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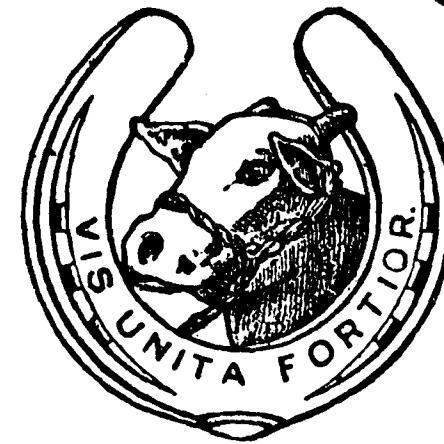
Vol. 37, No. 10

OCTOBER, 1960

# THE INDIAN VETERINARY JOURNAL

(The Journal of the Indian Veterinary Association)

*A Monthly Record of  
Veterinary Science*



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[THE JOURNAL OF THE INDIAN VETERINARY ASSOCIATION]

PUBLISHED MONTHLY

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A Monthly Record of Veterinary Science  
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Veterinary Profession

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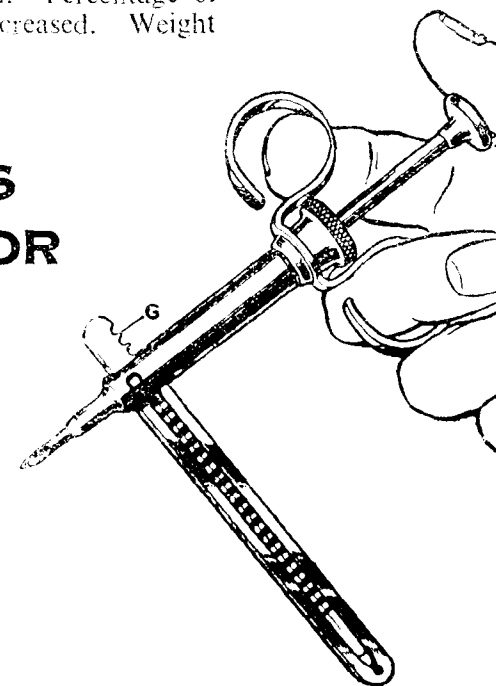


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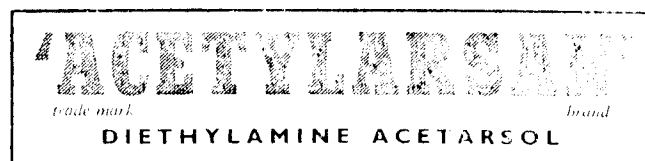
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THE

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## Editorial

### WHO IS BEST SUITED ?

Let the unprejudiced answer. Who is best suited for livestock work? The simple and straight answer is—Veterinarians. But the question is unnecessarily made to bristle with difficulties by dragging it into the realm of controversy even by those who ought to know better. It has created inter-departmental jealousies and bickerings. We are afraid such a state of affairs is not going to be conducive for the healthy development of livestock work in this land. What is needed is a happy co-ordination of work of different branches of this great Science. Animal Husbandry is a very vast science involving as it does, Veterinary Science, Dairy Science, Agricultural Science, Co-operative Credit and Marketing, etc. Each one is a vast field and specialisation in each is a life time work. India needs such specialisation and not inter-departmental quarrels.

There are four fields of work to be attended to under this great Science of Animal Husbandry. First and foremost is the work of preserving the livestock both in health and in disease. A casual look into the present day curricula of the various Veterinary Colleges should convince anyone that Veterinarians are easily the best equipped to look after the livestock both in health and in disease, even as their Medical confreres are with regard to human population. No body ventures to claim there, that because some are adepts in social welfare, in industrial expansion or in growing food materials rich in protein, vitamins and the like, that they are better fitted to be in charge of the human population in health. But where animals are concerned this wrangle has unnecessarily been brought about through lack of firmness on the part of those who have the destiny of the future livestock wealth of this land in their hands.

The Veterinarian with his knowledge of Anatomy, Physiology, Animal Hygiene, Animal Nutrition, Animal Genetics, Animal Gynaecology, Dairying, Fodder Crops, Parasitology, Bacteriology, Surgery and Medicine, is the one person who could claim without fear that he could manage the livestock of the land both in health and in disease without any other extraneous help. Can the same be said of others? If an animal is off colour, off feed, it is the Veterinarian who is to be called in; if she develops any kind of disease, it is the Veterinarian who has to run up and investigate and take both prophylactic and curative methods; if there is difficulty in calving it is the Veterinarian who has to set it right. Where then is he lacking to undertake livestock work? Is it in the care and management of animals? We assert that if he is not fit in that field, then nobody is. With his knowledge of Animal Hygiene and Animal Nutrition, he can certainly manage the feeding and up-keep of animals to the utmost standard required. If there are a few Veterinarians here and there who fall short of such expectations, they should be marked and weeded out. It should be realised that such men are to be found in all professions and at all levels of society. They go to the wall by the simple process of survival of the fittest. Again is it in the study of pedigree and performance records of animals and chalking out a breeding programme that he is found wanting? We hope not. Some of the Veterinarians in charge of big livestock farms have proved their worth. Even so, we admit it is a special branch of Science, wherein no body could claim perfection. Knowledge and experience are dove-tailed in this branch of work. Specialisation in Genetics is going apace at Post-graduate level in some of the Veterinary Colleges and we are certainly making the utmost use of the Geneticists available in the land. But a person who has specialised only in one branch of this vast science cannot displace the Veterinarian who is more or less a full-fledged man in Animal Science. So much for the first and primary field of preserving the livestock of the land both in health and in disease.

