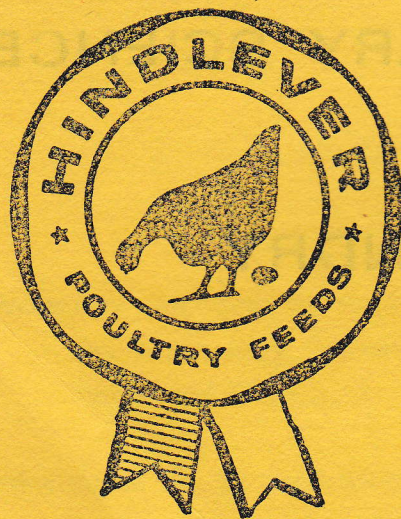


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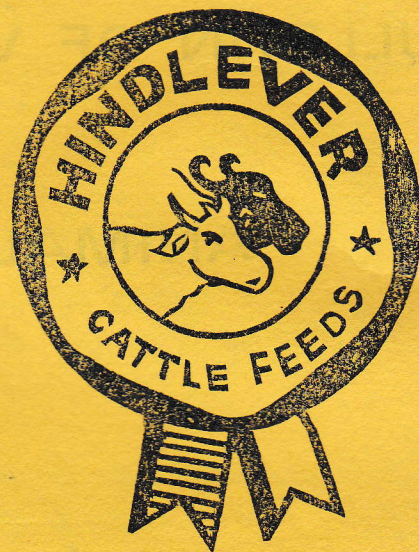
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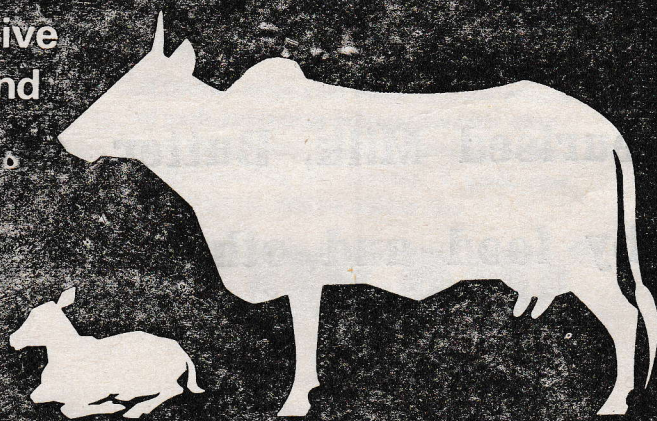
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Studies on diseases of domestic animals and birds in Nepal

III. Preliminary observations on the Prevalence of Tuberculosis, Para-Tuberculosis and Brucellosis at Livestock Farm, Pokhara.

D. D. Joshi, R. R. Shukla* and S. Pyakural

Central Veterinary Laboratory, Tripureswar, Kathmandu (Nepal).

Livestock Farm, Pokhara is situated in the sub-tropical zone of the lower mountain region and is two miles south of the existing Pokhara airpoort. It has 350 acres of land, out of which 74 acres have been so far cultivated. This farm has very poor water supply and is not sufficient for drinking purpose to the existing animals. This farm was established in the fiscal year 1961-1962 with the

collaboration of New Zealand Government and His Majesty's Government of Nepal (Shah, 1973). At present this farm has a total of 403 animals viz; 291 sheep, 46 goats, 39 buffaloes, 21 pigs and 6 bullocks.

According to the informations gathered from farm manager and from other staffs of the farm, the sheep and goats died during the 1972-73 revealed

* Adviser under Colombo Plan, Indian Cooperation Mission Kathmandu, Nepal.

symptoms like weakness, emaciation, diarrhoea, and loss of appetite. Although they had severe parasitic infestations in the beginning of the year, but after fecal examination and drenching against liverfluke and other nematodes and cestodes by the veterinarians and staffs of Parasite Control Project, Central Veterinary Laboratory, Kathmandu, the parasitic infestation was sufficiently lowered.

Mortality rate in local sheep and goats was 15-25% in F1 cross lambs (polworth × Kage sheep) 20-30% and in pure imported breeds of sheep and goats 10-15%.

The object of the present study was to conduct epizootiological studies on prevalence of different diseases at Livestock Farm, Pokhara. No systematic study had been made on the prevalence of diseases like tuberculosis, para-tuberculosis and brucellosis so far.

Materials and Methods :

Systematic survey of tuberculosis, par-tuberculosis (Johne's disease) and brucellosis was conducted in different animals of the farm.

Tuberculosis :

Fortyfive animals (39 buffaloes and 6 bullocks) were subjected to double

intradermal (DID) tuberculin test on the left side of the neck. Out of 45 animals, 27 were murrha buffaloes, 12 local hilly buffaloes and 6 local bullocks. Tuberculin (Heat Concentrated Synthetic medium - H. C. S. M) was supplied from Indian Veterinary Research Institute (IVRI), Izatnagar, U. P. (India).

Johne's disease (Para-tuberculosis):

Two hundred and twenty sheep Kage and Polworth Cross as well as Pure Polworth and three local goats were subjected to double intradermal (DID) Johnin test on the left side of the neck. Out of these animals 21 sheep and three goats were clinical cases of the disease which were weak, emaciated, having diarrhoea and poor appetite.

Brucellosis :

In all seventyseven blood samples were collected from sheep, goats and pigs, Out of which, 48 samples were of sheep, 28 samples of goats and one sample of pig (which was ailing) in this study.

All sera samples were subjected to plate and tube agglutination tests for brucellosis. Brucella abortus antigens coloured antigen for plate test and plain antigen for tube test were supplied from IVRI, Izatnagar, U. P. (India).

Results :

Tuberculosis: Details of the results of the tuberculin test are given in Table 1. It is apparent from the table that out of 39 buffaloes and 6 bullocks, 2 buffaloes and one bullock were found positive. They revealed severe oedematous reaction of gravitating nature. Besides, 7 buffaloes and one bullock exhibited mild oedematous and nodular swellings and they were suspected to be doubtful. No doubt number of animals tested were too less but it gives fairly good idea regarding the prevalence of tuberculosis in buffaloes and bullocks. Prevalence of this infection is 24.4% in the farm.

Para-tuberculosis: Details of the results of the Johnin testing are given in Table 2. Out of 224 sheep and goats tested, 15 sheep and one goat revealed severe reaction to Johnin. The thickness of the skin was many-folds more than normal. Besides, 4 sheep exhibited mild reaction and were declared as doubtful. In all 20 animals were found to be reactor to Johnin and this appears to be 9.0% of the total population of sheep and goats tested which is quite alarming.

Brucellosis: A total of 77 sera collected from different animals namely sheep, goats and pig, were subjected to

plate and tube agglutination tests for the presence of agglutinin against *Brucella*. Details of titre of the agglutinin are given in Table 3. It is evident from the table that 15 sheep and 3 goats had a significant titre of 1:20 and 9 of them had 1:40 in tube agglutination test. Four of the positive sera tested had 50% agglutination even at 1:80 dilution. On the contrary, 15 sera were found positive to plate agglutination test but did not give any reaction to plate agglutination test.

Discussion

During the present study, attempts were made to conduct systematic studies on the prevalence of three chronic diseases, namely tuberculosis, para-tuberculosis and brucellosis which pose a big problem to any organised farm both from veterinary and public health point of view. In case of tuberculosis and para-tuberculosis animals were subjected to DID test with tuberculin and Johnin respectively while in the case of brucellosis sero-agglutination tests were performed.

Buffaloes and cattle were subjected to only tuberculin test and criteria of declaring an animal reactor to tuberculin was based on local reaction. The animals which were exhibiting severe oedematous, gravitating and painful reactions were

declared positive while those which had reaction were declared or considered as doubtful.

Dhanda and Lall (1959) did extensive survey on different livestock farms of different parts of India in order to analyse the prevalence of tuberculosis and Johne's diseases in buffaloes, cattle, sheep and goats and they found that the incidence of tuberculosis and Johne's was very high in the areas where good breeds of animals were maintained and it was low where the animals were not of good breed. They also observed that the indigenous animals were less susceptible to generalised tuberculosis. Prasad and Shukla (1968) analysed allergic response in various groups of vaccinated and artificially infected animals using Johnin purified protein derivative (PPD) and avian PPD by intradermal and intravenous methods. They found that the intravenous allergic test with Johnin PPD and avian PPD gave better thermal response than Johnin which is prepared in heat concentrated synthetic medium (HCSM). Prasad and Shukla (1967) did comparative studies on allergic test and indirect bacterial haemagglutination test in diagnosis of Johne's disease. They advised the use of both the tests for the diagnosis of large number of infected cases. Guha and Sarkar (1970) studied the prevalence of tuberculosis in cattle in

Calcutta. They tested 46 clinical cases suspected for tuberculosis and 39 were found to be positive. Out of these 21 animals died, which in post-mortem examination revealed presence of various degrees of tuberculous lesions. They also conducted post-mortem examination on 224 animals out of which 64 had generalised tuberculosis. Shukla and Singh (1972) tried to correlate the findings of local reaction with post-mortem changes and indirect haemagglutination test and were of opinion that tuberculin test either gives doubtful reaction or no reaction in early as well as in advance cases of tuberculosis. During our studies on the other hand incidence of tuberculosis in buffaloes and cattle was found to be 24%. No doubt number of animals tested were too small as compared to the workers in India. In case of sheep, the incidence of Johne's disease was quite high 9% which appears to be alarming and requires suitable control measure.

