iii) A fairly severe reaction was produced in animals in milk, causing a decrease in milk yield over a period of several days. A few buffaloes went completely dry and failed to come into milk again.

As a final note, the history of one particular animal is given below. As a general rule, cattle affected with brucellosis abort once or twice, subsequently calving normally. This was the usual sequence of events in the outbreak described above, but a few animals were persistent aborters, the most noteworthy in this respect being a cross-bred cow. She was born on the farm on 17th October 1933, and produced her first calf normally on 11th December, 1938. Her next pregnancy terminated in abortion at seven months on 1st January, 1940. During the following five and a half years she became pregnant six times and aborted on each occasion. Rectal examination on 26th January 1946, showed her to be pregnant again and this time she produced a normal calf on 22nd August, 1946. The most remarkable fact about this animal is that from her first abortion on 1st January, 1940, to 24th May, 1946, when she was dried off after the seventh abortion, she was continually in milk with the exception of four periods of thirty-one, twenty four, 136 and ninety days respectively *i. e.*, out of 2,336 days she was in milk for 2055 days, during which time she produced 32,318 lb. of milk.

SUMMARY

An account is given of an outbreak of contagious abortion which occurred at the Military Dairy Farm, Jubbulpore, C. P., and of the measures taken to deal with it, including vaccination with strain 19. The history of one interesting case of persistent abortion is described.

THE EFFECT OF STRAIN 19 ON FERTILITY*

BY

CAPTAIN C. A. BUTLER, R.A.V.C.

During the year 1945, vaccination with Strain 19 was commenced as an experiment at the Military Farm, Jubbulpore, India, C. P. where an outbreak of contagious abortion has been in existence for several years. The majority of the animals vaccinated were buffaloes, including all the young stock over the age of four months and also a considerable number of adults. The latter included non-pregnant animals and a number in various stages of pregnancy up to eight months.

In view of the fact that observers are of the opinion that Strain 19 causes infertility, a careful examination of the records of these animals was made to determine whether their fertility was affected to any marked extent by the vaccine. The results obtained up to October, 1946, are given in the table on page 22.

It will be observed that, in general, the number of animals failing to conceive is less in the vaccinated groups than in the control groups, where there is little difference in the average time taken to become pregnant in the corresponding groups. This applies in all groups except the adults vaccinated on 28th February, 1945. In this case the vaccinated group included two animals which took fifty-nine and fifty-five weeks, respectively, after vaccination, before becoming pregnant, periods which are much greater than any in the control group. Both were served several times before becoming pregnant and it is considered that their temporary infertility was due to disease of the genitalia unconnected with vaccination.

The figures given in the table above suggest, therefore, that in buffaloes, vaccination with Strain 19 does not cause either temporary or permanent infertility. This view is supported particularly by the group vaccinated on 28th December, 1945, in which, of the sixty-six animals included under column 5, thirty-eight became pregnant within one month of vaccination, a further twenty within two months and the remainder within five months.

It will be seen that among the adult buffaloes, the average time between calving and subsequent conception varies very considerably in the various groups, those calving in the early months of the year (January—April) taking much longer to become pregnant than those calving in the later months (September—November). Over 70 per cent. of effective services normally take place during the period of October—January.

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1	2	3	4	5	6	7	8
Class of Stock	Date of Vaccination	(a) Vaccinated (b) Controls	Pregnant before Vaccination	(a) Pregnant after Vaccination (b) controls	(a) Average time between Vaccination date and Conception (b) ditto Controls	Non-pregnant Two or more Services One or no Service	Percentage Non-pregnant excluding Col. 4 from total vaccinated
Adult buffaloes, calved December, 1944-January, 1945	28-2-45 Controls	(a) 24 (b) 22	2 —	(a) 14 (b) 15	(a) 22 weeks (b) 17 weeks	3 2 5 5	36.4 31.8
Adult buffaloes, calved February-April, 1945	5-5-45 Controls	(a) 66 (b) 43	(a) 2 (b) 7	(a) 49 (b) 27	(a) 13-14 weeks (b) 15-16 weeks	1 2 14 7	23.4 25.0
Adult buffaloes, calved May-June, 1945	29-8-45	(a) 24	3	(a) 17	(a) 8 weeks	1 3	19.0
Adult buffaloes, calved September-November, 1945	28-12-45 Controls	(a) 169 (b) 39	(a) 67 (b) 14	(a) 66 (b) 20	(a) 5-6 weeks (b) 5 weeks	10 — 6 5	19.5 20.0

Class of Animal	Date of Vaccination	(a) Vaccinated (b) Controls	Average age at Vaccination	Pregnant after Vaccination	Average age at Conception	Non-pregnant up to 14-10-46	Percentage Non-pregnant
Buffalo, Young Stock	28-2-45 Controls	(a) 31 (b) 30	20 months 19 months	21 17	30 months 29 months	10 13	32.3 43.3

This is in marked contrast to the position in Britain, where animals calving in the spring become pregnant with much less delay than those which calve in the autumn (*Farm Animals — Their Breeding, Growth and Inheritance*, Hammond, 1940).

It would appear that this is an effort on the part of nature to produce the maximum number of calvings at the most suitable time of the year, which is, in India, the cooler months following the monsoon and, in Britain, the spring.

In addition to buffaloes, a number of cross-bred Friesian young stock were vaccinated on 28th December, 1945. These were all over the age of one year at the time of vaccination and are divided into two groups.

Group I: 1 to 2 years old at vaccination. Total 32.—Of these, thirteen were only a little over one year old at vaccination (average age was thirteen and a half months) and so have just reached maturity (January 1947). Several have recently been served and are likely to prove pregnant. Of the remaining nineteen, two were pregnant before vaccination, three are still not pregnant while fourteen became pregnant after vaccination. The average age at vaccination of these fourteen was eighteen months and at conception twenty-six months.

Group II: Over 2 years old at vaccination. Total 24.—Eleven of these were found to be pregnant at vaccination. Three more have so far failed to become pregnant although they are now (January, 1947) all over three years old. The remaining ten became pregnant after vaccination. Their average age was twenty-nine and a half months at vaccination and thirty-three months at conception.

Combining the two groups and excluding the thirteen from Group I, which are just reaching maturity, the total number which have failed to become pregnant after vaccination is six out of thirty or 20 per cent. This figure compares favourably with those for the buffalo young stock. Unfortunately no cross-bred controls were kept, and it is therefore not possible to give figures of vaccinated animals for comparison.

The conclusion reached as a result of this investigation was that vaccination with Strain 19 had caused little or no effect on the fertility of animals in this herd and that the number of cases of infertility which occurred among vaccinated animals was not higher than normal and could be ascribed to causes other than the vaccine.

APPLICATION OF WATER TO THE BODY SURFACE OF WATER BUFFALOES AND ITS EFFECT ON MILK YIELD *

By
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Imperial Veterinary Research Institute².

It is well-known that adequate heat dissipation is essential for the maintenance of a normal body temperature and for normal functioning of the organs. In cattle generally, heat dissipation begins to be difficult when air temperatures reach the 70-80°F. level. In conformity with this, water buffaloes, unlike most other domesticated animals, have developed the habit of bathing or wallowing. It has therefore become a practice to cool buffaloes, by permitting them to wallow once or twice daily in a tank or to splash their bodies with water from buckets. The effects of these practices on body temperatures have been reported in an earlier paper (Minett, 1947). This practice is said to be particularly necessary with females, but no exact enquiry to measure the effect of this splashing on the milk yield has been reported. To obtain some information on this matter, observations were made in the months of May and June, 1945, at the Military Farm, Bareilly, United Provinces. Since atmospheric and other conditions were more or less the same during this period, any abrupt deviations in milk yield may be more readily ascribed to the conditions imposed, viz, splashing or non-splashing.