The next field is Dairying. It is a very vast field with great potentialities in our land. The Dairyman is a specialist and not a general livestock man. His work begins the moment the milk leaves the udder of the cow. He has specialised in Dairy Hygiene, Dairy Chemistry, Dairy Bacteriology, Dairy Research and Dairy Technology. This specialised work is not receiving the attention it deserves in our land because of his being saddled with other items of work which are best left to the Veterinarians. It is a pity the Government have not

organised a separate Dairy Department in each State even so late in the day. They started producing Dairy Diploma holders and Graduates in dairy science without either developing dairy industry or constituting a separate Dairy Department. They put the cart before the horse. At present for lack of purely dairy work, these specialists are trying to work in the general field of breeding, feeding and management of livestock. It is neither in the interest of dairying nor in the interest of livestock development. They must confine and concentrate on the development of Dairy Science. It is only then India can advance in this field of work. It is true a good deal of co-operation and co-ordination is necessary between the first and second fields of work and that could be made possible if all concerned from the Government downwards place the interests of the country and the advancement of science before everything else.

The third field in this Animal Husbandry work is raising of fodder crops, maintenance of pastures, production of silage, hay etc. This part of crop husbandry can easily be managed without much fuss with or without the help of an Agricultural Officer. Here again we can well establish a happy co-operation between departments and individuals.

The fourth field of co-operative Credit and Marketing is an entity by itself and can be so worked in collaboration with the first three fields mentioned above.

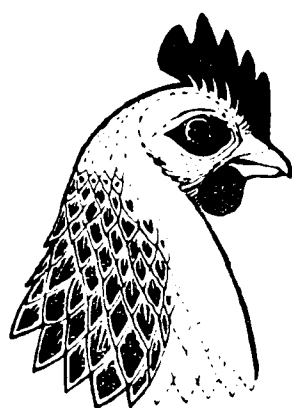
Our contention is that while all others specialise in particular branches of this Animal Husbandry work, the one man who goes through the entire gamut of Animal Science is the Veterinarian and as such must be entrusted with the general livestock development work in this land. Any State Government which ignores this fact, is doing the greatest disservice to the mother-land. But the trouble is we have far too many advisers from other countries; they are good men and true but their knowledge of our culture, character, historical background, rural economy, social structure and the like is too meagre to be of real help to us. It is time we tell them, politely of course, that we had left behind our feeding bottle long, long ago and that we would like to stand on our own legs through trial and error methods.

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## General Articles

### STUDIES ON GASTRO-ENTERITIS IN SHEEP IN THE UTTAR PRADESH

By

B. D. RAWAL, M.Sc. ph.D. (Sheffield),  
*Virus Research Centre, Poona\**

and

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*Central Sheep and Wool Research Station, Pashulok, Rishikesh.*

Attention was drawn to the occurrence of gastro-enteritis of unknown etiology in sheep when the Central Sheep and Wool Research Station, Rishikesh, lost several of their valuable rams last year. Indeed, between May and October, 37 of the 66 mortalities in the farm sheep were suspected to be due to this disease condition.

The syndrome was characterised by pyrexia (106°-108°F) lasting for four to six days and followed by diarrhoea which was often blood-tinged. While the sheep having the acute manifestations succumbed to the disease in the pyrexial stage animals with chronic illness did not show any signs of inappetence or lethargy. At post-mortem petechial and diffuse haemorrhages on epicardium and endocardium in the left ventricle of the heart were noted in about 80% of the cases. Patchy haemorrhages in the pyloric end of the abomasum, duodenum and occasionally in the ileum were seen. Linear and marked hemorrhages of colon and caecum were present. In about 20% of the cases subcapsular haemorrhages and congestion of the cortex and the medulla of the kidneys was found. A quarter of the cases recorded had consolidation of lungs. The histopathological examination revealed that the submucosa was oedematous. In the heart small foci involving the epicardium and the underlying tissue showed chronic inflammation and mucoid degeneration of fat. The spleen was markedly congested. The follicles mostly consisted of reticulum and plasma cells with few mature lymphocytes. The sinusoids were engorged with blood and many reticuloendothelial cells laden with haemosiderin. There was a diffuse inflammation of the lung characterised by large, foamy mononuclear cells with patchy areas of polymorphonuclear cell infiltration. The bronchioles contained exudate mixed with desquamated epithelial cells and red blood cor-

\* Present address: Bacteriology Division, Quality Control Department, Hindustan Antibiotics Limited, Pimpri, Near Poona.

puscles. Round, slightly eosinophilic, granular intracytoplasmic inclusion bodies were seen within the epithelial cells of the bronchioles. With a view to study this syndrome, etiological and serological studies were undertaken and our findings form the subject of this paper.

#### Own Investigations

*Sampling procedures*:—For the purposes of the isolation of the aetiological agent samples of whole blood from pieces of liver from one, spleen and lungs from four and of brain from one sheep having overt manifestations of the syndrome were collected at Rishikesh and sent to Poona on ice. A breedwise serum sampling was also undertaken as follows:

*Rampur Bushier*:—These are found in the Himachal Pradesh and in Tehri districts in Uttar Pradesh. The flocks migrate to alpine pastures at an altitude of about 12000 to 16000 feet during the summer and come down to the foot of hills at an altitude of about 1000 to 2000 feet for wintering. Of the 12 samples collected, 4 were from the sheep affected by gastroenteritis.