Brucellosis is one of the most important zoonotic disease which is prevalent all over the world. Serological evidence of Brucella infection in different species of domesticated animals have been recorded by many workers in India. Polding (1948), Murthy (1962), Mathur (1964), Srinivasan (1968), Nandgoakar and Narayana Rao (1971) Sen et al (1972), Mathur

(1972) and Kulshrestha et al (1973) did a survey of Brucellosis among cows, buffaloes, goats, sheep and pigs of organised farms and villages of India. According to these survey almost all organised farms and villages all over India were infected with brucellosis.

In our study sera samples were mainly collected from the sheep, and were subjected to sero agglutination test. It was found that 9.0 % of sheep had significant, antibody titres against brucella antigen. Sen and Joshi (1968) reported that 4.0 % of goats (out of 193 goats tested) and 4.0 % sheep (out of 228 sheep sera tested) were found positive for brucella antibodies. On the contrary the incidence of brucellosis at Livestock Farm, Pokhara was found 23.3 % which is quite high. It requires adequate measures for the control of this infection.

Summary:

- 1) Systematic survey of tuberculosis,

par-tuberculosis and brucellosis were done at Livestock Farm, Pokhara.

- 2) Incidence of tuberculosis in buffaloes and cattle (45 tested) was 24.4%.
- 3) Incidence of Johne's disease in sheep and goats (224 tested) was 9.0 %.
- 4) Incidence of brucellosis in sheep and goats (76 tested) was 23.3%.

Acknowledgement:

Authors are thankful to Mr. Shri Gobind Shah, Farm Manager, Livestock Farm, Pokhara, and his staff for extending all facilities and co-operation. They also acknowledge the services rendered by Mr. U. B. Shah, Laboratory technician, Central Veterinary Laboratory, Tripureswar, Kathmandu. Second author is also grateful to Shri P. N. Kaul, Director, Indian Co-operation Mission, for his keen interest and encouragement.

Table No 1.

Animals showing reactions to tuberculin test

Species & their number	Original thickness of skin before DID test	Final skin thickness after DID test	Remarks
Murrha buffalo			
No. 64	9.5 mm.	20.8 mm.	++ Oedema
" No. 25	12.0 mm.	21.00 mm.	++ "
" No. 7	8.0 mm.	12.6 mm.	Nodule
" No. 23	12.0 mm.	22.0 mm.	Nodule
" No. 6	11.5 mm.	18.0 mm.	+ Oedema
" No. 70	10.0 mm.	18.00 mm.	Nodule
" No. 31	5.0 mm.	8.3 mm.	+ Mild Oedema
" No. 11	10.4 mm.	14.4 mm.	Nodule
Local buffalo			
No. 19	9.8 mm.	10.8 mm.	Nodule
Bullock	10.0 mm.	27.8 mm.	Nodule
"	7.4 mm.	32.00 mm.	++++ Odema

Table No. 2

Animals showing reactions to Johnin test

Species & their Number.	Original thickness of skin before DID test.	Final skin thickness after DID test.	Remarks
Sheep No. 271	1.8 mm	3.8 mm	+ Doubtful
" " 240	2.0 mm	8.0 mm	++
" " 259	2.3 mm	10.4 mm	++++ Oedema
" " 156	2.5 mm	9.0 mm	++
" " 137	2.4 mm	10.4 mm	++++ Oedema
" " 7	2.0 mm	6.4 mm	+ Doubtful
" " 37	2.4 mm	8.0 mm	++
" " 71	3.0 mm	10.4 mm	+++ Oedema
" " 83	2.4 mm	10.0 mm	+++ Oedema
" " 21	2.4 mm	8.4 mm	++
" " 45	2.0 mm	9.0 mm	++ Oedema
" " 51	2.0 mm	11.9 mm	+++ Oedema
" " 44	3.0 mm	6.0 mm	+ Doubtful
" " 229	3.0 mm	9.0 mm	++
" " 15	2.0 mm	8.0 mm	+ Doubtful
" " 39	3.0 mm	9.0 mm	++
" " 27	2.0 mm	9.8 mm	++
" " 14	2.9 mm	13.2 mm	++++ Oedema
" " 17	12.0 mm	12.0 mm	++++ Oedema
Goat No. 100	3.0 mm	8.0 mm	+++ Oedema

Table No. 3

Results of Plate and Tube Agglutination Tests against Brucellosis

Serum No.	Species	Plate Agglutination	Titre of Tube agglutination				Result	
			Dilution of serum					
			1:10	1:20	1:40	1:80	Result	
S/652	Sheep Kage	4+	P	4+	3+	3+	+	P
S/664	"	4+	P	4+	4+	3+	+	P
S/649	"	4+	P	4+	3+	3+	+	P
S/660	"	3+	P	3+	4+	2+	+	P
S/661	"	3+	P	4+	4+	3+	2+	P
S/677	"	2+	D	-	-	-	-	N
S/647	"	2+	D	4+	3+	+	-	P
S/669	"	2+	D	4+	3+	2+	+	P
S/665	"	2+	D	4+	4+	3+	+	P
S/670	"	2+	D	4+	3+	2+	2+	P
S/656	"	2+	D	4+	3+	2+	+	P
S/659	"	2+	D	4+	3+	2+	+	P
S/666	"	2+	D	4+	3+	2+	+	P
S/668	"	2+	D	4+	3+	2+	+	N
S/665	"	-	N	4+	3+	3+	2+	P
S/690	"	-	N	4+	2+	+	-	D
S/688	"	-	N	4+	2+	+	-	D
S/686	"	-	N	4+	2+	-	-	D
S/681	"	-	N	2+	2+	-	-	D
S/667	"	-	N	4+	4+	3+	+	P
S/645	"	-	N	4+	3+	2+	+	P
S/657	Local goat	2+	D	-	-	-	-	N
S/634	"	-	N	4+	4+	3+	2+	P
S/658	"	-	N	4+	4+	3+	-	P
S/631	"	-	N	4+	3+	2+	+	P
S/620	"	-	N	4+	2+	+	-	D

P=Positive; D=Doubtful; N=Negative.

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Studies on the diseases of domestic animals and birds in Nepal

VI. Observations on the epidemiology of an outbreak of foot & Mouth Disease at Government Livestock Farm, Khumaltar.

R. R. Shukla*, T. N. Vaidya, D. D. Joshi, S. Pyakural and K. N. Upadhyaya**

Central Veterinary Laboratory, Tripureshwar, Kathmandu

Although no systematic work has been done on the epizootiology of F.M.D in Nepal, this disease is widely prevalent and outbreaks are reported every year virtually on all the organised farms as well as in villages in different parts of the country. The gravity of this disease is very well known all over the world and in the countries where its prevalence is very high polyvalent F.M.D. vaccine is

used to minimise the losses. One can have vague idea about the prevalence of this disease in different parts of the country by going through the reports of different Veterinary hospitals. During the year 1970-71, out of 34 Veterinary hospitals, 31 hospitals reported outbreak of F.M.D. Similarly in the year 1971-72, outbreaks from 29 Veterinary hospitals were reported. Besides many outbreaks remain unreported.

* Adviser under Colombo Plan, Indian Co-operation Mission stationed at Central Vet. Laboratory, Tripureshwar, Kathmandu.

** Acting Manager, Government Livestock Farm, Khumaltar.

During the present study, the epidemiology of F.M.D. at Government Livestock Farm, Khumaltar is studied in details and its impact on the economy as well as on the development programme of Livestock is analysed. This farm is situated at the vicinity of Kathmandu at the height of 4000 feet. This Farm is maintaining pure jersey cattle, murrah buffaloes, goats, exotic swines and poultry. Animals were never vaccinated with F.M.D. and outbreak generally occurs every year. This farm is meant to produce good quality animals and to supply them to the farmers to help improve the breeds of indigenous animals in the country.

Outbreak of F.M.D. at Livestock Farm, Khumaltar:-

The early clinical syndromes were manifested in the goats by the end of July 1973. This farm has more than 100 goats of shanan, local and crossbreeds. The lesions were seen in the feet and mouth and animals showed high temperature ranging between 105°F - 106°. They became weak, emaciated and there was drop in the milk yield, but luckily there was no mortality. Morbidity rate was 100%. Only one goat did not exhibit thermal reaction. All animals recovered, after a period of 3 weeks.

Clinical manifestations in Jersey

Cattle & buffaloes :

After about 3 weeks of the recovery of goats, some of the jersey cattle revealed high temperature ranging from 105°F - 106°F on 27th August 1973. All the adults as well as young calves were affected. It continued till 6th October 1973. Reactions were very severe in young calves as compared to that of the adults. One jersey pregnant cow died, another had abortion, and four jersey calves died. Lesions in Foot and Mouth were very pronounced, and there was considerable loss in the milk yield too.

After about 10 days of the onset of the syndromes in cattle, buffaloes were also affected. However, manifestation in these animals was not so severe as compared to jersey cattle. There were mild lesions and rise in temperature but none of the animals died or aborted.

Clinical manifestations in Swine :

On 29th October, after 2 weeks of the recovery in cattle and buffaloes adult swines started showing rise in temperature, and other clinical manifestations. Temperature reaction as well as clinical manifestations were very severe in them. Foot lesions were severe. Many of them

lost their hooves. Manifestations were very severe in the piglets; 9 young piglets died. However, no mortality occurred in the adult ones. Secondary complications were seen in adult pigs resulting in lameness.

This way the outbreak took a period of $3\frac{1}{2}$ months to infect all the animals in this farm.

Discussions :

Foot & Mouth Disease is one of the most important endemic of domestic animals in Nepal and is prevalent all over the country including the organised Government farms. Pyakural (1972) reported presence of types O and A in cattle and goats in an outbreak. In India, O, A, C, and Asia I have been reported by Seetharaman and Dutt (1961), Dhanda et al (1958) and Dutt et al (1968-1969). Since Nepal being neighbouring country of India and there being no restriction on the movements of the animals, it is presumed that all types of F. M. D. virus prevalent in India do exist in this country. The prevalence of disease could be very well visualised by numerous reports of F. M. D. in different regions.