MATERIAL AND EXPERIMENTAL METHODS

The procedure was to make four sets of observations over consecutive periods of 10 days each. In the first period, the normal routine of splashing was followed, except for certain minor alterations mentioned below as necessary to make the conditions more exact. In the second period splashing was omitted. In the third period the original group of animals was divided into two subgroups, one of which was given daily splashing and the other not, while in the fourth period all animals were brought back to the routine practice of splashing. For the experiment, 22 buffaloes, 8-10 years old, were selected, so as to obtain a group of animals as near as possible to their maximal yield, which is usually at about 90 days after calving. The average duration of lactation for the experimental group thus formed was at the outset 86.9 days. Unfortunately, for reasons stated below the records of all 22 animals could not be utilized.

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¹The authors are grateful to Col. G. E. Macguckin, Director of Military Farms, and to Mr. Har Swaroop Narad the Farm Manager at Bareilly for arranging facilities for this work. The statistical work was carried out by Mr. Suprakas Sen.

²Jatnagar, U. P., India.

No alteration was made in the animal's daily ration or routine during the four periods. They remained in open paddocks from 3:00 to 7:00 A.M. and 5:00 to 7:00 P.M., during which time they were allowed to drink at will, and at other times they were stalled. When splashing was carried out, this was done two hours before milking times, which were 11:00 A.M.

TABLE I
Environmental Conditions and Mean Daily Milk
Yields of water Buffaloes in Periods I and

Period I											
Date	Air temp. degrees F.		Relative humidity, percent		Rain-fall, inches	Temp. of splash water, degrees F.		Body temp. variation, degrees F.		Avg. milk yield, lbs.	
	Max.	Min.	A.M.	P.M.		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
May 1	103	71	40	13	0	80	82	-0.6	-0.4	6.78	6.77
2	105	77	43	13	0	81	84	-0.7	-0.7	6.87	6.95
3	106	73	24	5	0	83	85	-0.9	-0.7	6.68	6.95
4	106	75	24	5	0	84	86	-0.8	-0.7	7.28	7.23
5	106	72	23	6	0	85	86	-0.9	-1.0	7.09	7.32
6	108	77	25	13	0	84	86	-0.7	-0.8	7.17	6.97
7	109	82	29	11	0	82	84	-0.8	-0.7	7.22	6.83
8	109	79	23	9	0	82	84	-0.8	-0.8	6.57	6.28
9	108	83	24	6	0	83	86	-1.0	-0.9	6.63	6.83
10	107	75	27	9	0	83	85	-1.0	-0.7	7.18	7.05
Period II											
May 11	108	76	26	9	0			+0.1	-0.1	6.45	6.64
12	107	78	23	9	0			0.0	-0.1	6.58	6.21
13	108	78	24	13	0			0.0	-0.2	6.47	6.98
14	108	80	25	7	0			0.0	-0.2	6.32	6.70
15	108	78	41	21	0			-0.1	-0.1	6.62	6.30
16	101	79	46	27	0			+0.1	0.0	6.42	6.99
17	100	81	42	29	0			-0.1	-0.3	6.67	6.67
18	101	75	53	39	0			+0.1	-0.1	6.55	6.62
19	97	73	73	33	0.2			+0.1	-0.1	6.93	6.70
20	99	77	59	27	0			0.0	-0.2	6.64	6.53

* Minus sign indicates fall in temp., and plus sign indicates an increase.

and 11:00 P.M. Milk was weighed on a spring balance, records being taken in the presence of one author to the nearest two ounces. Air temperature and humidity figures were obtained from a meteorological station two miles from the farm.

During the first period all the buffaloes were splashed much as usual, viz, for 5 minutes morning and evening (between 9:00 and 10:45) by throwing water over their bodies with buckets. Body temperatures were recorded immediately before and one-half hour after splashing. The only

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TABLE 2.

*Environmental Conditions and Mean Daily Milk Yields of Water
Buffaloes in Period III
Environmental Conditions*

Date	Air temp., degrees F.		Relative humidity, percent		Rainfall, inches	Temp. of splash water, degrees F.*	
	Max.	Min.	A.M.	P.M.		A.M.	P.M.
May 21	103	78	47	28	0	81	84
22	105	81	29	17	0	82	83
23	106	83	38	7	0	80	81
25	108	74	16	11	0	82	84
26	111	84	23	17	0	83	84
27	109	85	23	8	0	82	84
28	110	82	45	16	0	80	82
29	106	78	42	26	0	82	83
30	102	82	59	18	0	81	82
31	104	76	45	23	0	82	84

Body Temperature Changes and Milk Yields

Date	Subgroup I (splashed)				Subgroup II (not splashed)			
	Body temp. variation, degrees F.		Avg. milk yield, lbs.		Body temp. variation, degrees F.		Avg. milk yield, lbs.	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
May 21	-0.8	-0.7	6.95	7.00	0.0	-0.1	5.95	6.50
22	-0.6	-0.7	7.07	7.07	-0.2	+0.1	6.11	6.64
23	-0.8	-0.8	7.07	7.00	0.0	-0.1	6.14	6.54
25	-0.4	-0.9	7.32	7.07	+0.1	-0.2	6.66	6.79
26	-0.5	-0.7	7.61	7.00	+0.1	-0.1	6.46	6.57
27	-0.5	-0.7	7.32	7.57	0.0	-0.1	6.71	6.64
28	-0.5	-0.7	7.50	7.57	+0.2	-0.1	6.50	6.50
29	-0.8	-0.5	7.50	7.43	+0.3	0.0	6.36	6.00
30	-0.7	-0.9	7.46	7.50	0.0	0.0	6.50	6.57
31	-0.7	-0.8	6.36	7.50	-0.1	-0.2	6.11	6.71

* Minus sign indicates fall in temp., and plus sign indicates increase rise.

deviation from the normal routine was that the duration of splashing was exactly 5 minutes and care was taken to wet their bodies thoroughly, even beneath the abdomen.

During the second period body wetting was omitted. Body temperatures, however, were taken twice daily at about the same times as during the first period, three recording being made on each occasion at half-hour intervals.

During the third period the 22 animals were divided into two subgroups of 11 each. Those in subgroup I were splashed for 5 minutes morning and evening, while animals of subgroup II were not splashed. Body temperatures of the first subgroup were recorded before and half-an-hour after splashing, in subgroup II three temperature recordings were taken at about the same times at half-hour intervals.

During the fourth period, all animals were splashed as usual. Unfortunately, the weather conditions at this period differed somewhat in that air temperatures were higher than before, and the hot spring wind, known as the loo, and characteristic of the plains of North India, had begun.

TABLE 3.

*Environmental Conditions and Mean Daily Milk Yields of Water
Buffaloes in Period IV*

Date	Air temp., degrees F.		Relative humidity, percent		Rainfall, inches	Temp. of splash water, degrees F.*		Body temp. variation, degrees F.*		Avg. milk yield, lbs.	
	Max.	Min.	A.M.	P.M.		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
June 1	103	83	35	16	0	83	85	-0.6	-0.8	6.61	6.50
2	106	81	36	17	0	82	83	-0.8	-0.8	6.37	6.60
3	108	84	26	13	0	82	84	-0.6	-0.8	6.52	6.43
4	109	81	27	13	0	80	82	-0.7	-0.7	6.22	6.50
5	111	89	22	10	0	82	84	-0.8	-0.7	6.27	6.53
6	113	90	33	15	0	83	84	-0.8	-0.7	6.72	6.38
7	112	86	60	18	0	82	86	-0.7	-0.7	6.45	6.77
8	108	84	49	18	0	83	82	-0.7	-0.7	6.40	6.63
9	110	81	51	7	0	83	86	-0.8	-0.7	6.27	6.27
10	112	81	39	12	0	84	86	-0.7	-0.6	6.18	6.63

* Minus sign indicates fall in temp., and plus sign indicates increase rise.