*Danpuri Sheep*:—These are of non-descript type and are found in the Almora district of the Uttar Pradesh. These are non-migratory and stay at altitudes of 6000 to 8000 feet. Out of the five sheep sampled two were affected by unknown syndrome.

*Muzaffarnagari*:—These sheep came from the plains of Western Uttar Pradesh at a height of 800 to 1000 feet. One of the eleven sheep whose sera were taken had suffered from this syndrome.

*Bikaneri*:—These are found in the plains of Rajasthan. Sera were obtained from the animals brought from Mechanised State Farms at Madurikhand and Bharari. Four ewes and three rams of the thirteen animals bled had gastro-enteritis of unknown etiology.

*Polwarth rams and its crosses with local sheep*:—Polwarth rams are imported from Australia and are crossed with local sheep. Of the 24 sheep bled 6 were affected by gastro-enteritis.

*Rishikesh sheep*:—These belonged to a private farm near the Central Sheep and Wool Research Station Farm, Rishikesh. These were apparently healthy and 11 were bled.

*Majri Sheep*:—These sheep were bled at village Majri in Dehradun District at an altitude of 1600 feet. No illnesses were recorded in these.

*Goats*:—Five samples of blood were collected from Majri goats. In addition five samples of blood were drawn from goats kept in the

Rishikesh farm along with the ailing sheep. Yet none of them had any overt manifestations of the syndrome.

*Experimental procedures*:—The tissues were ground in a sterile mortar with pestle and suspended in 0.75% Bovalbumin phosphate saline, pH 7.4, to make a 10% suspension. This was kept in a refrigerator for one hour to let the coarse particles settle down. These suspensions as well as the blood samples were then inoculated into 7-8 days old embryonated eggs of white Leghorn fowls by the yolk sac route and into 9-10 days old eggs by the chorioallantoic route. These were incubated at 37°C for seven days when they harvested. The embryos did not manifest any signs of illness. However, in the eggs inoculated with the lung suspension from the lamb 9 and blood from lamb 15 respectively by the chorioallantoic route, distinct whitish pocks were seen. A 10% suspension of the membrane was made in saline and organisms resembling the proliferative form of *Toxoplasma gondii* (Nicolle and Mancaux, 1908) were seen in Leishman stained smear. The organism was typically crescentic with distinct nucleus. On passaging this suspension to monkey kidney cell culture tubes cytopathic effect with granulation of the cells was produced. Indeed, three passages were made in the cell culture and *Toxoplasma* was recovered from the supernatant cell culture fluid by inoculating it into fertile eggs by the chorioallantoic route at each passage level.

Besides the morphological and cultural identification of the isolates, serological evidence was also obtained. A 10% suspension of the infected membrane was made in saline, alternately freeze and thawed five times in dry ice-acetone and water respectively. The suspension was centrifuged at 2500 r.p.m. for 30 minutes and the supernatant was used in a complement fixation test as antigen against known *Toxoplasma* immune serum. A standard *Toxoplasma* antigen was also included in the test. The antigenicity of the new isolate was tested at 2nd and also at the 5th passage levels in eggs, the titres being 1:20 and 1:40 respectively. With the same serum the standard antigen gave a titre of 1:60, thus confirming the antigenic relationship of the new isolate with *Toxoplasma*.

In view of these isolations 85 sheep and 10 goat sera were flown to Sheffield, England where they were tested by Dr. J. K. A. Beverley for *Toxoplasma* dye-test antibodies (Beverley and Beattie 1952). The sera were inactivated at 56°C for 30 minutes prior to testing. The results are presented below.

TABLE I  
Showing the incidence of *Toxoplasma* dye-test antibodies in sheep  
suffering from gastro-enteritis in the Uttar Pradesh.

| Breed tested                                             | Total tested | Number Positive | Dye-test titres        |
|----------------------------------------------------------|--------------|-----------------|------------------------|
| Rampur Bushier ...                                       | 4            | 3               | 1: 8, 1: 8, 1: 58      |
| Danpuri ...                                              | 2            | 2               | 1: 17, 1: 32           |
| Muzzaffarnagari ...                                      | 1            | 0               |                        |
| Bikaneri                                                 |              |                 |                        |
| Ewes ...                                                 | 4            | 4               | 1: 4, 1: 5, 1: 7, 1: 5 |
| Rams ...                                                 | 3            | 3               | 1: 5, 1: 7, 1: 70      |
| Polwarth rams and its cross-<br>ses with local sheep ... | 6            | 3               | 1: 5, 1: 7, 1: 9       |
| Total ...                                                | 20           | 15              |                        |

TABLE II  
Showing the incidence of *Toxoplasma* dye-test antibodies in apparently  
healthy sheep and goats in the Uttar Pradesh.