Although this disease is so prevalent and is only next to Rinderpest, no me-

asures have so far been taken for the systematic control even at Government Live stock Farms which are the nucleus for improving the indigenous breeds as well as for maintaining pure bred animals of different species. The pure-bred young calves and piglets are supposed to be worst sufferers. This disease takes heavy mortality of young calves and piglets. Singh and Murty (1972) reported 6.93% of mortality in pigs due to F. M. D. in India but in piglets mortality was 33.62%. In our study mortality in piglets was 100% but in jersey calves only 17%. However, no mortality was noted in buffaloes and goats.

The spread of infection of this disease is either airborne or through attendants or contaminated feed, water, pasture or by introduction of infected animals from outside. On this farm, usual practice is that attendants frequently visit from one shed to an other, animals graze on the same pasture and even burial and post-mortem examination is conducted on the grazing land which is just adjacent to the animal sheds.

The epidemic started in goats which is located at one end of farm (see sketch of topography) but the swine-shed which is not far off from the goats shed was infected at the last. The only probable explanation for this might be that these

animals were confined to shed and not allowed to graze. Goats had first outbreak which might have been due to frequent addition of the local goats from the neighbouring villages or areas where infection might have been prevalent. After infection of goats, jersey animals were affected because these are very near to the dispensary where infected animals are sent for dressing or the dresser visited the goat shed, first and carried the infection to the jersey cattle.

The losses due to F.M.D. are in many ways. The direct effect is that animals affected become weak, emaciated and there is decrease in milk yield and working capacity of milched and draught animals respectively. The pure bred and young animals are succumbed to death with the result, it upsets whole breeding programme and livestock development target is never achieved. These animals lose their resistance and are exposed to secondary infection. The buffaloes at this farm were attacked by pasteurella organisms and 6 of them died. Others could survive due to timely diagnosis and treatment. The pregnant animals aborted and thus resulted in loss of progeny, milk yield and sometimes developed mastitis, metritis and become sterile. The magnitude of losses due to the disease have been estimated to be worth Rs. 40 million I. C. in India (Dhanda and Gopalkrishna 1958)

In order to have effective control under existing set up, it has been considered essential to start F.M.D. vaccination. This vaccination programme has been now taken up. All the animals were vaccinated with poly-valent F.M.D. vaccine. This vaccination programme if taken up regularly will boost up the production of protective antibodies. The animals should be vaccinated every year. Besides, no new animal which is unvaccinated should be brought to the farm. There should not be any post-mortem examination on the grazing ground and these animals should be buried in a corner exclusively meant for this purpose. In face of outbreaks no attendant should be allowed to visit other units. If all these precautions along with the vaccination programme are carefully taken up, it would be possible to minimise the losses and to achieve the production of enough number of improved breeds of animals for extension purpose and livestock development programmes.

Summary:-

First attempt was made to study the epidemiology of F.M.D. on Government Livestock Farms, and its impact on the economy, and Livestock development programme was assessed. Some suggestions were also made to overcome frequent occurrence of F.M.D. outbreaks on the

farms where pig breeding programme is carried out.

Acknowledgement :

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TOPOGRAPHY OF LIVESTOCK FARM, KHUMALTAR

PIG-SHED

GOAT-SHED

IV-Fourth Victims I Start of outbreaks.

SHEDS

SHED

SHEDS

BURRIAL AREA
POST-MORTEM AREA

GRAZING AREA

JERSEY
SHED
II SECOND
VICTIMS

BUFFALOS SHED
III THIRD VICTIMS

CLINIC
JERSEY
CALF SHED
II SECOND
VICTIMS

MANURE
DUMP

BUFFALO-CALVES
SHED
III THIRD VICTIMS

FODDER CULTIVATION AREA

MAIN OFFICE LABORATORY

LIVESTOCK CAMPUS

FODDER CULTIVATION

ROAD LEADING TO SHEDS

← COMMON ROAD

FROM MAIN ROAD →

AGRICULTURE CAMPUS

Egg as a complete food and its industrial uses

T. B. Basnet M. V. Sc, (Poultry Science)

In various parts of the world approximately 95% of the annual egg crop is disposed of through market channel for human consumption or for other uses and only about 5% is used to produce chicks by hatchery operators. Hen is consider as the most efficeint physiological machine producing 30 lb of finished products (eggs) of highest quality, though the hen itself may weight only 4 lb. This finished product in addition of the minerals and vitamins contain 3.3 lb proteins, 3.3 lb fats and 3 lb of calcium carbonate in the form of egg shell as packing materials.

In contrast of the embryonic developments of the chick within the egg

during the incubation period is solely depends upon the various nutrients of egg itself. So it is obvious that egg contain a variety of essential food materials for embryonic development such as proteins for building of the body tissues, fat for production of energy, minerals for bone and blood formation and vitamins for enzymic action, body registance and growth.

The egg is mainly composed of protein and lipids (fatty substances) the most important dietary essentials and poor in carbohydrates which, however, are in abundant sources in fruits, cereals and vegetables. Proteins are composed of nitrogenous substances, the amino acids. The human body can synthesised many

amino acids during the metabolic process, but there are some that body is unable to synthesized These amino acids are known as essential amino acid and must supplied in the food. The body require proteins of high biological value for the growth and repair of body tissues. As compaired to vegetable proteins animal proteins i. e eggs, milk, meat and fish are of much higher quality Egg is a poor source of carbohydrate which, however, can be easily obtained from bread, sugar and many other food. The fats (lipids) present in the egg mostly in the yolk is in highly emulsified form easily digested and richer in the constituents than most other fats occuring in the human diet.

Egg is a very good source of vitamin 'A' and vitamin 'D' to be supplied in the diet which are concerned for proper functioning of vision, resistance to infection

of the membrane of the respiratory tract, calcification of bones and development of healthy teeth The egg is only deficient in vitamin 'C' which leads scurvey (bleeding gums) in humans. Egg yolk contains all the minerals essential for the formation of blood, bones and tissues trace elements such as copper manganese and iodine which is required for normal funtioning of the thyroid gland. The disturbances of which caused goitre in man.

The above mentioned facts are of evidence that egg may be considered as most complete, palatable and digestable food materials for human health. On the basis of the nutrients content of the egg, three to four eggs along with other food ingridients in a diet per person a day would be sufficient to keep in good health The composition of egg in percentages has been given as below:

	Egg with shell	Yolk and white	Yolk	White	Egg shell
Water	65.6	73.6	48.7	87.9	1.6
Proteins	12.1	12.8	16.6	10.6	3.3
Lipids	10.5	11.8	32.6	0.03	.03
Carbohydrates	0.9	1.0	1.0	.9	0.0
Minerals	10.9	.8	1.1	0.6	95.1

(Alexis L. and Anastasia. J. Roman off, 1949)

Besides being served as fried, poached cooked, boiled or half boiled omelets and to improve the flavour, texture and appearance of the food products for human consumption eggs has its great industrial uses. Some of the important industrial use has been summarized as follows:-

A. Medicinal, bacteriological and virological uses

i) The oil of egg is used for making certain ointments and emulsion.

ii) Injection of cocaine with egg yolk preparation has been considered as valuable drug to prolong the anesthetic period specially for cornea operation.

iii) Egg alluin is very beneficial for burn, scald and as antidote for certain poisonous drugs.

iv) Egg white or whole egg is widely used as diluent in artificial insemination work.

v) Fertile eggs are used extensively in the production of immunizing serums and vaccines against animal diseases.

B. Food Industries

Eggs are used in the preparation of the following food industries:-

a) Bakery products- Cakes and pastries

b) Noodle and macorani products

c) Mayonaise and salad dressing

d) Ice cream, custards and pudding

e) Confectionary- In biscuits and chocolates preparation.

f) Animal feed- In some of the valuable zoo animals whole eggs or powder eggs mixed with other food are used in various zoo.

g) Fertilizer value- The hatchery clear (dead embryos, infertile eggs) as a fertilizer has a great value.

C. Manufacturing Industries

a) Leather- for tanning

b) Paints- Egg oil is used for diluting resins and pigments in paints industry.

c) Dyes- Used in textile as a fixing agent specially for cotton fibres.

d) Cosmetic- Used in preparation of beauty soaps, hand creams and shampoo.

e) Eggs shell Mosaic- Egg shell are used for preparation of different arts like egg shell mosaic.

Studies on the diseases of domestic animals and birds in Nepal

VIII. Paramphistomiasis in Water Buffaloes (*Bubalus bubalis*)

N. B. Singh, B. M. Basnet, D. D. Joshi and R. R. Shukla*

Central Veterinary Laboratory, Tripureswar, Kathmandu.

The paramphistomiasis is caused by *Cotylophorum* (Paramphistomids) among domestic and wild ruminants. Adults parasites seem to be non-pathogenic to sheep as reported by Mukherjee & Deorani (1962). However, disease due to young and immature paramphistomids appears to be more pathogenic and cause severe economic losses. A lot of work has been done in India in sheep and cattle but reports on the buffaloes are scanty. D. Souza (1949) reported paramphisto-

miasis in Indian buffaloes, Lee (1967) in Malaya and Kurtpinar and Latif (1970) from Iraq.

Under parasitic control programme, faecal examinations were made on large number of animals in the different parts of the country and it was found the amphistomiasis and liverfluke are two most important parasitic infections which are most prevalent all over the country.

The object of the present study

* Adviser under Colombo Plan Indian Co-operation Mission stationed at Central Veterinary Laboratories, Tripureswar, Kathmandu.

was to make pathological investigations on the prevalence of amphistomiasis in buffaloes and analyse its impact on health of water buffaloes.