RESULTS

The mean daily milk yields of 15 animals are shown in tables 1 and A3. larger number would have been used had it not been for some gross irregularity in yield, due to temporary sickness such as tympanites, rendering certain animals unsuitable for experiment. The average duration of lactation of the group at the beginning of the four periods was as follows: Period I—86.6 days; period II—96.6 days; period III, subgroup I—105.6, and subgroup II—106.2 days; period IV—116.6 days. During the third period, 14 were used viz., 13 of the 15 used in period I, and one other. As stated, these 14 animals were divided into two subgroups, their average duration of lactation at this time being 105.6 and 106.2 days, respectively. The mean daily milk yields of these two subgroups in period III and of the same animals during the other three periods are shown in figure 1. which

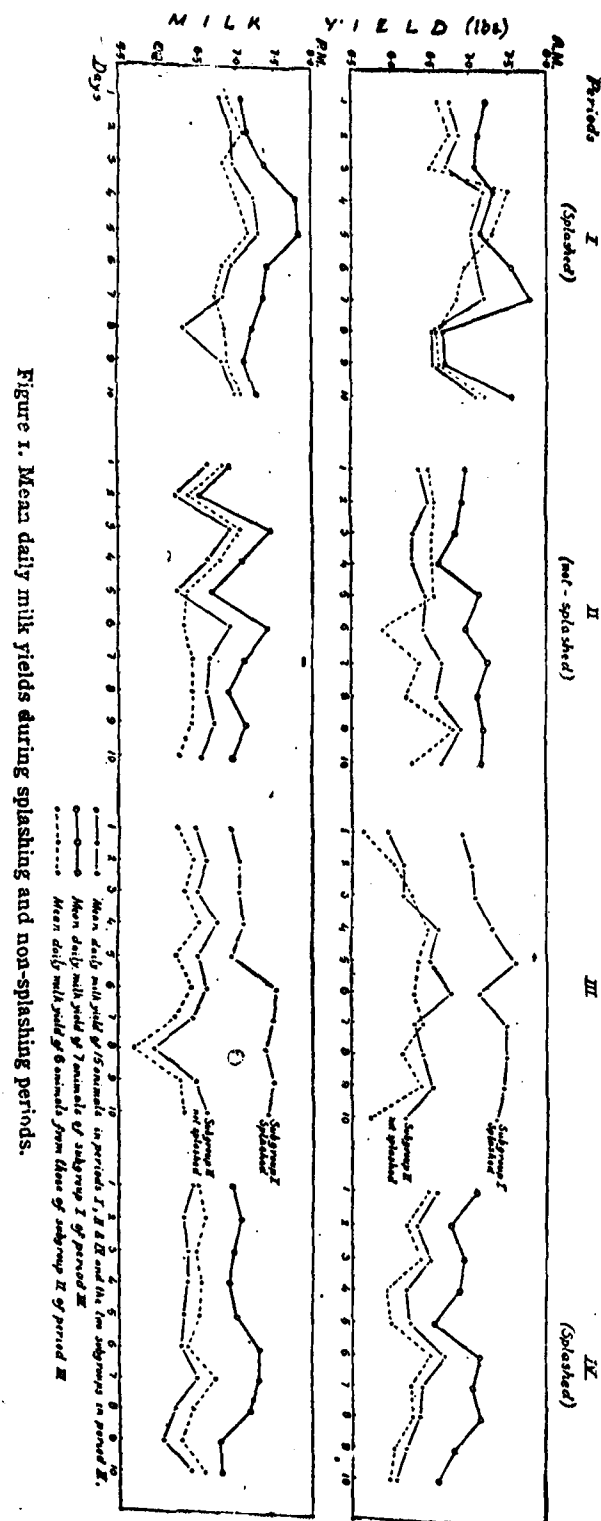


Figure 1. Mean daily milk yields during splashing and non-splashing periods.

TABLE 4
Differences in Mean milk Yields of Splashed and Unsplashed
Water Buffaloes

Com- parison	Groups Compared			No. of animals	Milk yield		Signifi- cance of differ- ence**
	Time	Period	Treatment		Mean for to-day period, lb.	Difference, lbs.	
1	A.M.	I II	Splashed Not splashed	15 15	6.95 ± 0.063* 6.56 ± 0.039	0.39 ± 0.074*	b.s
2	P.M.	I II	Splashed Not splashed	15 15	7.92 ± 0.054 6.63 ± 0.039	0.29 ± 0.75	h.s
3	A.M.	III II	Subgroup I, splashed- Not splashed	7 7	7.32 ± 0.051 7.04 ± 0.065	0.28 ± 0.083	h.s.
4	P.M.	III II	Subgroup I, splashed Not splashed	7 7	7.27 ± 0.053 7.02 ± 0.086	0.25 ± 0.101	s.
5	A.M.	III IV	Subgroup I, splashed Splashed	7 7	7.32 ± 0.051 6.94 ± 0.157	0.38 ± 0.165	s.
6	P.M.	III IV	Subgroup I, splashed Splashed	7 7	7.27 ± 0.053 7.03 ± 0.051	0.24 ± 0.074	h.s.
7	A.M.	IV III	Splashed Subgroup II, not splashed	6 6	6.21 ± 0.098 6.13 ± 0.104	0.08 ± 0.143	n.s.
8	P.M.	IV III	Splashed Subgroup II, not splashed	6 6	6.39 ± 0.067 6.29 ± 0.080	0.10 ± 0.104	n.s.

* In each comparison, the same animals were used in the two periods for which data are compared.

* Standard error.

** h.s.=highly significant.

s.=significant.

n.s.=not significant.

also shows the mean milk yields of the 15 animals originally selected. Statistical analyses are set out in table 4.

Behaviour of Animals in Different Periods:—During the period the extent of body cooling by splashing was 0.73°F. in half-an-hour as against 0.06°F. in one hour without splashing during the second period (table 1). The experimental animals in the latter half of the second period were perhaps in rather more favorable environmental conditions, as the air temperature fell a little, though this was off set by a rise in relative humidity. From table 1. however, it is seen that the daily mean milk yields during the

second period dropped significantly, that is during the time when the animals were not being splashed; further, the level of milk become irregular, this being more marked with the evening yield (figure 1). From comparisons 1, 2, 3 and 4 (table 4), it is seen that the milk yield level declined significantly when the animals were not splashed.

The extent of body cooling induced by splashing during the third period was 0.68°F . in half-an-hour (subgroup I), whereas it was 0.02°F . in one hour without splashing in subgroup II (table 2). During this period the mean daily milk yield of the splashed animals showed a tendency to rise, a trend not observed in the unsplashed animals (table 2). The evening milk yield of the unsplashed animals was also irregular during this period (figure 1).

During the fourth period the buffaloes showed a decline in yield. But the level during this period of extreme air temperature, when the animals were more advanced in lactation, is not unlike that of the second period when the air temperature was lower and the buffaloes were nearer the peak of their lactation (figure 1). Also, the irregularity seen during the periods of non-splashing was not marked during period IV.

SUMMARY

Observations were carried out on 15 milking buffaloes during the optimal period of their lactation, in order to ascertain whether any relationship exists between milk yield and cooling of the body by daily wetting of the body surface.

It has been shown that during the hot months body wetting is essential. When this is not practiced as a routine, the milk yield decreases and also becomes more irregular. Such differences are found to be statistically significant.