| Breed tested                                               | Total tested | Number Positive | Dye-test titres         |
|------------------------------------------------------------|--------------|-----------------|-------------------------|
| Rampur Bushier ...                                         | 8            | 3               | 1: 11, 1: 24, 1: 26     |
| Danpuri ...                                                | 3            | 2               | 1: 7, 1: 48             |
| Muzzaffarnagari ...                                        | 10           | 3               | 1: 7, 1: 8, 1: 11       |
| Bikaneri ewe ...                                           | 6            | 0               |                         |
| Polwarth rams and its cross<br>breeds with local sheep ... | 18           | 4               | 1: 4, 1: 4, 1: 9, 1: 10 |
| Rishikesh ...                                              | 11           | 2               | 1: 22, 1: 28            |
| Majri sheep ...                                            | 9            | 2               | 1: 5, 1: 25             |
| Total sheep ...                                            | 65           | 16              |                         |
| Majri goats ...                                            | 5            | 0               |                         |
| Pashulok goats ...                                         | 5            | 0               |                         |

Discussion

While *Toxoplasma* is known to produce disease in sheep (Beverley, 1959) it does not seem to be the causative agent of the gastro-enteritis syndrome reported herein for the dye-test titres encountered in the affected sheep are indeed, low. Latent toxoplasmosis in sheep is also known to occur and dye-test antibodies have been encountered in apparently healthy sheep as in the present tests and elsewhere (Rawal, 1959). However, in the present investigation a higher overall incidence in the diseased sheep (15/20) than in the healthy ones is indeed striking. This may suggest that either the etiological agent of the syndrome is antigenically related to *Toxoplasma* or that the animals

affected by the syndrome were indeed, more susceptible to toxoplasmosis. This latter possibility seems to be a more likely one, for toxoplasmosis is endemic in the Uttar Pradesh, as evidenced by isolations and serology in the present study, in both hill and plain sheep. Further Campbell (personal communication, 1960) believes that in canine toxoplasmosis dogs with bacterial or viral infections are more susceptible to toxoplasmosis. Similar may be the case with sheep too and this study points to just that. Indeed, the occurrence of cytoplasmic inclusion bodies in the bronchioles of the affected sheep may suggest viral aetiology and that pneumonia may be associated with the syndrome.

Summary

The prevalence of post pyrexial gastro-enteritis in sheep in the Uttar Pradesh is reported. The aetiology of the syndrome remains obscure. However, a higher incidence (15/20) of toxoplasma dye-test antibodies was found in sick sheep than in healthy Sheep (16/65). These and two successful isolations of *Toxoplasma gondii* from the Indian sheep point out to the occurrence of toxoplasmosis in sheep in India for the first time. While an association between toxoplasmosis and the gastro-enteritis syndrome is apparent, on the basis of histopathological evidence a viral aetiology of the syndrome is suggested.

Acknowledgments

We wish to thank Dr. C. R. Anderson, Director, Virus Research Centre Poona, for the facilities provided and to other members of the staff for their most valuable cooperation. To Dr. J. K. A. Beverley of the University of Sheffield we are especially indebted for supplying us the various materials and testing the sera for toxoplasma dye-test antibodies. The assistance of various people in the Central Sheep and Wool Research Station, Rishikesh is gratefully acknowledged.

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Hallo! Remember the I.V.J. Reserve Fund.

# ON A NEW SPECIES OF WHIPWORM—*TRICHURIS RAOI* FROM A CAMEL

By

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A male *Trichuris* was recovered at autopsy from the caecum of a camel belonging to a circus troupe. The specimen which was in excellent condition proved to be a new species on detailed examination.

## Description

**Male:**—The worm measures 33.6 mm. in length. The slender anterior portion of the body is 17.8 mm. long and has a maximum thickness of 0.35 mm. at its distal end. The posterior portion measures 15.8 mm. in length and 0.8 mm. in breadth. The intestine is 13.5 mm. long and 0.17 mm. broad, while the cloacal tube measures 2.3 mm. in length and 0.3 mm. in width. The testis begins at about the level of origin of the spicular tube and is 14 mm. long. It is 0.17 mm. wide at the start but becomes broader in the latter half to 0.5 mm. The testis is straight in the region of ejaculatory duct and convoluted in the region of vas deferens. The vas deferens and the ejaculatory duct measure  $7.0 \times 0.5$  mm. and  $6.5 \times 0.42$  mm. respectively with a conspicuous constriction in between. The spicule is 5.0 mm. long and 0.04 mm. thick. It is expanded at the proximal end to a breadth of 0.14 mm. while at the terminal portion it tapers to a point. The spicular sheath is exerted, cylindrical and lacks distal enlargement. It measures 1.0 mm. long and 0.12 mm. broad and is armed with spines throughout. The spicular tube arises from the anterior portion of the cloacal tube at 1.7 mm. from the posterior end and is 2.2 mm. long and 0.2 mm. wide.

## Discussion

The morphological characters of this worm of total size, proportion of the anterior portion to the posterior portion, nature of testis, length of vas deferens ejaculatory duct, cloacal tube, spicule and spicular tube as well as the length, shape, and armature of the spicular sheath do not conform entirely with those of any one of the whipworms described from the camel. Hence the helminths under study is condered as a new species and is named as *Trichuris raoi*, after Dr. M. A. N. Rao, an eminent Veterinary Parasitologist.

*Trichuris raoi* n.sp.