Materials & Methods :

During present study large number (more than 300) of adult as well as young buffalo calves which are slaughtered by the butchers for human consumption in Kathmandu as well as in the zoo for the zoo animals were examined. Pathological materials were collected and preserved in 10% formalin for histopathological examinations.

Results :

General clinical symptoms of the animals having paramphistomiasis were starchy coat, weak, loss of condition and some-times profuse diarrhoea with juvenile amphistomes and at times blood.

On post-mortem examination animals were found to be dehydrated particularly adult ones. The upper portion of intestine, reticulum and rumen were filled with varying number of amphistomes. In many cases whole of it was completely impacted with large number amphistomes and whole surface was giving mosaic appearance. Mucosa was congested, thick-

ened, oedematous and corrugated and covered with catarrhal exudate sometimes parasites were also present in abomasum and lower portion of intestine particularly in those cases in which infestation was very high. In such cases, parasites were also seen in gall bladder and liver. The bile ducts of liver were filled with parasites and they were severely dilated. Liver had lost its normal appearance looking greyish. Kidneys were swollen and oedematous. Medulla was filled with gelatinous mass. Capsules were adherent on surface in majority of the cases;

On histopathological examination, there was severe hyperaemia of the mucosa as well as oedema. There were large number of leucocytic infiltration consisting of large and small lymphocytes and few eosinophiles. The epithelial cells were swollen, detached and many of them were necrosed and covered with fibrin. The cells of the Bruner's gland were swollen and hypertrophied. Some parasites were also seen in sub-mucosa.

There was severe proliferation of the connective tissue hepatic triads with the abundance of connective tissue and endothelial living cells of the blood vessel were hypertrophied and swollen and showing degenerative changes. Hepatic cords were showing necrotic changes. These

changes were more severe around central vein. Cells were hypertrophied with granular cytoplasm and poorly stained nuclei. Some of them were showing neorotic changes with Karyorrhexis and karyolysis of nuclei.

The epithelial cells of the urinary tubules in the cortex of kidney were showing neorotic changes. These changes were suggestive of some toxic effect.

Discussions :

Pande (1935) was first to describe the pathology of immature amphistomes embedded in the mucosa and submucosa of the anterior intestine of cattle. D. Souza (1949) described fatal enteritis in buffaloes. Clinical and Pathological changes in our studies were similar to those described by Horak (1963, 1966 and 1967), Deorani and Katujai (1967), Deorani and Jain (1969) in sheep and cattle. On contrary, we also observed that there was severe infestation of liver resulting in the damage of the liver tissue. This might have caused generalised toxic effect liberated by the necrosed tissue as well as parasites. Necrosis of the kidney tubules as well as submandibular oedema appears to be due to the substances liberated by liver damage. The oedema in submandibular is described "Gillar" and that of general body as "Pittoo"

by Indian workers and thus disease is popularly known as Gillar & Pitto. Buttler & Yeoman (1962) recorded that paramphistomiasis caused deaths of 76 calves and 6 adult cows in a flock containing 131 cows were grazing on swampy pasture. Continuous grazing on swampy land helps continuous ingestion of cercariae and metacercarial and if these numbers are excessively large, it embalances host-parasites relationship and animals die. Harak (1967) could immunise sheep and cattle by repeated doses of metacercariae (500 to 1500). He could also immunise by divided doses of 40,000 irradiated metacercariae.

There is no specific treatment but however some drugs have been tried. Horak (1964) reported that "Freon 112" mixed with equal volume of liquid paraffin was effective against adult amphistomes in sheep and cattle. He found "Lintex" to be effective against immature flukes at the rate of 50-100 mg/kg body weight. He later reported that Bithinol is effective against both adult and immature worms in sheep but not in cattle. Because none of the anthelmintics are quite effective, it would be desirable to develop suitable control measures. In Swampy areas where disease is endemic animals should not be allowed to graze and such areas should be fenced and treated with molluscicides.

In such areas irradiated vaccines might be useful. However, it requires to be tried on large scale particularly in Nepal where 98% animals are infected with paramphistomes as is evident by foecal examination (Basnet 1973)

Summary :

Clinical and pathological examination of paramphistomiasis in buffaloes were studied in the detail. Suitable measures to control the infection were suggested.

This is first report where attempts have been made to describe pathology of this disease in Nepal.

Acknowledgements :

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Preliminary observations on the Prevalence of diseases at the central Zoo, Jawalakhel

Mukti N. Shrestha
Veterinary Hospital, Lalitpur.

The central zoo, the only one in the kingdom, is proving to be an important place for education and recreation. It was established in the year 1989 B. S. (1931 A. D.) and was inaugurated on 27th Baishakh of that year by Prime Minister Juddha Shamsen. The inauguration coincided with the Bhoto Jatra of Patan Machhendranagar. It is expanded in the area of 128 ropanies (approx 16 acres) including 12 ropanies pond in the centre, which gives most natural surrounding to zoo animals.

Now coming to the animals in the zoo there are about 500 species including exotic birds and animals of some 100 species; of them namely are Red Pandas,

Black Buck, Yak, Blue Bull, Ghoral, Himalayan Palm civet cat, Horn Bill, Partridge Kaly pheasants and peacocks are collected from different part of the country those that have been brought from other countries are the Emu, Kangaroo, Sulphur crested Cockatoo, Lion, tigers, Black bears, Zebras Rock coon, Marabou (Adjutant stork) crane sarus, Mute swans etc.

So far there were no adequate facilities of veterinary care for the production of animals so naturally loss of rare and valuable species had to bear by the zoo itself. Previously many animals died undiagnosed without proper medical care, hygiene and balanced ration. Now to some

extent animals are treated periodically why required to prevent and cure these animals against many diseases.

During present study attempts have been made to compile all different diseases in the zoo animals on the basis of (1) Stool examinations (2) Post mortem finding and (3) Serological investigations.

Materials and Methods:-

The faecal samples were collected from different species of animals and birds excluding ducks and some other species of which such collections were not possible. The faeces were examined in the Parasitology Laboratory, Tripureswar, Kathmandu, where all the laboratory facilities are available.

Similarly diagnosis of the dead animals on the basis of Pathological, Bacteriological investigations were done by Disease investigation Unit of the Central Laboratory. Serological tests were also carried out on some sera in the same laboratory.

Results:-

(A) Faecal Examination:- Details of investigation regarding the faecal examination are given in Table No. 1

During investigation a total of 102 faeces of different species of animals were examined and out of that 100 were found positive for coccidiosis; 7 for Ascar-

riasis, 5 for *Ascardia galli*, 3 for *Toxascariasis*, 3 for *Hetrakis gallinae*, 2 for *Paraphitomes*, 1 for Liver fluke, 1 for *Anchylostoma*, 1 for *Amoebotania aphenoides*.

(B) Postmortem Examination: During the period (13 months) of observation a total of 60 animals died out of which 27 from enteritis, 9 from pneumonia, 2 from trauma, 2 from lung abscess, 2 from liver abscess, 2 from internal haemorrhage, 2 from fracture, 2 from chronic hepatitis, 2 from worms. 1 each from F. M. D. bee-sting poisoning, mange, stomatitis, tympanitis paralysis tick infestation (Table No. 2)

Most interesting pathological changes were seen in chimpanzee which had severe gastro-enteritis but no parasite, bacteria could not be isolated. It was suspected a case of viral gastro-enteritis.

(C) Serological investigations:- The blood serum samples were collected from 23 buffalo bulls slaughtered in the zoo and were tested for brucellosis by plate and tube agglutination tests. Out of 23 buffalo bulls, 4 were positive of brucellosis.

Discussions and Summary:-

No doubt in recent past good emphasis has been made in the country for the diagnosis and control of disease of domestic animals and birds.

Preliminary investigations have revealed the importance of parasitic disease like Fascioliasis, Amphistomiasis, Coccidiosis and lung worm etc in the economy of the country. Similarly much attention has been paid towards the early diagnosis and control of infections and chronic disease, however, no attention was paid towards the infections of zoo animals. Majority of zoo animals are found to be positive for different types of parasites. Serological investigation revealed that some of the animals had agglutinin antibodies against Brucellosis. Postmortem examination revealed gastro enteritis, pneumonia, hepatitis.

These observations indicate that zoo animals might be potential reservoir

for many infections and danger to attendants and visitors. They should be kept under proper hygienic conditions and treatment.