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Editorial

WE AND THE COUNTRY

We continue to be flooded with complaints about the wholly inexplicable way in which the Veterinary Profession is being ignored in the various developmental activities sponsored by the Government. Technological development is looming large, but, equally important, or even more than that, is the development of the Cattle. Wealth of the land, because, as is very well known, the prosperity of the rural side is closely linked up with the Livestock therein. We have time and again stressed in these pages the valuable part the veterinary profession can play in the Rural Development schemes, if only it is given a chance. But, unfortunately, our words have not appealed to the powers-that-be and we find that the Veterinary profession is hardly anywhere in the picture. There must be something wrong somewhere in this arrangement of things and we are anxious that the *profession* and the *Government* should take earnest efforts to fill up this lacuna without any further delay. Development of the countryside is an immediate necessity, if, at all, our land is to be made prosperous and be made self-sufficient in the matter of its food requirements. Agricultural improvement, about which so much is being talked about, is a practical impossibility without livestock development, but, we are afraid, this aspect is not receiving the consideration it deserves. As one of our correspondents has expressed "Agriculture is a fine combination of Animal Husbandry and Plant Husbandry: the two are so intimately dovetailed that the

development of the one without the other is a practicable impossibility. To attempt to do so is sheer folly and the results will neither be satisfactory nor sustaining". In fact, it is our firm conviction that the downfall of our agriculture has been greatly due to the past neglect of livestock and Veterinary profession. And, therefore, the Government should see that, in all agricultural and developmental schemes, the Veterinarian is given his proper place and assured of all facilities for work. For example, large irrigation schemes are being launched for the expansion of agriculture, but we do not see therein any provision for livestock work. Apparently, it is not realised that, in the same way as different soils react differently to irrigation, so also the animals that live on those soils. As such, it is highly necessary that a Veterinary team is made part and parcel of all these schemes and that it is given opportunities and facilities to observe and study the livestock sufficiently in advance of the changed conditions, so that it may closely watch the "change over" when the irrigation project is under way. Such an arrangement, such an agency, well equipped and mobilised, will be a guarantee for a smooth and easy transition without the travails of sudden and unobservant changes. Only then the various problems relating to the feeding and management of livestock will be easy of solution, and, only then, the cattle will constitute the wealth of the people reacting favourably to the soil-wealth of the country.

Again, we have seen, with bitter and great disappointment, the posting of non-veterinary men to be in charge of livestock work and we have also, with deep regret, heard it being explained away, in a most casual way, that such non-veterinary men have been handling livestock for some time, and that, therefore, there is not much harm done in such arrangements. Are we to pity explanations like these, or are we to pity the *power* behind such explanations? On that analogy, a gardener or a garden maistry can be posted as a Curator of government gardens, because, forsooth, he has been doing gardening work for a long time! Such acts of omission and commission are not in the general interests of the country and, naturally, they are causing anxiety to the Veterinary profession.

We, therefore, in all earnestness, appeal to the powers, in the centre as well as in the provinces, to give the Veterinary profession a chance to serve the country and the people - not to speak of the millions of dumb suffering animals - and contribute its share to the real progress of our dear motherland.

THE SURVIVAL OF THE UNFITTEST?

By

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Hospitals, more hospitals, and still more hospitals—this appears to be the slogan of the present day. In pursuance of this slogan, high-sounding clinics and medical institutions are opened periodically in different parts of the country and the sick and the ailing are assured of modern and ultra-modern treatment in these places. Added to these, drugs and medicines—spurious and real—are advertised very freely to the lay public in quite attractive styles as the panacea of all human ailments and, in consequence, home-doctoring goes on galore with all its attendant risks and evils. All these make one seriously ask as to what we are really aiming at. Are we aiming for the building up of a healthy, strong, virile nation, or, are we planning for the survival of the unfittest? It looks very much as though it is for the latter. Anyone interested in our problems and our country,—leave alone the doctors and nutritionists, economists and statisticians—will straight away say that the main problem of our country is want of adequate nourishing food. It was Dadabhoy Naoroji, if I remember right, who first disclosed decades ago, that the majority of Indians do not know what one real square meal is from year in to year out. Since then, matters have been steadily deteriorating and we have now reached a stage of what may be called perpetual famine. The food that is consumed by the people is not only deficient in quantity but also *poor in quality*. As the Famine Commission put it, 'the diet of the greater part of the population is unbalanced and does not provide in sufficient quantities the nutrients which are

necessary for health, or, in other words, does not contain enough protective food. Within this majority group, there is a considerable section, perhaps amounting to 30% of the whole population, which does not get enough to eat, i.e., is short of both energy yielding and protective foods'. Prof. Afzal Hussain put it more pointedly when he said "India is suffering and, in fact, has been suffering for some decades from a very acute famine of protective foods which has brought about physical decline and inefficiency, both in men and cattle, and, if not attended to immediately, may have serious consequences in an emergency". This unbalanced diet has led to malnutrition of a very high degree and this is reflected in the impaired physical development, ill-health and untimely death of the people. The Nutrition Advisory Committee expressed the effects of mal-nutrition in the following words:—"The general effects of mal-nutrition in lowering resistance to microbic and parasitic diseases must also be emphasised. Experience gained in times of famine amply demonstrates its importance. Attention is especially drawn to the association between mal-nutrition and tuberculosis, a disease which is daily increasing in prevalence. It is generally recognised that resistance to tubercular infection is decreased by diet deficiency". With these clear data before us, what should we do and how should we proceed? Treat the cause or the effect? Make arrangements for feeding the people better, or, make arrangements for treating medically the nutritionally deficient sick and ailing people? In other words, aim at survival of the fittest or the unfittest? Of course, it must be for the former. We want our people to be healthy, strong and virile. The first and foremost thing for this is the provision of adequate nourishing food, and that within easy reach of the people. Has the Government done anything in that direction? It is to be regretfully admitted, not much. Mere importations of foodstuffs at fabulous prices can, at best, afford only temporary relief. What about the permanent measures for increase of food production? The Grow More Food campaign that has been going on for the past few years has not been much of a success. That has been admitted by the Government itself. The reasons for this failure of the campaign have been explained in many

ways. But, in the ultimate analysis, it will be found that the cause is due to the wrong approach to the whole question of food production. The Government is thinking all the time of an increase in cereals, and cereals alone, as though that was the only thing that counted. After all, the deficit in our requirements for rice is only under ten per cent; and this does not justify all the uproar that has been created about it. What about the deficit in the requirements of our very essential protective foods, like cow's milk, which is as much as 500%? No thought is bestowed to correct this huge deficit, although it has been well known that it is the protective foods like milk "that enable people to live in a state of physical and intellectual efficiency with an alert mind, bodily vigour and buoyant health". And, therefore, the slogan "Grow More Food" must give place to the slogan "Produce More Milk". If this is done, and if the stress is laid on the better feeding and management of livestock, then, the whole phase of the campaign will alter, and, in a short time, there will be a lot more of good nourishing food in the country. Firstly, better-fed cows will give more milk—in a good number of cases even up to 30 to 40%; secondly, better-fed cattle will help soil fertility by an increase in the farm yard manure, which is manure *par excellence*; and, thirdly, better-fed cattle will increase the motive-power behind the plough—all these will wipe out the small deficit in our cereal requirements in a very short time. Will the Government think of this aspect of the problem of our food supply?

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Clinical Articles

COCCIDIOSIS IN BUFFALO CALVES *

By

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Of all the diseases affecting the young buffalo calves of the Government Dairy of the Milk Supply Scheme at Cuttack, Coccidiosis is probably the second most important disease and is at times responsible for bringing about appreciable casualties, the first and most prevalent disease being ascaridosis. Since the inception of the Farm at Cuttack I have had great opportunities of treating buffalo calves suffering from coccidial dysentery.

In this article, I shall record my personal observations about the syndrome presented by affected animals and the efficacy of the remedial measures adopted in treating them.

At the onset it may be stated that although the members of the general *Isospora* and *Eimeria* are responsible for coccidiosis or coccidial dysentery as we call it, still, it is only the latter that is responsible for coccidiosis in buffalo calves.