**Specific diagnosis:**—Male 33.6 mm. long; anterior portion slightly longer than posterior portion; testis starting at the level of the origin of spicular tube, straight at the beginning and convoluted anteriorly; cloacal tube, vas deferens, ejaculatory duct, spicule, spicular tube and spicular sheath 2.3, 7.0, 6.5, 5.0, 2.2 and 1.0 mm. long respectively

ON A SPECIES OF WHIPWORM—*TRICHURIS RAOI* FROM A CAMEL  
By V. S. ALWAR and H. N. ACHUTHAN

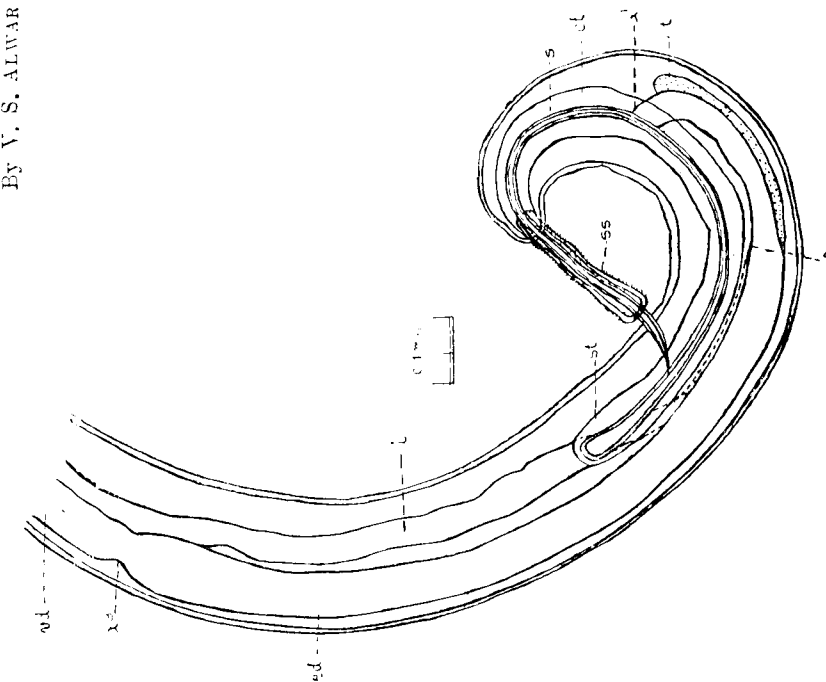


Fig. 1

Camera lucida drawing of the posterior portion of male.  
ct, cloacal tube; ed, ejaculatory duct; i, intestine; s, spicule;  
ss, spicular sheath; st, spicular tube; t, testis; vd, vas deferens;  
x2, junction between ejaculatory duct and vas deferens; x3, junction of cloacal tube and spicular tube.

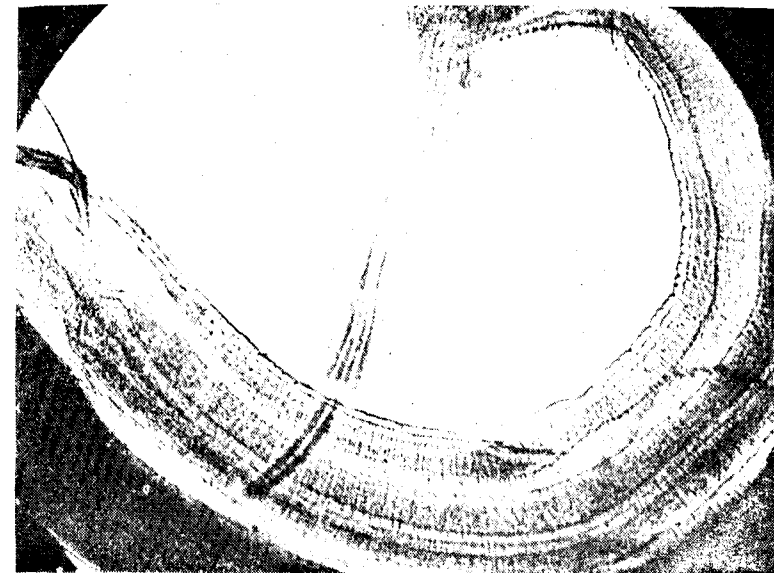


Fig. 2

Photomicrograph of the tail end of male: x50.

### Materials and Methods

The material from a Rhode Island-red hen was received for histopathological examination from the Poultry Research Division of this Institute. The bird was about one year old and death was attributed to "Avian Leucosis Complex" in view of enlargement of the visceral organs. The ovary was collected in 10% formal-saline. Serial paraffinised sections 4 to 5 microns in thickness, were stained with Lillie-Mayer's haematoxylin and eosin and Van Gieson's picro-fuchsin.

### Results

**Macroscopic changes:**—On *post-mortem* examination, the left ovary was found to be grossly enlarged and had no maturing ova. The growth was well pedunculated, and enclosed in an intact fibrous connective tissue capsule. The tumour was approximately the size of a walnut, yellowish-white in colour and oval in shape with distinct lobulations. These lobules, on the cut surface were solid in nature without any cavities and were divided into sections by connective-tissue stroma. Multiple focal areas of haemorrhages were seen on the cut-surface. All the other organs were apparently normal macroscopically, except liver which was enlarged. The abdominal cavity was filled with a small quantity of serous fluid.