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Table No. 1

TABLE SHOWING RESULT OF EX

S. No.	Sps. of Animal	no of faeces Positive	No of faeces Examined	Parasitic		
				Ascaris	Coccid	Paramphis
1.	Bears	2/7		++	—	—
2.	Porchpines	4/4		+++	—	—
3.	Reccoons	2/2		++	—	—
4.	Ghoralls	2/2			++	++
5.	Liones	1/1		+		
6.	Kangaroo	1/1		+		
7.	Rabbits	10/10				
8.	Monkeys	3/5				
9.	Tigers	2/3		+		
10.	Leopards	9/9		+		
11.	Deers	11/11			+	
12.	Python	0/1				
13.	Blue bull	0/1				
14.	Emul	3/3			++	
15.	Snow Goose	0/1				
16.	Pheasants (all)	10/38			+	
17.	Common Horn Bills	3/3				

AMINATION IN ZOO ANIMALS & BIRDS

Liver fluke	Tox- ascaris	Ascar- dia gell	Hetra- kesgal	Capl laria	Isos Pora	Ancyc- lostoma	Strong- yle	Remarks
-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	Male ghoral + ve for L. F. & Param phi stoms
+							+	
	+++						+	Rhesus and Lang ur monkeys included.
							+++	
							+	
								2+ ve for Ascaris only Sambar deer
					+		+	2 only + ve for cocc.
		+	+	++		+		This includs for spotted barking deer

Table No. 2

S No.	Sps. of animals	Postmortem	S. No.	Sps. of animals	Postmortem
1	Chimpanzee	Enteritis	2	Red Panda	Enteritis
3-4	Jungle fowls 2	"	5	Hawk	"
6	Purple Men	"	7-8	Canary 2	"
9	Red Munia	"	10	Otter (Salak)	"
11	Java Sparrows	"	12	Turkey	"
13	Green Pigion	"	14-15	Ring neel Phenosants 2	"
16-17	Rabbits 2	"	18	Teal Duck	"
19	Pin tailed duck	"	20	Mongoose	"
21-22	Burdagionger (2)	"	23	Myna	"
24	Moor Hen	"	25	Pigion	"
26	Peora	"	27	Neospor	"
28	Chimpangee	Pneumonia	29	Koel	Pneumonia
30	Myna	"	31	Chari Bag	"
32	Sambar Deer	"	33-34	Golden Phlasant (2)	"
35	Owl	"	36	Guinee Pig	"
37	Black Stork	"	38	Spoon Bill Duck Trauma	"
39-41	Leopard cubs (3)	"	42	Java sparrow	Lung Abscess
43	Hungarian Duck	Lung Abscess	44	Cuinea fowl	Liver "
45	Ring Neck Pheasant	Liver Abscess	46-47	Red deer (2)	Internal Haemmorage
48	Red deer	Tympanitis	49	Leopard cub	Paralysis
50	Lion Tailed monkey	Bee-sting-poisoning	51	Partridge	Stomatitis
52	Rhesus Monkey	Cronic Hepatitis	53	Lion	Cronic hepatitis
54	Crane sarus	Fracture	55	Musk Dur	Fracture of ribs
56	Himalayan ceretcat	Worms	57	Pea-fowl	Worms
58	Python	Tick infestation	59	Jackal	Mango
60	Goat	F. M. D.			

Local Terminology of Yak and its Crossbred

D. D. Joshi and P. M. Singh Pradhan*

Central Veterinary Laboratory, Tripureswar, Kathmandu.

The name "Yak" originates from Tibet. The Tibetan native name for this animal is "gayak" or "gyak". According to Marco Polo, in Tibet the wild yak was called "beiamini" or "dju-mau yab" or "Father of tails" (Burlakov and Startsev, 1967).

Here in Nepal male of yak is called Yak and female of yak is called "Nak" but in western alpine region of Nepal male is called "puwa" and female "paa".

In Mongolia and Altai (USSR) the domesticated yak is called "sarlyak" and the wild yak is called "bukha, while in Kirgizia it is referred as "topos".

Yak is a large and long haired wild ox of the Nepal and Tibetan plateaus, found between 14,000-20,000 ft. (about 4,300-6,100 m.) above sea level. It is "Bos poephagus" or "Bos grunniens", of the family Bovidae, in the order of even-toed hoofed mammals, Artiodactyla (Encyclopaedia Britannica, 1967). Sanders (1926) had described about the yak that wild yak belongs to the Bisontine group of the bovine creation and in common with other bisons, his voice resembles the grunting of swine; therefore the naturalists have fastened upon him the designation "Bos" or "Poephagus grunniens". Yak is closely related to the taurine group

*Manager, Yak Breeding Farm, Solukhumbu.

of common cattle. Linnaeus included the yak in *Poephagus*, that is, the grain eating genus, and differentiated them from lowing cattle by giving them the specific name of *grunniens*. At present there is only single identity of these two forms of yak and refer to both the wild and domesticated varieties as the species *grunniens*, defining the wild form as *ferus* and the domesticated as *domesticus*.

The domesticated and few wild yak cattle are found in the northern alpine region of Nepal, below the Tibetan border (border of People's Republic of China) Yak and nak always stay or live in the alpine region. They never come down below 10,000 to 12,000 ft. above sea level.

Chowri cattle are crossbred offspring of yak and zebu or local hilly cattle of Nepal. They are found throughout the higher midlands and alpine region of north western and north eastern part of the country. Chowri cattle move down below upto 8,000 ft. and go up on the mountain to 16,000 to 20,000 ft. above sea level.

Yak and Chowri cattle are geographically distributed in the alpine and higher midlands of 17 districts of Nepal viz: Taplejung, Sankhuwasabha, Solukhumbu, Rasuwa, Dolakha, Shindhupalchaur, Gorkha, Manang, Mustang, Dolpa, Tibrat, Mugu, Humla, Jumla, Bajura, Bajhang and Darchula districts (Joshi et al. 1968, Singh

Pradhan et al, Kesari et al 1968, Nepali et al, 1968 and Rana et al 1969)

Joolang bull or Khirket bull or Kirko bull is a small bull of high hill regions of Nepal (Pradhan and Upadhyay, 1967). Kirko bull of Pike in the Solu district is also called Tibetan bull (Tiwari, 1967). In Solukhumbu area Kirko cow has appearance of jersey cattle. It is small in size, milk production 10 manas (7 to 8 lb) per day, tail is very long, lactation period 6 to 9 months, and very good for chowri production. Crossing of Joolang with Nak is very common for high altitude chowri cattle.

Dimzo chowri is a crossbred animal whose father is Joolang or Khirket or Kirko and mother is nak.

Zhumu chowri or zhopa or zhupu is crossbred animal of yak male and local hilly cow or zebu cow. This type of chowri is also called "Urang chowri" for female and "Urang zhopkyo" for male.

Dimzo chowri is better than Urang or Zhumu chowri. The body coat of Dimzo is more shining and smooth than Urang. It gives more milk and body size is also bigger. Twich (tail) of chowri is smaller than yak and nak. Body size of Dimzo is bigger than nak. Male chowri is always sterile and use for draft and transportation purposes. It can carry load up to 2-2½ monds on the back at the height of

18,000 ft. altitude above sea level.

Zebu cattle (*Bos taurus indicus*) distinguished from other varieties by its hump and by its general body conformation. Most present day zebus belong to the group with thoracic humps. There are 35 different zebu breeds have been described in India. Indian zebu bulls have a more developed hump than the cows. Zebu cattle of plane and hilly areas of Nepal are of crossbred offspring of Indian zebu and local hill cattle of Nepal.

The terms used for different cro-

ssbred animals (F1, F2 to F7 generations) of yak and zebu cattle or local hilly cattle or Kirko or Joolang bull and cow are mentioned below. This breed terminology of yak, chowri and others differs in western and in eastern alpine regions of Nepal. This terminology is completely based on data and informations taken by the authors from farmers of those alpine regions during their visits in different years. Data are also collected from different reports, books and papers published.

Breed Terminology of Yak and Chowri in Western Alpine Regions of Nepal:

I. 1. Yak (M) x Hilly cattle (F)

F1 Zhumu chowri or
Zhopa or Zhupu (F)
and Zhopo (M)

2. Yak (M) x Zhumu chowri (F)

F2 Tolbu (F) and Tolbo (M)

3. Yak (M) x Tolbu (F)

F3 Chalbu (F) and Chalbo (M)

4. Yak (M) x Chalbu (F)

F4 Ghagmu (G) and Ghagmo (M)

5. Yak (M) x Ghagmu (F)

F5 Logmu (F) and Logmo (M)

6. Yak (M) x Logmu (F)

F6 Chowri (F) and Chowri (M)

7. Yak (M) x Chowri (F)

F7 is more or less like yak and nak but they call Paa (F)

NB: (M) = Male animal and (F) = Female animal

II. 1. Yak (M) x Zebu cattle (F)

F1 Zhumu chowri or Zhupu (F) and Zhopo (M)

The terms used for F2 to F7 generations are same as in the case of yak x hilly cattle (F) F2 to F7 generations.

III. 1. Zebu (M) x Zhumu chowri (F)

F1 Falang (F) and Falang (M)

2. Zebu (M) x Falang (F)

F2 Lulu zhopa (F) and Lulu zhopa (M)

3. Zebu (M) x Lulu zhopa (F)

F3 Lulu (F) and Lulu [M]

4. Zebu [M] x Lulu [F]

F4 Dhimu [F] and Dhimu [M]

Dhimu is more or less like hilly cattle and dhimu male is infertile but more weaker than falang and lulu so this type of breeding is not commonly practised.

IV. 1. Yak [M] x Falang [F]

F1 Ghingar zhopa [F] and Ghingar zhopa [M]

2. Yak [M] x Ghingar zhopa [F]

F2 Tolbu [F] and Tolbo [M]

3. Yak [M] x Tolbu [F]

F3 Chalbu [F] and Chalbo [M]

The terms used for F4 to F7 generations are same as in the case of Yak [M] x Hilly cattle [F] F2 to F7 generations.

VI. 1. Zebu [M] x Ghingar zhopa [F]

F1 Lulu zhopa [F] and Lulu zhopa [M]

2. Zebu [M] x Lulu zhopa [F]

F2 Lulu [F] and Lulu [M]

3. Zebu [M] x Lulu [F]

F3 Dhimu [F] and Dhimu [M]

VII. 1. Joolang bull or Khirket bull or Kirko bull x Nak or Paa [F]

F1 Dhimju chowri [F] and Dhimjo zhopa [M]

2. Joolang bull x Dimju chowri [F]
F2 Fa'ang [F] and Falaang [M]

VIII. 1. Zebu [M] x Nak [F]

F1 Dimju chowri [F] and Dimjo zhopo [M]

2. Zebu bull x Dimbu chowri [F]
F2 Falang [E] and Falaang [M]

IX. 1. Yak [M] x Dhimju chowri [F]

F1 Tolbu [F] and Tolbo [M]

The terms used for rest generations for VII, VIII and for IX are same as in the case of III and I respectively.