Syndrome :—The affected calves were all young, their ages varying from 1 to 8 months. They go off-feed and off-rumination, and become dull and depressed. The faeces are foul smelling and are diarrhoeic. Often they are mixed with strings of mucus & blood clots, the latter being passed even separately along with the terminal portion of the faeces. There is tenesmus and the animal strains very much. It stands with arched back in a characteristic posture for a few minutes. There is constant grinding of teeth, which is very distinctive. Frequent straining and general inappetence make the animals weak and emaciated in a few days and if they are not attended to in time they succumb.

P. M. Lesions :—General anaemic condition of the carcass accompanied with varying degrees of congestion, ulceration and excoriation found scattered throughout the intestinal mucosa, are the most noteworthy features. In most of the cases the contents of the intestine, are semifluid, dark in colour, offensive in odour and often mixed with varying quantity of shreds of m.m. and streaks of blood clots. On microscopical examination the faecal samples reveal numerous oocysts of coccidia.

* Read at the 3rd Annual General Meeting of the Orissa Veterinary Association held on 23-2-48.

Treatment :—I. Smythe mixture (Pulv-Catechu, dr. 2; Pulv. asafoetidae, dr. 1; Tinct. Opii, dr. 2; Creosote. dr. 1; Rice gruel 10 oz; 4 oz. of this mixture is given to each calf per day) was administered to each calf twice daily for a period of 3 to 6 days. During the course of treatment some of the treated calves showed complications e.g. constipation, impaction, etc., in consequence of which the medication had to be discontinued. The calves were allowed to take sufficient milk to keep up their strength. But, then, the excess intake of milk and the weak digestion of the animals, instead of doing any good affected them adversely. Out of 7 calves treated with this mixture, 3 died (one died of other cause) and 4 recovered giving a mortality percentage of 28 (from coccidiosis alone.)

Smythe mixture does not appear to have either coccidiostatic or coccidiocidal effect in coccidial infection in buffalo calves.

II. A. Sulfaguanidine (M & B) was given at the dosage of 0.05 to 0.1 gm. per kilo body weight dissolved in water, thrice daily for a period of 6 to 9 days till diarrhoea stopped.

B. A second lot of calves received sulfa-guanidine with, in addition, pelonin 150 m.gms, Sodibicarb 45 grs. and Dextrosol 75 grs. divided into 3 doses & given one dose three times a day. The dose of sulfaguanidine was given in the same manner as in 'A' e.g. 0.05 to 0.1 gm. per kilo body wt. These calves also received intravenous injections of Cal. gluconate (20 to 30 c.c. of 10% sol.) and glucose (40 to 50 c.c. of 25% sol.) for six to nine days according to severity of infection.

Out of 11 calves treated with sulfaguanidine 2 died and rest recovered giving a mortality per centage of 18. This low rate in mortality is probably due to enough caution taken in adding pelonin to their daily dosage of sulfaguanidine & intravenous injections of Cal. gluconate & glucose to keep up their vitality.

III. Sulfamezathine, a proprietary product of Imperial Chemical Pharmaceuticals, Ltd., was given in the manner detailed below.

Each calf received 4 to 5 gms. sulfamezathine, 150 m.gms. pelonin, 45 grs. sodi bicarb, 75 grs. glucose divided into 3 doses and each dose given every 4 hours on the first day. Sulfamezathine was given at the rate of 12½ gms. per hundred kilo body wt. For each of the subsequent days the dosage rate was halved. The treatment was continued for 4 to 6 days. The calves also received Cal. gluconate & glucose injections during the course of treatment.

All six calves treated with sulfamezathine recovered within 4 to 6 days. Sulfamezathine seems to have the best curative effect and appears to be the drug of choice in coccidiosis in buffalo calves.

DISCUSSION

Three medicaments, which are said to have some degree of anti-coccidial value, were used by me & they varied in their effects as follows.

/ Smythe mixture did not prove effective. Where the general condition of the calf is not good it gives fairly, if not all, other complications like impaction, constipation, etc & the cases end fatally. It is however, effective in relieving straining and resulting discomfort.

Sulfaguanidine has practically little effect in checking infection in advanced cases. In the initial stages of the disease, it does good in some cases, but it must be continued like all sulfa preparations, even after an apparent cure. Cessation of diarrhoea should not be taken as an indication of cure. The faecal examination must be negative.

Sulfaguanidine when given in combination with pelonin gives better result than when given alone.

Sulfamezathine gave cent percent recovery in affected cases. It is evidently effective in checking infection even after the onset of diarrhoeic stage and when the faeces are mixed with blood clots. It seems it is coccidioidal in its effect, bringing a cure in about 4 to 6 days. Complete absence of oocysts is noticed on examination of faecal samples of affected animals after the course of treatment.

The disadvantage is its cost which is too expensive for wide spread use in private stock.

At present we are using sulfamezathine in all cases of coccidial infection in Government Dairy calves irrespective of their age & gravity of infection with very good result.

ACKNOWLEDGMENT

The writer wishes to express his gratitude to Mr. G. B. Singh, the Director; Mr. P. S. Kuppuswami, the Deputy Director, and to Mr. B. Das, Poultry Investigation Officer for the advice received from them and the medicines (Sulfaguanidine and Sulfamezathine) supplied to him in the treatment of these cases.

SULPHAGUANIDINE IN CANINE COCCIDIOSIS

By

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Cases of chronic diarrhoea in dogs are often due to coccidial infections and these cases have responded well to treatment with Sulphaguanidine. The following few cases may be found interesting.—

Pomeranians and Pokes weighing approximately 4 to 6 lbs. were given 0.75 gms in the course of a day at 8 hour interval and in three doses. Treatment was continued for four days. Thereafter, examination of the faeces was negative for coccidia. This line of treatment was successfully adopted for six Pomeranians and a Peke.

Two Afghan Hounds and two Alsations weighing about 40 to 45 lbs were given 2 gms per dose at 8 hour interval and this was repeated for seven days. Faeces were negative for coccidia after this period.

Three King Charles Spaniels weighing 15 lbs. each were given 1 gm. during the course of the day divided in three equal doses and given at 8 hour intervals. The treatment was continued for five days. There was complete recovery after this period.

Throughout the course of treatment, adequate fluid intake was always maintained by adding glucose D and Dextrosol to the drinking water. Toxic effects such as nausea, emesis, and urticaria which are generally recorded in prolonged Sulphanilamide therapy have not been observed in these cases.

The author is very much indebted to Mr. R. L. Kaushal L.V.P., Officer-in-charge, Biological Products, for microscopical examination and to Lieut. Col. Dr. H. K. Mehera, M.R.C.V.S. (Lond.) for his valuable advice from time to time during the treatment of these cases.

PENICILLIN IN BOVINE MASTITIS

BY

R. B. SARMA, G.M.V.C.,

Veterinary Assistant Surgeon, Dharmapuri.

Subject :—A local-bred cow, good milker for its breed.

History and symptoms :—The owner purchased the cow with its third calf last year (1947). She was yielding about 12 pounds of milk per diem. A few days after purchase, the right fore quarter was found inflamed and, with the application of fomentation and embrocation, the affection was cured in a few days time. Now, after the fourth calving, for the first two days only the calf was allowed to suckle and no attempt was made to strip the udder completely. On the third day of calving, the left fore quarter was found inflamed and the teat occluded. As usual, the malady was attributed to evil eyes and the milk man was sent for. He treated it by introducing the stalk of a neem leaf into the teat canal to remove the occlusion. On the next day, the milk man found blood and pus coming out of the quarter when stripped. On the 5th day, I was called in. I found the left fore quarter inflamed and when stripped, pus tinged with blood, was obtained. The animal was otherwise normal with no systemic disturbance.

Treatment :—The normal quarters were first milked. Then the affected quarter was completely stripped of its contents. 10 c.c. of Penicillin solution containing one lakh of units was injected into the udder through the teat under aseptic conditions and the quarter well massaged.