**Histopathological changes:**—Histologically, the tumour-mass mostly presented a medullary type of growth, consisting of the mature granulosa cells, interspersed with delicate blood vessels and a quantity of filamentous connective tissue strands, detected by the Van Gieson's method of staining, replacing the normal parenchyma of the ovary. In other areas, the same tumour presented small cavities, surrounded by the solid masses or cords of mature and immature granulosa cells with concentrically arranged fibrous connective tissue, supporting this formation (Fig. 1). In some of the areas, it was also seen that the cells were more or less detached from the basement connective tissue and lying in the lumen, probably due to degenerative changes (Fig. 2). However, none of these areas of lumens showed the presence of fluid, nor the presence of mitotic figures in these lining cells. The blood vessels leading to the tumour either showed severe sclerotic changes almost obliterating the lumen of blood vessel or gross dilatation with necrobiotic changes in the surrounding parenchyma. Scattered irregularly, in this tumour mass, were multiple focal areas of haemorrhages, probably due to the rupture of minute blood vessels with heavy deposition of haemosiderin pigments.

The connective tissue stroma in the tumour was quite characteristic, chiefly composed of mature type of fibrous connective tissue carrying the blood vessels. However, the amount of connective tissue stroma compared to the parenchyma was far less in quantity.

### Acknowledgment

Thanks are due to Shri P. G. Pande, M.Sc., M.R.C.V.S., Director, I. V. R. I. Izatnagar for providing all the laboratory facilities for carrying out this work, and to Dr. E. Cotchin for identifying the tumour.

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### OBSERVATIONS ON THE EFFECT OF IMMUNIZATION OF FOWLS WITH DIFFERENT VACCINE STRAINS OF RANIKHET (NEWCASTLE) DISEASE VIRUS

By

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Immunization of fowls against Ranikhet disease with live attenuated virus has been in vogue in India as well as in many other countries a little over fifteen years. In India a strain of virus attenuated through serial passages in embryonating hens' eggs has been very successfully used in all the organized poultry farms as well as in village poultry flocks. However, occasionally reports are received that post vaccination reaction is rather severe in the vaccinated chicks; further the vaccine is advocated for use only in chicks of six weeks and above of age and the younger ones have to be left unprotected. In the recent past different routes have also been used for administering the vaccine to chicks in different countries depending upon the convenience and cost of administration of vaccine and at the same time bearing in mind the efficacy. However, in India subcutaneous or intramuscular route of immunization of chicks is being practised. Seetharaman and Nilakantan (1951) and Dhanda, *et al* (1958) have indicated the use of cutaneous route of vaccination of birds against Ranikhet disease.

Results obtained on the comparative efficacy of different vaccine strains when administered through various routes are presented in this paper.

### Materials and methods

Four strains of vaccine virus, namely, Mukteswar (R<sub>1</sub>B), Palestine, American 'BI' and British 'F' were used in this study.

**Mukteswar (R<sub>1</sub>B) strains:**—(Haddow and Idani 1946): This strain had undergone 390 serial passages in embryonating eggs. After in-

fection through allantoic cavity route, the embryos die in 36 to 48 hours. Haemorrhage in the brain, petechiae on the pectoral and abdominal region and oedema of the abdomen are the constant macroscopic lesions seen in the embryos infected with this strain.

*Palestine strain* :—(Komarov and Goldsmith 1946): This strain of virus had undergone seventeen serial passages in embryonating hens' eggs after receipt in our laboratory. This strain resembled the Mukteswar strain in its pathogenicity to chick embryos and in producing lesions in them.

*American 'BI' strain* :—(Hitchner and Johnson 1948): This strain had undergone fifteen serial passages in embryonating hens' eggs in our laboratory. Being a strain of low virulence it did not kill the embryos even after 72 hours of infection. Practically no macroscopic lesion was produced in the infected embryos excepting slight oedema of the abdomen in some. Presence of the virus in the allantoic fluid while harvesting had to be ascertained by carrying out spot haemagglutination test.

*British 'F' strain* :—(Asplin 1951): This strain had undergone 25 serial passages in embryonating eggs in our laboratory. This resembled the American 'BI' strain in its pathogenicity to chick embryos.

#### Routes of administration of vaccine

- (i) *Intramuscular route* :—One ml. of a 1:1000 dilution of allantoamniotic fluid containing the virus was given intramuscularly in the wing.
- (ii) *Intradermal route* :—A mounted sewing needle with the eye end sharpened was used for this purpose. The needle was dipped in the allantoamniotic fluid containing the virus and pricked in the web of the wing. Two pricks were given to each bird.
- (iii) *Intranasal route* :—A small drop of allantoamniotic fluid containing the virus (approximately 0.05 ml.) was dropped into the nostrils of chicks.
- (iv) *Conjunctival route* :—A small drop of the fluid containing the virus was dropped on the conjunctiva of one of the eyes.
- (v) *Oral route* :—Birds were allowed to drink a 1:50 suspension of the allantoamniotic fluid containing the virus in normal saline solution.

All the experimental birds were bled before vaccination as well as at weekly intervals after vaccination for collection of serum and sera thus obtained from all the birds were subjected to haemagglutination inhibition (HI) test.

For carrying out the HI test serial double fold dilutions of samples of sera were made in perspex haemagglutination trays, to which constant quantity of virus containing 2 HA units as determined earlier was added. After a lapse of one hour 0.5 per cent suspension of chick red blood cells was added and the results read when the cells settled down, that is, nearly an hour after addition of the cells.