Breed Terminology of yak and chowri in Byans Garkha, Byans village Panchayat (Tinkar and Chhangaru Villages) of Darchula District, Mahakali Zone (B. S. Kalyal, 1973).

Here local terminology differs slightly from other far western development regions of Nepal. Yak male is called "Yak" and yak female is called "Dhum".

I. 1. Yak [M] x Local Hilly cattle [F]

F1 Jhumo or Jhumu [F] and Jhupo or Jhupu [M]

2. Yak [M] x Jhumo [F]
F2 Gharu [F] and Gharu [M]

3. Yak [M] x Gharu [F]
F3 Yak and Dhum like

People always maintain this type of breeding in this part of the country.

II. 1. Dhum x Local hilly cattle [M]

F1 Jhumo [F] and Jhupo [M]

2. Jhumo [F] x Local hilly cattle [M]
F2 Talbuni [F] Talbo [M]

3. Talbuni [F] x Local hilly cattle [M]
F3 Local cattle like

This type of breeding is not common because it is unproductive breed and also not profitable. They do not breed commonly yak with zebu cattle, however, people

of Humla, Mugu, Dolpa and Mustang maintain this breeding practice.
Breed Terminology of Yak and Ghowri in Eastern Alpine Regions of Nepal (Tiwari, 1967, Singh Pradhan et al, 1968, Pradhan et al, 1967, and Rana et al, 1968):

I. 1. Joolang bull or Khirket bull or Kirko bull x Nak

F1 Dimjo chowri [F] and Dimjo zhopkyo [M]

2. Joolang bull x Dimjo chowri

F2 Tolmu chowri [F] and Tolmu toplkyo [M]

3. Joolang bull x Tolmu chowri [F]

F3 Nurmu or Yunrmu [F] and Yunrmu tolpsyo [M]

4. Joolang bull x Nurmu

F4 Gurmu nak and Garyak [M]

At this stage Gurmu nak and Garyak male are just like yak and nak.

II. 1. Zebu bull x Nak

F1 Dimjo chowri [F] and Dimjo zhopkyo [M]

2. Zebu bull x Dimjo chowri [F]

F2 Tolmu chowri [F] and Tolmu toplkyo [M]

The terms used for F3 and F4 generations are same as in the case of Joolang bull x nak F3 and F4 generations.

III. 1. Yak [M] x zebu [F]

F1 Urang chowri [F] and Urang zhopkyo [M]

2. Yak [M] x urang chowri [F]

F2 Tolmu chowri [F] and Tolmu toplkyo [M]

The terms used for F3 and F4 generations are same as in the of Joolang bull x nak F3 and F4 generations.

IV. 1. Zebu [M] x Urang chowri [F]

F1 Pamu chowri [F] and Payok (Pyok) [M]

2. Zebu [M] x Pamu [F]

F2 Pamu [F] and Payok [M]

V. 1. Kirko bull x Urang [F]

F1 Pamu chowri [F] and Pamu zhopkyo [M]

2. Kirko bull x Pamu [F]

F2 Pamjo chowri [F] and Pamjo zhopkyo [M]

VI. 1. Yak [M] x Pamu [F]

F1 Pamjo chowri [F] and Pamjo zhopkyo [M]

2. Yak [M] x Pamjo [F]

F2 Tolmu chowri [F] and Toplkyo [M]

3. Yak [M] x Tolmu [F]

F3 as described in yak [M] x Urang chowri [F] F3 and F4 generations.

VIII. 1. Kirko bull x Nepali hilly cattle [F]

F1 Syakchan [F] and Syakcha [M]

Syakcha bull becomes always fertile.

Breed Terminology of Yak in other Countries of the World. (Epstein, 1970, and Phillips et al, 1945):

I. In Tibetan Platu.

1. Yak [M] x Domestic cattle [F]

F1 "dzo"

2. Zebu [M] x Nak [F]

F1 "dzo"

II. In People's Republic of China:

1. Yak [M] x Domestic cattle [F]

F1 "pien niu"

2. Zebu [M] x Nak [F]

F1 "pien niu"

III. In Monogolia:

1. Yak [M] x Domestic cattle [F]

F1 "hainak"

2. Zebu [M] x Nak [F]

F1 "hainak"

IV. In Russa (USSR):

1. Yak [M] x Domestic cattle [F]

F1 "hainyk"

2. Zebu [M] x Nak [F]

F1 "hainyk"

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Epidemiological Studies on Sheeppox Outbreak in North Western Nepal.

R. R. Shukla*, D. D. Joshi, and S. Pyakural,
Central Veterinary Laboratory, Tripureshwar.

Sheep-pox is one of the pox diseases, which is most severe among all pox diseases of domestic animals. It causes heavy mortality in young lambs as compared to the adult ones. In former case mortality may range from 60% to 100% while in latter one from 3% to 50% or even more depending on the virulence of the strain and resistance of the animals. This disease poses a big problem in the developing countries where sheep industry is in process of making substantial growth. This disease has been eradicated from many developed countries like England (1866), Sweden (1874), Denmark (1879), Norway (1882),

Netherlands (1893), Germany (1920), Yugoslavia (1948), Poland (1950), Hungary (1957), Cyprus (1958). However, this disease is still a problem in this subcontinent including India, Ceylon, Bangladesh, Pakistan and Nepal. Considerable work is being done in India to evolve suitable measure.

In Nepal, no doubt many contagious and infectious diseases have been reported during last 5 years from 34 different veterinary hospitals but there is no mention about the existence of sheep pox and goat pox. The object of the present study was to investigate the epidemiology of an outbreak

*Adviser Under Colombo Plan, Indian Cooperation Mission, Kathmandu, stationed at Central Veterinary Laboratory, Tripureshwar, Kathmandu.

of sheep pox in North Western Nepal and establish its real aetiology. Since reporting system of the different diseases in this country is still to be developed and there is no surveillance of prevalence of different infection it is just possible that such outbreaks do occur in remote areas and remain unreported.

Origin of sheep-pox outbreak:

Disease was first observed in the sheep of Khamba (Tibetan Refugees) in Darchula area in the month of July 1973. These refugees are nomadic and moved their flock via Bajhang (Seti Zone) to Bajura. They were stationed for a week at Kunna. The disease then spread in local sheep flock at Kunna and there was heavy morbidity and mortality. More than 500 sheep died as reported by Shri Bheem Prasad, Member, National Planning. Tibetans then moved their flock from Kunna to Humla district and disease was reported in local sheep of that area. There was heavy mortality in local flock as well as Tibetan flock. This was reported to Zonal Commissioner of Karnali by Pradhan Panch of Nanikot Village Panchayat (Raskot) because disease also spread in some flock of Raskot area. Zonal Commissioner, Karnali, reported to Department of Agriculture for investigation and prophylaxis. Dr. Joshi visited Jumla and Tibrikot on

receiving report 3 Gate Kartik, 2030. He met Pradhan Panch and four local shepherds who were at Zonal Commissioner's office. Since disease was existing at remote corners, some people were sent by Zonal Commissioner along with shepherd and Pradhan Panch to collect the material in specimen bottles provided by Dr. Joshi. Material consisting lung, intestine, vesicles, spleen, liver and skin with pimples were collected and despatched by air to Central Veterinary Laboratory from Zonal Commissioner's office Karnali. This material was received on 13th Nov., 1973. Immediately, all tissues were triturated in sterile pestle mortar in N.S.S. and suspension was treated with penicillin and streptomycin for 45 minutes at room temperature. Subsequently, it was centrifuged and supernatant was inoculated in 2 healthy sheep in abdomen by S/C and I/C routes. These animals were left in separate room. Their temperature was recorded daily. Slight rise of temperature was seen on 2nd day thereafter, it subsided. On 8th day, there was rise in temperature, red papoules were seen all over the abdomen. On 9th day animals were quite dull temperature was 40.5 to 41.0 C. There was watery discharge from nostrils and eyes. Animals were dull and off feed. There were big red papouls all over the abdomen including thigh region and tes-

ticles and tails. Temperature remained high for 4-5 days. Thereafter vesicles in one sheep were ruptured while in other started reducing the size. There was hardening of the papoules in the tail. There were constant watery discharge from the eyes and nostrils. Sheep became weak and emaciated. Temperature remained constant ranging from 40 to 41.0 C. Plate I and II

Post Mortem Examination

First sheep - One sheep was sacrificed on 16th day after inoculation of infective agent. Abdominal skin was carefully removed. Some of the vesicles were filled with watery fluid while others were having greenish yellow thick material. These vesicles had penetrated in subcutaneous tissues and abdominal muscles, which were slightly removed. The peritoneal cavity was filled with some quantity of serous fluid. Pericardial cavity was also filled with similar fluid. Spleen was congested. The right lung was severely congested mostly apical, intermediate and anterior portion of diaphragmatic lobe. Left lung was pale in appearance. Myocardium was pale and flabby in appearance and slightly congested.

Second Sheep - This sheep died on 5.12.73, three weeks after inoculation of virus. It had become weak and emaciated. It developed severe conjunctivitis and even could not open the eyes. Vesicles ruptured and

scabs were formed in the abdomen and thigh. On post mortem examination, vesicles at their back were found to have some pus material in abdominal muscles with fibrosis. There was some serous fluid in the peritoneal cavity and membranes were congested. Lungs were showing generalised congestion and oedematous. Plural cavity was filled with sero-sanguinous exudate. Pericardium was oedematous and congested, and covered with fibrinous material. Pericardial cavity was filled with sero-sanguinous fluid. Myocardium was congested flabby in appearance.