After 24 hours, when the quarter was stripped, thin milk was drawn and there was no trace of blood or pus. The quarter was again emptied and another 10 c.c. solution of Penicillin containing 100,000 units was injected through the teat and the quarter well massaged. No other treatment was adopted and quarter became normal in three days time.

This single case I treated with Penicillin has given me very encouraging results and the owner reports that the cow is yielding the usual quantity of milk.

My thanks are due to Sri V. Venkataraman, G.M.V.C., District Veterinary Officer, Salem, for helpful suggestions in treating this case.

MIXED PROTOZOAL INFECTION IN A CALF

BY

A. NARAYANAN, G.M.V.C.,

Veterinary Assistant Surgeon, Srivalliputtur.

The subject of this case was a young non-descript red bull calf, aged only two months. It was brought to the hospital on 10—8—46 with the history that it had gone off feed quite suddenly since that morning and that it was quite dull and depressed. Examination revealed that the temperature was 105.4° and that the pulse and respiration was accelerated. The urine was high coloured and the bowels were costive. Blood smears were taken for examination and, in the meanwhile, a dose of Lugol's Solution (in 3 c.c. Aqua Distillata) was given intravenously followed by febrifuge mixture. The temperature gradually came down to 102°F but the colour of the urine remained unaltered. There was also no appreciable improvement in the general condition. A dose of Alum and Boric acid was given after the first two days of treatment but this also had no effect on the colour of the urine. The result of the blood examination was received only a week after and it revealed a mixed protozoal infection of *Theileria* species and *Trypanosoma*. Immediately a dose of Antimony Tartaratum $\frac{1}{2}$ grain in 15 c.c. of Aqua distillata was given intravenously and the calf put on a course of Pulv. chiretta and Sodii Bicarb. The trypanosomes disappeared after the single injection of Antimonium Tartaratum but the *Theileria* persisted for a long time. Weekly injections of Lugol's Solution 61% solution of Acriflavine 10 c.c. and internal administration of Pulv. Chiretta for varying periods did not seem to have an immediate effect on the *Theileria* but they finally disappeared after four months. Periodical examinations of the blood from 10—1—47 to 7—6—47 were all negative. The calf has since grown well and is lively and active.

ACETONEMIA IN CATTLE

BY

B. M. LAHIRI,

Agricultural College, Bihar, Sabour, Bhagalpur.

Acetonemia, also known as post-parturient dyspepsia, is a non-infectious disease affecting dairy cattle from five days to six weeks or longer after parturition.

The ailment usually occurs in high-producing, well-nourished animals and manifests itself by a low blood sugar level and high ketosis without even clinical symptoms at times. This is probably the reason why it has apparently escaped the notice of the Veterinary practitioners of this country.

It is characterised by digestive troubles, loss of condition, decreased milk yield and a high concentration of acetonic bodies in the blood and urine. The cause of the disease are said to be as follows :—

1. The carbo hydrate intake is insufficient or the glycogen stores in the liver is not released into the blood or the carbo hydrates in the diet are not utilised to a normal degree.
2. Because carbo hydrates are not available in sufficient quantities increasing quantities of fats are used but not completely oxidized.
3. The incomplete oxidation of fats results in the production of toxic oxidation products or ketone substances—B oxy Butyric acid, aceto-acetic or diacetic acid and acetone—and their accumulation in the blood and tissues producing a condition known as ketosis.
4. This further results in the lowering of the alkali reserves in the system, a disturbance of gas transport and of the regulation of PH of the blood and the exhibition of associated symptoms.

In mild cases of the disease, the attack may come on gradually or the onset may be sudden and severe in nature accompanied by rapid loss of condition and total loss of appetite. The affected animal may stand with its back arched, eyes half closed and disinclined to move. In severe cases there may be muscular twitching, convulsions and incoordination of movements. The animal may remain recumbent due to its inability to lift the hind quarters. Pulse and temperature are usually normal and respirations are either quick and shallow, or deep and abdominal in type. Rumination will be slow and irregular or totally suspended; bowels are constipated, the faeces being dry, dark in colour and covered with thick, tenacious mucus. The odour of acetone is evident in the breath, milk and skin.

Diagnosis is based on the examination of urine for the presence of acetone bodies. The best is known as Rothera's test. It consists of saturating 5 c.c. of urine in a test-tube with crystals of Amm. Sulphate, then adding 2 or 3 drops of a 1% solution of Sodium Nitro-Prusside and mixing and finally super-imposing it with 1 or 2 c.c. of a strong solution of Ammonia by gently trickling it down the side of the test-tube. The appearance of a purple or Potassium at the junction of the two fluids in 5 to 10 minutes will indicate the presence of acetone.

Treatment :—Best results can be achieved by injecting intravenously 500 c.c. of a 20% dextrose solution and repeating it if necessary until recovery occurs. Another alternative and an almost empirical remedy is to give Chloral Hydras by mouth in usual doses, 4 such doses given in 72 hours have brought about complete recovery though even a single dose has been found effective in some cases. Carbohydrate intake should be encouraged and treacle or molasses should be fed to the animal in large quantities.

The following case reports may be interesting :—

Case No 1:—A heavy milking grey, Taylor breed cow, in good condition, suddenly fell ill on the seventh day after calving. When examined, she was found lying prostrate on the ground in a semicomatose condition with neck stretched, eyes shut, and tongue protruded. The breathing was stertorous, pulse 80, and temperature normal. The case was provisionally diagnosed for Milk Fever and the animal was treated with udder inflation. Calcium Gluconate was not resorted to as the owner was too poor to bear the cost of the same. The next day the animal was found lying on its chest, quite lively and taking interest in her calf and surroundings, but unable to lift her hind quarters. Udder inflation was repeated but no further improvement was noticed. It was therefore thought that the case was one of Milk Fever complicated with Acetonemia and the owner was consequently supplied with four doses of Chloral Hydras with instructions to administer the same four times, and an uneventful recovery of the case has been reported.

Case No. 2 :—A cross-bred cow in fair condition. She was carrying and was in the eighth month of pregnancy. One morning she was found unable to get up. When examined she was found lying on her chest eating grass and straw cheerfully. Her eyes were shining. She could not lift her hind quarters when made to get up, but there was response to pin pricks over the limbs and quarters. Taking it as a case of paraplegia of some unknown origin the animal was treated with a saline purge, hot fomentations, and the application of stimulating liniment. No improvement was noticed even after three days treatment was over. Acetonemia was therefore suspected. The case was treated with Chloral Hydras in 1 oz doses and 3 doses were administered. No further report about this case was received and the case is believed to have recovered completely.

Case No 3 :—A well nourished Montgomery cow giving 12 seers of milk suddenly went off-feed with total suppression of milk yield. She had given birth to a calf just two weeks previously to my examination and she had been treated for indigestion and catarrh for nearly six days with no improvement. Her pulse rate was 90, temperature 100.2°F. Her heart beats were strong and regular, the visible mucous membranes were slightly congested and there was a slight discharge from the nostrils. The animal was standing in a drowsy state with eyes shut and taking very little interest in her surroundings. The muscles of the hind quarters and thighs showed tremors. Her jaws were tightly closed making it difficult to examine the mouth. There was not much apparent loss of condition.

A tentative diagnosis of Acetonemia was made and Chloral Hydras in daily doses of 1-oz was prescribed. A liberal allowance of molasses and green grasses was also advised. The cow was found perfectly normal the next day and is reported to have yielded three seers of milk.

This milk-yield after a total suppression for over six days in the last case is highly gratifying and makes one feel that Chloral Hydras treatment can be considered as almost a specific in the treatment of Acetonemia.

REFERENCE

- Acetonemia in cattle—W. H. Vanderbilt, *Vet. Med.* Vol. 37, No. 11.
 .. —Sampson, Jesse, and L. E. Boley, *Vet. Med.* Vol. 37 No. 12.

MASTITIS : MASS TREATMENT TRIALS

BY

DR. A. W. STABLEFORTH.