*Immunity test* :—As a routine all the experimental birds were subjected to challenge at varying periods after vaccination with approximately 104 minimum infective doses of virulent Ranikhet disease virus which had been maintained by serial passages in susceptible fowls once a month.

#### Results and discussion

Groups of 6 to 8 birds were used in this study for vaccinating through different routes with the four different strains. Average HI titres of sera of birds used in the experiments are presented in the following table:

TABLE  
Showing the average HI titre of sera of birds vaccinated with  
different strains of Ranikhet disease virus.

| Strains used<br>for vaccination | Route of<br>vaccination | Before<br>vaccination<br>I: | Average HI titre |                   |                   |                   |                   |
|---------------------------------|-------------------------|-----------------------------|------------------|-------------------|-------------------|-------------------|-------------------|
|                                 |                         |                             | Post vaccination |                   |                   |                   |                   |
|                                 |                         |                             | 7th<br>day<br>I: | 14th<br>day<br>I: | 21st<br>day<br>I: | 28th<br>day<br>I: | 35th<br>day<br>I: |
| Mukteswar                       | Intramuscular           | 0                           | 1446             | 8840              | 4075              | 3100              | 2078              |
|                                 | Intradermal             | 0                           | 2160             | 3200              | 3840              | 14080             | 1120              |
|                                 | Intranasal              | 0                           | 693              | 4603              | 2183              | 13663             | 3200              |
|                                 | Conjunctival            | 0                           | 1088             | 6120              | 2560              | 4760              | 2298              |
|                                 | Oral                    | 0                           | 507              | 5978              | 1493              | 8820              | 1280              |
| Palestine                       | Intramuscular           | 0                           | 537              | 7860              | 3184              | 1682              | 550               |
|                                 | Intradermal             | 0                           | 68               | 2804              | 4510              | 2048              | 1152              |
|                                 | Intranasal              | 0                           | 16               | 1423              | 2160              | 1280              | 640               |
|                                 | Conjunctival            | 0                           | 192              | 970               | 740               | 192               | 347               |
|                                 | Oral                    | 0                           | 920              | 8000              | 4640              | 4693              | 1600              |
| 'BI'                            | Intramuscular           | 0                           | 10               | 30                | 15                | 20                | 15                |
|                                 | Intradermal             | 0                           | 0                | 668               | 400               | 627               | 416               |
|                                 | Intranasal              | 0                           | 0                | 370               | 627               | 698               | 464               |
|                                 | Conjunctival            | 0                           | 0                | 312               | 180               | 320               | 498               |
|                                 | Oral                    | 0                           | 0                | 70                | 307               | 320               | 1147              |
| 'F'                             | Intramuscular           | 0                           | 23               | 46                | 48                | 72                | 15                |
|                                 | Intradermal             | 0                           | 16               | 992               | 282               | 285               | 180               |
|                                 | Intranasal              | 0                           | 18               | 2856              | 440               | 560               | 378               |
|                                 | Conjunctival            | 0                           | 38               | 288               | 60                | 20                | 28                |
|                                 | Oral                    | 0                           | 9                | 333               | 120               | 183               | 188               |

It may be pointed out that there was some difference in the exact quantity of virus introduced into the system of birds while administering vaccine through different routes, but the defect could not be rectified. However, it had been our experience that when a fairly high dosage of the vaccine was used the antibody response did not differ appreciably even if there was a difference in the dose. In the foregoing experiments the average embryo infective dose of all the vaccine strains was 0.1 ml of  $10^{-7}$  dilution of allantoamniotic fluid collected from infected embryonating eggs. This ensured a high dosage of the vaccine administered to birds in every case.

There was certain amount of variation in the antibody response by individual birds to the same vaccine strain administered by a particular route. However, the pattern of variation was such that the HI antibody response could be classified as high and low. It would be observed from the table that in the case of birds vaccinated with Mukteswar and Palestine strains the HI titre was of a fairly high order whereas the same in the case of birds vaccinated with 'BI' and 'F' strains was of a low order. In the latter two cases administration of vaccine through intramuscular route had a definite disadvantage.

*Immunity test of vaccinated birds:*—Most of the birds of the experiment were subjected to challenge with virulent Ranikhet disease virus along with suitable unvaccinated controls. It was observed that all the birds vaccinated with any of the four vaccine strains, irrespective of route of vaccination withstood the challenge infection atleast for two months after vaccination. When tested eight months after vaccination through intramuscular route, birds vaccinated with 'BI' and 'F' strains succumbed to the infection and no HI antibody could be demonstrated in their sera, but those vaccinated with Mukteswar and Palestine strains proved solidly immune to challenge infection and the HI titres of their sera were 1:853 and 1:320 respectively. Duration of immunity of birds vaccinated with 'BI' and 'F' strains through more appropriate route is being determined.

*Development of protection against infection with virulent Ranikhet disease virus in birds vaccinated with different vaccine strains:*—Groups of birds were vaccinated by intramuscular and intranasal routes with the four vaccine strains. Two birds from each lot were challenged with virulent Ranikhet disease virus 24, 48, 72, 96 and 120 hours after vaccination along with suitable unvaccinated controls which invariably died of typical R. D. in four days. Sera from the vaccinated birds were also collected daily and the HI titre determined.