Gel diffusion test

The sera were collected from both the sheep on 9th when papoules were already developed and animal had 41 C temperature. Again it was collected on 15th day. Sera were subjected to immuno-diffusion test in gel. Original antigen was used. No lines could be seen against the sera of 9th day and 15th day.

Passage of material in eggs:

Suspension of scab pus material and fluid from vesicle was made in N. S. S. to which pencillin and streptomycin were added. It was kept for 20 minutes at room temperature and then centrifuged. Nine eggs of 10 days incubation were inoculated by Chorioallantoic route with 0.1 ml of suspension. These eggs were kept



Plate II Pox lesions in the abdomen of sheep.



Plate I Pox lesions in the tail and around the rectum of sheep.

at 37 C. After 3 days, eggs were chilled overnight and chorioallantoic membranes as well as allantoic fluid were harvested. This material was again inoculated in the eggs, and being passaged in laboratory.

Discussion

No doubt transmission of sheep pox virus is either by direct or indirect contacts and virus gets established either through inhalation or skin. The virus remains viable in infected scab for a period of six month and infected sheep can be carrier even after lesions are healed up Surthmadzhiev (1963). Singh and Murty (1969) reported that migratory flock from Rajasthan were responsible for the outbreak of F. M. D. in Mathura. In our study too, it is quite apparent that sheep of Khamba (Tibetan refugee) who move their flock from higher altitude to lower region before winter starts are the potent carrier of the infection. The mortality in their sheep was less in the beginning but as the sheep moved from areas to areas, the infection spread in the neighbouring area. It took heavy toll and in some flock, morbidity and mortality rates were 100/.. Wilner (1969) while studying the properties of animal viruses, placed sheep pox, swine pox and horse pox in ungrouped pox viruses. These viruses have not been characterised morphologically and antige-

nically. There are many reports on the serological relationship and cross protection of sheep pox and goat pox viruses. Gel-diffusion studies were conducted by many workers in India (Bhabani and Murty 1963, Sharma et al 1966). They reported that 1-2 precipitin bands have common antigens. Cross complement fixation reactions have been also reported by Uppal and Neelakanthan (1970) Sharma and Dhanda (1971).

Since sheep pox causes considerable loss to sheep industry, it is essential to have a safe and efficient vaccine which could be used for control of disease. Many live and inactivated vaccines have been developed from the virus raised in experimentally infected animals or propagated in cell culture. Ramyar and Hessami (1967) succeeded in developing modified (attenuated) live virus Strain (RM/65) at Razi Institute, Iran by serial passage of virus in sheep kidney cells. This vaccine has been found to be safe and immunogenic. In India attempts are being made to attenuate indigenous sheep pox strain isolated from Jaipur. Formaline inactivated alum hydroxide gel adsorbed vaccine prepared as per Russian method has been also found to be safe and immunogenic and is widely used on large scale in India. This vaccine has been proved to give solid immunity. This is

high time that government sheep farm in Nepal are protected against sheep pox particularly in the area where sheep industry is to be developed.

Summary: An infected material received from the field out-break from the Pradhan Panch of Nanikot village. This material was found to be positive for sheep pox. Sheep could be infected experimentally. These sheep had severe reactions with typical lesions and one died on 21st day. One sheep was sacrificed on 16th day and P. M. was conducted. No gel diffusion lines were seen on the sera on 9th and

15th day. Virus is being passaged in eggs.

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Preamble of Nepal Veterinary Association

1. Introduction: Since the Veterinary profession came into existence in our country every veterinarian engaged in this profession strongly felt the need of an Association. As many of the developed or developing country or countries, trying to follow the developmental course, need an organisation, we need one.

The Association may give direction and energy to corporate endeavour for the betterment of country and countrymen. This Association shall be a source of incentive to the members of profession and also to do something substantial in the path of improving service condition of the Veterinarians to work collectively in the development of Veterinary, Animal Husbandry and allied Sciences in the Country, so that

veterinarians might contribute singly or collectively their shares to help progress of the Nation.

2. Name of the Association: Shall be Nepal Veterinary Association or in short N. V. A.
3. Headquarter of the Association: Shall be at Kathmandu.
4. Aim and objects.

This Association shall be purely be a scientific and professional organisation with politics and also shall not indulge in any political or any other short of in relevant propaganda which is beyond the scope of the profession.

The objects of the Association shall be:-

- i) to emphasize the necessity of the unity among the members of the profession, to promote spirit of harmony co-

operation among each other and the staff working in this profession.

ii) to convey new discoveries and developments in the field of Veterinary, Animal Husbandry and Allied Sciences in our country as well as in other corners of the world to the members of the profession, to improve the professional knowledge amongst the members of the profession.

iii) to work for the Development of Livestock wealth of the country.

iv) to help supply of better and standard proteinous food of livestock origin and other livestock products to the nation.

v) to improve the Allopathic system of veterinary medical treatment and surgery.

vi) make veterinary service and promptly available to the public

vii) to help control and prevention of Animal pests and to eradicate them wherever possible.

viii) to safe-guard public health from diseases communicable from animals to man & vice-versa (Zoonotic diseases).

ix) to do the things necessary to keep up the honour and dignity of the profession in the society & to safeguard its rights and interests.

5. Methods:

In order to fulfill the aims and objects stated above the Association (N. V. A.) shall among other things, carry

our following acts and functions.

a) to help promote the spirit of harmony cooperation among the members of the profession.

b) to maintain up to date allopathic standard of treatment, to educate the public to notify in case of enzootic diseases and also to make the people conscious regarding treatment of animals.

c) The Association will always be willing to offer its service and cooperation to the Government in the solution of any technical problems and difficulties relating to veterinary, animal husbandry and allied subject.

d) The association shall consider all matters affecting the mode, life and work of the members of veterinary profession and will always endeavour and safeguard the legitimate professional interest.

e) The Association will also publish periodicals or other papers or both for the attainment of its aims & objects from time to time.

f) The Association will encourage members to exchange professional informations with one another.

g) The Association will also arrange conferences or seminar for the discussion of subject pertaining to Veterinary, Animal Husbandry and allied Sciences:

h) The Association will also perform any other functions or duties in the

the realization of its aims & objects.

6. Official year

The Official year of the Association shall be calander year.

Constitution: The constitution of the Association shall be as given here under.

1. Membership: Persons possessing a recognised degree or diploma in Veterinary Sciences are eligible to become a member of the Association. Every member of an affiliated branch Association is ipso-facto a member of the Nepal Veterinary Association. The membership of Nepal Veterinary Association can be classified as follows.

a) Honorary membership: Persons of high distinctions or persons who have rendered significant service to the Association, or the profession, will be invited to become the member of the Association by a special resolution of the council of the Association.

b) Ordinary members: All the persons passing minium profession pualification as mentioned above shall have the membership of this catagory as per rules laid down in the constitution.

c) Associate Members:- Non-Nepalese nationals prossesing minimum professional qualification as mentioned above shall have the privilege to enjoy the membership of N. V. A. They shall enjoy

all the privileges of ordinary members except that they shall not be eligible to vote or to hold office.

d) Life members: Person possessing the minimum qualification as mentioned above, if pays a sum of Rs. 400/- at a time, in lieu of the monthly subscription shall enjoy this catagory of membership. Their previlages and facilities shall be as those of ordinary members.

2. Mode of admission: Every application for membership shall be addressed to General secretary of the Association. The General Secretary will put those applications before the council of the Association which is empowered with right to admit, refuse or re-admit the members

3. Reeligibility of Membership: Any member who has discontinued the membership by resignation or by nonpayment of the dues shall be admitted by fresh application to the General Secretary Association.

4. Privilages of members:

a) They shall be entitled to receive the publications of the association either free or at rates as fixed by the council of Association.

b) They shall be entitled to vote on all resolutions put forward at the meetings of the Association.

c) They shall have the right to take part in scientific lectures, seminars,

conferences, demonstration and discussions by the Association.

They shall be entitled to enjoy other privileges as per discussion of the council.

e) They shall be entitled to use the reading room and library of the Association, if there is any.

5. Termination of membership: The membership of the association can be terminated by any one of the three ways as mentioned below.

- i) by resignation.
- ii) by nonpayment of the subscription in time.
- iii) by indisent behaviour or conduct of any member which shall be deemed prejudicial to the interest of the Association or found to be responsible for bringing disrepute to profession or Association. In such cases any member shall terminate to hold the membership by the resolution of the council of the Association.

6. Subscription:— The annual subscription shall always be pay as advance either in one instalment for one year or by half yearly instalment.

The annual subscription of all categories of members shall be Rs. 36/- No subscriptions shall be collected from Honorary members and they will not be eligible to vote on any matters and to hold the

office of the association.

7. Council of the Association:— The Office bearers of the Association shall constitute the council of the Association.

8. Office bearers: The Association shall have the following office bearers for the proper management of its activities.

- i) A President.
- ii) A Vicepresident.
- iii) A General Secretary
- iv) A Joint Secretary Cum Treasurer
- v) EDITOR.

9. Powers and Functions of the Council of the Association

i) The council of the Association shall carry out all the administrative work of the Association according to the constitution of the Association.

ii) The council shall form within itself or with the inclusion of some other ordinary members of the Association or dissolve as when necessary committies of not more than three members for some specific purpose such as finance, propaganda etc. A committee of such type which also include member cum editor shall look after the work of publishing a bulletin or Journal, what so ever it may be, which shall be the official organ of the Association, or other publications.

iii) The council of the Associa-

tion shall have following powers.

a) to appoint a special adhoc committee or committees and to deligate a portion of its powers to such committees.

b) to make some ammendments in the articles of the constitution as time demands, in view of the aims and objectives of the Association, by the concent of the general body.

c) to admit, refuse or redimit admission.

d) to sanction all expenditures of the Association.

f) to arrange for conferences and general body meeting.

i) to prepare or ammend by laws in furtherence to the approval of the general body at its next meeting.

j) to entertain, investigate and determine any dispite or reference, or matter that may be brought to its notice by any member.

h) to take all other steps for the fulfilment of the aims & objectives of the Association.

iv) The decission of the council of the Association shall be final in all matters not covered by the rules of the Association.