Results of recent work point to mass treatment of the dairy herd premises and equipment as the simplest way to eliminate mastitis from a herd and to keep it free from further infection.

This was said by Dr. T. Dalling in a paper on bovine mastitis prepared for yesterday's meeting of the Farmers' Club. His address was in the nature of an introduction to one by Dr. A. W. Stableforth, who has been working on mastitis since the early 'thirties.

Dr. Dalling emphasized that in the treatment of mastitis there followed no immunity or resistance in the udder to further infections with the same micro-organism. The treated and cured cow was just as susceptible as ever she was to the infection.

The introduction of a new animal harbouring *Streptococcus agalactiae* was fatal to any scheme of control, for, following her introduction into the herd, it might be only a matter of time until the infection had spread throughout the herd.

Types of mastitis, other than that associated with *Streptococcus agalactiae* were also of considerable importance. Concerning some forms, our knowledge of control methods was either very meagre or entirely lacking. The troublesome "Summer Mastitis" in dry cows and in heifers had been the subject of much study and experimental work, but, up to date, there was little to recommend for its prevention. Research work, however, was being intensified, and doubtless in time the methods of control would be understood.

VARIOUS FACTORS

Bovine streptococcus mastitis and its control were dealt with in Dr. Stableforth's paper, in which he described non-bacterial factors, environmental factors, affecting the bacteria and treatment,

Attempts had been made, he said, to raise the resistance of the animals by vaccination, but the consensus of opinion at the present time was that vaccines were not of any material value.

Treatment in the herd might be carried out in three different ways.

One method Dr. Stableforth adopted in an experimental herd was to treat all cows, whether infected or not, and to take full disinfection measures. In the herd 13 out of 17 cows were infected.

"We used this very radical method because we wanted to make quite sure that all animals would be cured and infection completely removed from the premises. The method used was to treat every quarter of every cow on five successive days with 100,000 units of penicillin. Penicillin cream was used on hands and teats for 14 days.

"The cows were disinfected with hypochlorite solution on the morning of the fifth day, and then turned out whilst their premises were being finally cleaned and treated with coal-tar disinfectant. They received their final treatment at the afternoon milking of the fifth day, when clean udder cloths, milkers' clothes, etc., were provided. Before this was done, *Str. agalactiae* infection was present in 23 quarters, and it could be obtained at almost any time from the teats of most cows, from other parts of the cow's body, and from the various other places in the environment—referred to earlier.

"Numerous tests were made in subsequent weeks, but from the day when the last treatment was carried out and the cows and premises disinfected, *Str. agalactiae* could not be obtained either from the cows or any part of their environment. This method had been used purely for experimental purposes in the first place, but the result was so striking and immediate that it was decided to test it in 10 farm herds."

To summarize the work on these first 10 herds, seven out of the 10 herds were freed from *Str. agalactiae*—without any serious difficulty and had remained free for 15 to nine months. One herd was dropped because of lack of co-operation, two herds had given difficulty due to persistent infection outside of the udder, and in one of these a second crop of infection had occurred due to introduction of an untested infected cow.

HIGH COSTS

Whilst the result of whole herd treatment and disinfection had been highly satisfactory, costs were high. Further trials were already well under way to find whether similar results can be obtained with a

smaller number of injections, a smaller dose, or other modifications so as to bring the cost more within the reach of the average dairy farmer. Some 30 more herds had thus been dealt with.

It was early to give details, but the results fully supported those already referred to for the first 10 herds in showing that *Str. agalactiae* could be eradicated from 50 per cent of herds at once, and from 60 to 70 per cent without serious trouble. Eradication would probably be achieved in the remainder.

RECTIFYING POST-OPERATIVE SELF-MUTILATION (EVisCERATION) IN A BITCH*

By

W. FOULSTON, M.R.C.V.S., AND F.A. BYRNE, M.R.C.V.S.,
Salisbury.

The subject of this report was an eight-year-old crossbred bitch, upon which an ovaro-hysterectomy had been performed to relieve an open pyometra. The bitch made an uneventful recovery from this operation until the sutures were removed on the seventh day. An hour after the removal of the suture, the bitch was found in the kennel with a mass of small intestine, spleen and omentum ranging from the wound.

The bitch was anaesthetised with nembutal intravenously, three grains giving surgical anaesthesia (weight 30 lb. approx). When the mass of intestine was investigated it was found that the bitch had carried out a "resection" of the bowel, tearing it away from the mesentery, which was intact. The chewed ends of the intestine were trimmed off and an end to end anastomosis made. The bowel was dusted with thiazamide powder and returned to the abdomen, and the wound was closed with mattress sutures of synthetic silk-worm gut, through peritoneum, skin and muscle, with a final row of sutures through skin, subcutaneous tissue and abdominal fascia. The bitch was given 10 oz of glucose saline and 1 c.c. of penicillin (125,000 units) in oil.

The following morning she was found to have omitted and to have disgorged approximately five feet of small intestine. Glucose saline s/c was continued for three days and the penicillin for four days. She was allowed saline to drink from the second day onwards after operation, and food was allowed on the fourth day. The sutures were removed progressively on the ninth, tenth and eleventh days after the operation, and the bitch was discharged on the 13th day.

* *Veterinary Record*, Vol. 60 No. 18.

This case is reported because although evisceration is not a very rare accident, recovery from extensive self-mutilation such as this is uncommon.

We wish to thank Mr. J. B. White for permission to publish this communication.

Association News

THE MADRAS VETERINARY ASSOCIATION

The members of the Association will be glad to learn that the Government have recognised this Association as the representative body of the Veterinary Profession in the Madras Presidency.

The Provincial Veterinary Conference which was to have taken place in December 1947 and which had to be unfortunately postponed on two occasions is now scheduled to take place in the third week of September 1948. Professional papers to be read at the Conference, and also any resolutions to be moved on the occasion, may be sent sufficiently early to the Secretary of the Conference, at the Madras Veterinary College.

On 27-6-48, the Association was "At Home" to Sri S.V. Mudaliar, on his promotion as Principal Madras Veterinary College.

Madras Veterinary College,
1st July, 1948.

M. R. SUBRAMANIA SASTRY,
Secretary.

College News

ASSAM VETERINARY COLLEGE

Synopsis of the Prospectus

Last date of Admission—5th July, 1948

Scholarships and several concessions for candidates of the Assam Province.

1. The Assam Veterinary College is a Government Institution. The Syllabus covers a period of Three Years. At the end of 3 years the Institute will hold an Examination, and will confer the Diploma to the successful candidates.

ADMISSION

2. Students are required to submit applications for admission into the College to the Director of Veterinary Department, Assam, Gauhati, on or before the 20th June, 1948. Each candidate for admission is required to produce the following particulars in their application for admission:—

- (1) Certificate of age,
- (2) Certificate of good moral,
- (3) Certificate of health from a Medical Practitioner,
- (4) Certificate showing that he has passed the Matriculation Examination of the Gauhati University or other Universities.

Preference will be given to candidates who have passed the I.Sc. Examination with Biology.

3. Students are required to present themselves for selection on the 28th June, 1948, and when selected, to join the College at Nowgong (Assam) on the 5th July, 1948. Candidates shall be between the ages of 17 and 22 years. Relaxation in age-limit may be considered by the Principal in some special cases. Five seats will be reserved for students from the neighbouring States of Assam, viz.—Manipur, Cooch Behar, etc.

COURSE OF STUDY

4. The collegiate year commences on the 5th July, 1948, and is divided as follows:—

The First-Term from 5th July to 30th September, 1948, short vacation from 1st October to 17th October, 1948.

The Second-Term from 18th October to January, 1948. The Third-Term from 19th January to 20th April, 1949.

Summer vacation—from 21st April to 30th June, 1948.

Teaching facilities exist at the College for about 30 students only.