The council shall prepare an annual report of the work of the Association together with an audited of its finance &

present it to the general body of the Association of its annual meeting for adoption.

10. Meeting of the Association:- The meeting of the association shall be of the following kind:-

i) Meeting of the council- The council of the Association shall ordinarily be meet once in 4 months or often as it may be necessary. The qourum of such meeting shall be four.

ii) General body meeting:- The general body of the association shall meet ordinarily once in a year, or at the time and place of Nepal Veterinary conference or at any other time & place as per decission of the council. The General secretary shall call for such meetings not later than a month in the case of the general body and not later than two weeks in the case of the council from the date of the receipt of the requisition. The quorum in the above cases will be 50% of the total number of members for the general body.

Ordinarily at least 2 weeks notice of the meeting shall be given to all the members in case of the council and one month in the case of the general body giving the place the date and time of the meeting and also the agenda for it.

iii) Emergency meeting:- In case of emergency, the general secreary, in co-

nsultation with the President, can call for a meeting at a short notice, but in no case, shall it be less than 10 days, by giving the place date, time & agenda.

11. Quorum:- The quorum of the meeting shall be as mentioned in Article 10 sections i) & ii) of the constitution in all cases. If a member of the council fails to present himself consecutively in two meetings without any previous notification giving some specific reason causes to be a member of the council.

12. Method of filling the vacancy in the council:-

i) Any vacancy caused by any reason in the council except that of the President shall be filled up by any member of the Association nominated by the President for the purpose, with the consent of the remaining members of the council.

ii) The vacancy of the President shall be filled up by the vice-President until next Nepal veterinary conference.

13. At all meetings of the general body and of the council, the decision of the majority shall prevail and in case of equality of votes, the presiding officer shall have the privilege of casting a deciding vote.

14. Any member of the Association can move at the general body meeting any resolution in furtherance of the obje-

ctives of the Association, provided notices thereof had been given to the General Secretary at least one week in advance. Power, function and duties of the Office bearers:-

1. The President:-

i) He is the constitutional head of the organisation.

ii) He shall preside at all meetings of the association, council & of the committees of which he is a member.

iii) He shall guide and control the activities of the Association

iv) He shall regulate the proceedings of the meetings and conferences, interpret the rules and regulation and decide doubtful points.

v) He shall have a casting vote.

vi) He shall have the authority to call a meeting of the council in case of emergency arising by any reason what so ever.

2. The vice president:- He shall help the President in the discharge of the functions and carry out the duties of the President during his absence.

3. The General Secretary:-

a) He shall be incharge of the office of the Association and its properties.

b) He shall carry out all correspondence related to the Association.

c) He shall organise, arrange and conven all the meetings, conferences, lectu-

res and demonstrations.

d) He shall record the proceedings of all the meetings, and shall get them duly signed by the President for presentation in the next meetings.

e) He shall maintain a correct and upto date register of all the members.

f) He shall be the authority to sanction amount up to Rs. 75/-

g) He shall bring any matter which he considers necessary in the interest of the Association to the notice of either the council or the general body what so ever may be the case.

4) Joint Secretary cum treasurer:-

a) Shall help the general secretary in all his duties.

b) Shall be the custodian of the funds of the Association.

c) Shall collect subscriptions from the members of the Association.

d) Shall maintain a correct account of the receipts and submit it to the council as and when required.

e) Shall officiate as the general secretary endowed with full powers of the General Secretary during his absence for any reason.

16. Funds of the Association:-
The funds of the Association shall be deposited in Nepal Bank Ltd or Nepal Baniya Bank and with drawn with the signature of the President and the Joint Se-

cretary cum Treasurer as and when necessary. The account shall be audited annually by such person or persons and on such terms as the council may determine.

17. Elections of the Office bearers:-

A. General Rules

i) The office bearers shall be elected from among the members which does not include honorary members and Associate members of the Associations every year or at the time of conference.

ii) No member can stand for more than one post.

iii) A member stading for a post should be nominated by one members and seconded by the other.

iv) A member can neither propose not second more than one name for the same post.

v) The newly elected office bearers will hold Office after the cessation of conference week.

Bye-laws.

1. The General Secretary working in collaboration with the president, shall facilitate the work of the council by circulating to all members by post whenever necessary to obtain the openion of the members.

2. The General Secretary shall be responsible to maintain following records-

i) Register containing the name

of the members with their correct permanent and temporary address.

ii) Book containing the agendas and minutes of the general body meeting or the meeting of the council of the Association.

iii) Correspondence register & other allied files.

3. The joint Secretary cum treasures shall maintain the following records.

i) Subscription book showing clearly all the relevant details.

ii) Receipt book.

iii) Cash book.

iv) Voucher file

v) Bank pass book & cheque.

vi) Inventory book containing the list of expendable & nonexpendable properties of the Association with all particulars.

4 The General Secretary shall always have an advance of not more than Rs. 25/- and can reimburse it from the Treasury producing the necessary vouchers.

5. The treasurer may have an

advance of not exceeding Rs. 10/- withdraw from the bank only when demanded by the Secretary for bonafide expenses of the Association.

6. Items of expenditure not exceeding Rs. 20/- can be authorised by the President. For any items of expenditure exceeding that amount the sanction of the council must be taken.

7. Vouchers for all expenses as far as practicable, and necessarily for all amount exceeding Rs. 3/- must be obtained & should be handed over to the treasurer, who shall file it in his office and shall present them for auditing as and when required.

9. A veterinary conference will be held, under the auspices of Nepal Veterinary Association, as far as possible every year or at a suitable intervals, as decided by the council of the Association. The place and date of the conference shall be notified by the General Secretary at least before 3 months by correspondence to the members of the Association.

Association news:

1. Nepal Veterinary Association was established on 2024.3.11 and legally registered on 2025.11.13 (1967)

2. The present office bearers of the association are as follows:

President: Dr. N. B. Singh M. V. Sc.

Vice President: Dr. N. L. Sharma B. V. Sc. & A. H.

General Secretary: Dr. Durga D, Joshi B. V. Sc. & A. H., M. P. V. M. (Calif.)

Assistant General Secretary: Dr. M. N. Shrestha B. V. Sc. & A. H.

Tresurer: Dr. N. R. Joshi M. V. Sc.

3. Names of the member of the Nepal Veterinary Association:

- | | |
|------------------------------|----------------------------|
| 1. Dr. S. Pyakural | 2. Dr. M. N. Pandey |
| 3. Dr. A. C. Gupta | 4. Dr. N. R. Joshi |
| 5. Dr. T. B. Basnyat | 6. Dr. N. B. Singh |
| 7. Dr. S. L. Gupta | 8. Dr. K. R. Sharma |
| 9. Dr. S. L. Shrestha | 10. Dr. B. N. Thakur |
| 11. Dr. U. Singh | 12. Dr. T. P. Subba |
| 13. Dr. P. Sapkota | 14. Dr. L. B. Chand |
| 15. Dr. M. D. Lohani | 16. Dr. M. S. Kumar Sharma |
| 17. Dr. P. M. Shingh Pradhan | 18. Dr. K. N. Upadhyay |
| 19. Dr. S. K. Shrestha | 20. Dr. B. M. Basnyat |
| 21. Dr. N. L. Sharma | 22. Dr. M. N. Shrestha |

23. Dr. B. D. Shrestha
25. Dr. N. K. Yadab
27. Dr. B. M. Shrestha
29. Dr. T. N. Baidya
31. Dr. A. S. Khan
33. Dr. D. D. Joshi
35. Dr. S. L. Shrestha

24. Dr. B. K. Jha
26. Dr. D. B. Singh (Lt. Cornel)
28. Dr. S. B. Malla
30. Dr. P. N. Sharma
32. Dr. N. P. Singh Karki
34. Dr. R. R. Shukla

(Honorary member)

Book Review:

VETERINARY PUBLIC HEALTH HAZARDS IN NEPAL: By Dr. Durga D. Joshi. First edition, published by Mr. Chandra Kumar Bhattarai 15/268, Pakanajole, Kathmandu, Nepal, 119pp. (Including figures). Price Rs. 6/-, 1973.

In this book he has pointed out some of the major existing public health problems such as meat and milk inspection, rabies problem in different chapters along with suggestions and recommendations. However, index should have been given at the end which is lacking. Considerable number of spelling and printing mistakes have crept which could have been avoided with little more care.

However, this book represents methods and technics for implementing contributions by veterinary medicine and by veterinarians for the improvement of physical, mental, social-well-being of human health as a whole. Because this is the first book of its kind is very useful to the research worker, teacher and the student and also to the reader who is specially not trained in biology or human or veterinary medicine. This can also serve as a reference book in the Institute of Medicine, Agriculture, Veterinary, or Animal Sciences.

He passed away:-

Dr. Shyam Bir Malakar, M. V. Sc; expired on 2029-6-25 at the age of 36. Dr. Malakar, was the first Parasitologist of Nepal. His untimely death has made an irreparable loss to the Veterinary Profession of Nepal. We are deeply moved by the death of Dr. Malakar. He is survived by his wife and 4 children. The members of the profession organised a condolance meeting on 2029-6-26 and extended consolation to the grieved family.

Rates of advertisements:—

- | | |
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