STUDENTS' HOSTEL

5. A well-ventilated and decently furnished hostel provided with arrangements for boarding and lodging, etc., exists, and it is primarily meant for the students outside Nowgong. A Medical Practitioner inspects the Hostel once a week, and also attends students' individual cases whenever required. There is a good Medical Hospital nearby.

Nowgong, Assam,
25th June, 1948, }

CAPT. J. M. BUJARBARWA,
For Principal.

Extracts

CONCESSIONS TO INDIAN VETERINARY STUDENTS

It is understood the Royal College of Veterinary Surgeons, London, has agreed to grant certain concessions to Graduates and Licentiates of Indian Veterinary Schools who want to take the diploma of M.R.C.V.S. of that College.

Holders of Veterinary Degrees of the Universities of Agra, Bombay, Madras and Nagpur will be required to take the final examination plus one extra subject after a minimum of two years' attendance at an affiliated Veterinary School, but some schools may require a little longer than two years in order to fit in with their courses of instruction. Holders of the Diploma of Madras Veterinary College (G. M. V. C.) will be granted exemption from the first professional examination in the Diploma of M. R. C. V. S., if in possession of an Inter B. Sc.

Every application made for concessions will, however, be dealt with on the individual merits of the application.

The Royal College is also taking steps to have its Charters altered in such a way as to enable the Graduates of recognised universities to take their post-graduate diplomas which at the moment are reserved exclusively to persons who are members of the College.

When the Veterinary Surgeons Bill, which is now before Parliament, becomes law, there will be increased facilities for post-graduate education at various universities in the United Kingdom, and in addition two new Veterinary Schools will be created at Bristol and Cambridge which will help to alleviate the present difficult position regarding the obtaining of places at Veterinary Schools.

"HINDU" June 27, 1948.

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HUMAN ANTHRAX FROM ELEPHANT TUSKS. An unusual case reported from the United States [Seidemann, R. M., and Wheeler, K. M. (1947). J. Amer. Med. Ass. 135, 837], arose in a man of 59 who had been making piano keys from elephant tusks which he cut with an electric saw lubricated with water. The only cleansing to which the tusks were subjected was swabbing the cores with a long-handled sponge soaked in water. The illness began with a simple pimple on the face. Within three days the man became progressively ill with chills and fever and on the fourth day he became semi-comatose and was admitted to hospital. Blood smears revealed large Gram-positive encapsulated rods occurring singly and in long chains; Gram-positive rods were also found in a smear of oedematous material from the face lesion. Penicillin therapy was begun but the patient died five hours after admission to hospital. Necropsy confirmed that the cause of death was anthrax. Preliminary spot sampling of surface area of whole tusks for the presence of anthrax bacilli are found on suspected material. In this case the bacilli were subsequently isolated from the tusks and the method of obtaining the sample is worth recording. A double bucket was used, the side and bottom of the inner bucket being perforated. Samples of tusk scraps which had been sawn by the man before his illness were placed in the inner bucket under tap water and brushed. The washings were drained and poured into sterile jugs. In the laboratory the samples were centrifuged and the sediment taken up in about 50 ml. of sterile water. After guinea-pig inoculation a pure culture of *B. anthracis* was isolated. Some of the guinea-pigs died early from gas-gangrene infection. An attempt to isolate *B. anthracis* by culture without animal inoculation was unsuccessful.

The case illustrates the importance of considered anthrax in the differential diagnosis of cutaneous lesions in workers who handle elephant tusks. It appears that there is no known method of sterilisation which does not alter the physical qualities of the ivory.

'THE LANCET'

February 21, 1948.

Studies on The Blood of Dogs: The Blood Picture in Normal Dogs—

By M. R. EL HINDAWY, M.V.Sc. (CAIRO). *Vet. J. Vol. 104, No. 2.*

A study of the blood cytology of 74 normal dogs of different ages, breeds and sexes was undertaken to establish normal indices for dogs.

These normal dogs were selected from about 400 apparently healthy stray dogs and fed on diet fairly representative of the food ordinarily available to dogs in Egypt. The cases included puppies between 15 and 90 days, adolescents (young dogs) from 3 to 12 months, and animals over a year in age, the latter being considered adults. The weight ranged from 5 to 25 kg.

THE RED BLOOD CORPUSCLES

The data obtained demonstrated that the red blood cells increase in number per c.mm. from an average of 4,000,000 cells for puppies to an average of about 4,500,000 for adolescents, to an average of about 5,400,000 for adult males and 5,600,000 for adult females. This denotes:—

- (1) Puppies have a relatively low red cell count which increases from three months to puberty.
- (2) A slightly higher count then occurs after sexual maturity is reached in both sexes.
- (3) Considerable variations in the counts of dogs estimated at different times and among the dogs in a particular age group are not uncommon.
- (4) The general average count of the red blood cells is lower than that reported by most investigators, which may have been caused in part by the relatively poor state of nutrition of the dogs in our study.

HAEMOGLOBIN

The haemoglobin concentration was 50.5 per cent. (relative to a 100 per cent normal human standard) or 8.7 g. in 100 c.c. of blood for puppies, 48.4 per cent or 8.5 g. for young dogs, and 57 per cent. or 9.8 g for adults. The following observations emerged:—

- (1) There is a wide normal range and much variation also among individuals.
- (2) Within the first three months of life there is a physiologic decrease in the haemoglobin concentration.
- (3) The haemoglobin values then rise to the normal level, which is reached at about the sixth month.
- (4) The dogs examined had a lower average haemoglobin content in their blood than has been reported generally by other workers.

COLOUR INDEX

The points observed were:—

- (1) The "colour index" values were 0.61 in puppies, 0.54 in young dogs, and 0.51 in adult dogs.
- (2) The highest index was shown by puppies and the lowest by adult males.
- (3) The indices as a whole were only slightly higher than one-half the index recorded as normal for man.

RED CELL DIAMETER

The average was between 6.9 and 8.0 U. The diameter was larger in puppies than in adults.

RETICULOCYTES

There was no significant statistical difference between the two sexes. The mean average in puppies was higher than that of adults.

THE TOTAL LEUCOCYTE COUNT

- (1) The mean values per c. mm. were 8,123 for puppies, 10,446 for young dogs, and 12,762 for adult dogs.
- (2) No significant difference was found to exist between the two sexes.
- (3) The average found for puppies was strikingly low.

THE DIFFERENTIAL LEUCOCYTE COUNT

- (1) No significant difference was found to exist between the counts for the male and female groups.
- (2) The averages of the young and adult dogs agreed well with each other.
- (3) Puppies tended to have a larger proportion of lymphocytes and fewer polymorphonuclears than adults.

NEUTROPHILE GRANULOCYTES

Myelocytes were totally absent from the normal blood of dogs, juveniles were scanty; segmentation of the nucleus was not so pronounced as in man. The mean average percentage ranged between 55.9 and 69.32 per cent of the total leucocytes.

EOSINOPHILES

These were not so numerous as the neutrophils and lymphocytes. No great difference existed between the different groups. They averaged between 5.08 and 6.08 per cent. of the total leucocytes.

BASOPHILES

Considerable variation was noted, the average percentage being 30 per cent. for puppies, which is much higher than the average of 17.6 per cent. observed in the adults.

MANOCYTES

Our data are higher than those given by other investigators. The average found for puppies, young dogs, and adult males, which lay between 8.87 and 9.08 per cent., were lower than the average percentage found for adult females (11.8 per cent.).

SHILLING INDEX

Myelocytes were totally absent from the peripheral blood of dogs. Juveniles were between 0.2 and 1.45 per cent, stab forms between 5.45 and 7.19 per cent., and segmented cells between 47.65 and 62.3 per cent. of the total leucocytes.

PLATELETS

The platelet count was very variable in different individuals and even in the same individual, the average ranging between 223,000 and 270,000 per c.mm.



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