It was observed that under the experimental conditions birds vaccinated with Mukteswar and Palestine strains withstood the challenge

infection 72 hours after vaccination but not in 24 or 48 hours. The presence of HI antibody in the sera of these birds could be detected only on the 5th day after vaccination. The birds vaccinated with 'BI' and 'F' strains resisted challenge infection five days after vaccination. Detectable HI antibodies in their sera were present from 6th day after vaccination. The route of vaccination did not have any effect in this particular experiment.

*Comparative test between Mukteswar and Palestine strains:*—In order to compare the reaction evoked by these two strains on vaccinated chicks, two lots each of 87 chicks of 6 to 10 weeks of age were inoculated intramuscularly with the two vaccines. Thirteen unvaccinated chicks were left as incontacts along with each group of vaccinated chicks. It was observed that four of the chicks vaccinated with Palestine strain and 3 of those vaccinated with Mukteswar strain died due to causes other than R.D. and 2 and 3 chicks respectively of the two groups developed lameness and then recovered. Immunity test on a few chicks from each group revealed that they were solidly immune. Incontact chicks remained well during the period of observation of three weeks but immunity test on them did not give any conclusive results. Thus there was practically no difference as regards the virulence to chicks and production of immunity between the two strains.

#### Summary

Observations on the use of four vaccine strains of Ranikhet disease virus namely, Mukteswar, Palestine, American 'BI' and British 'F' are recorded.

Irrespective of route of vaccination, namely, intramuscular, intradermal, intranasal, conjunctival or oral Mukteswar and Palestine strains evoked a high order of HI antibody response in the vaccinated birds which withstood challenge infection with virulent virus even after a period of 8 months. Protection against challenge infection was set up in 27 hours after vaccination even though HI antibodies could be detected in their sera only 5 days after vaccination.

HI antibody response in the case of birds vaccinated with 'BI' or 'F' strain was of a low order. The birds withstood challenge infection 2 months but not 8 months after vaccination. Protection against challenge infection was set up only 5 days after vaccination and HI antibodies could be detected in serum 6 days after vaccination.

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### PATHOLOGY OF VEGETATIVE ENDOCARDITIS IN A HARIANA COW

BY

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The occurrence of valvular endocarditis particularly the vegetative form is not uncommon in domestic animals irrespective of age and species. According to Evans (1957), Carlisle (1841) appears to be the first worker who described the endocarditis in cattle, followed by Gowing (1848), Sheriton 1852), Gamgee (1857), Anon (1859), Roberts (1881) and McFadyean (1889). Thomassen (1899) and Sheather (1911) pointed out the possible etiology of this syndrome. The former associated the endocardial lesions as a result of polyarthrititis and the latter described a case in which the endocarditis was present along with the septal defect in the heart. Brown (1955) related bacterial endocarditis in cattle as a sequelae to three day stiff sickness. Evans (1957) described 40 cases of bacterial endocarditis in cattle. The present communication is to record a case of vegetative endocarditis in a Hariana cow and to elucidate the clinical manifestations in relation to the pathological lesions.

#### History of the case

A Hariana cow No. 566/36 aged 3 years and one month belonging to Dairy Demonstration Farm, Mathura developed loss of condition. It subsequently showed respiratory distress and extreme weakness. The animal was admitted to the Kothari Pashu Chickitshalaya on September 1st, 1959. It was treated suspecting to be a case of pneumonia. During the course of treatment no rise in temperature was present. On 8-9-59 and 9-9-59 the temperature remained at 98°F. The animal died on 10-9-59. and the cadaver was necropsied on 10-9-59.

### Post Mortem Lesions

The heart and pericardium showed increased straw coloured pericardial fluid in the sac, petechial areas of haemorrhages on the right side of myocardium and gelatinous fat mixed with white chalky deposits around coronary grooves. Thick vegetations like thrombi measuring 1" wide and about  $\frac{1}{2}$ " thick were observed on the auricular surface of tricuspid valve with stenosis of the lumen. Superficially the vegetations were a fragile mass of dark red colour, covering over the thick creamish deeper growth which was attached to the septum (Fig. 1).

The apical, cardiac and diaphragmatic lobes of the lungs showed consolidated patches which on section appeared as dark red conical areas. The trachea was congested and full of frothy exudate.

Liver, spleen and kidneys were highly congested. Ileum and ileocaecal valve were oedematous and thickened. The mucous membrane was covered with catarrhal exudate.

Impression smears from lungs, intestines, valvular vegetations and udder revealed no pathogenic organisms.

### Histopathology

The tissues for histopathological examination from vegetations, heart, kidneys, liver, spleen, lungs, udder and intestines were preserved in 10% formol saline. The paraffin sections of 5-6  $\mu$  thick were stained by Harris Haematoxylin and 1% alcoholic solution of eosin. The sections for the demonstration of organisms were stained by Maccallum Goodpasture's and Gram Weigert's stains. A few selected sections were also stained by Periodic acid Schiff reaction and Gridleys fungus stain.

**Heart:**—Vegetations appeared as laminated thrombi, (Fig. 2). At places the strongly acidophilic hyalinized mass was covered on either side by endothelial lining which was loose and partly desquamated. The subendocardium was distended with serofibrinous exudate along with the infiltration of large and small mononuclear cells in the fine meshes of fibrin (Fig. 4). Proliferation of connective tissue was noted under the necrosed superficial layers of some of the thrombi. Large mononuclear cells with some plasma cells, lymphocytes and neutrophils were irregularly infiltrating in the granulation tissue (Fig. 3). The neighbouring endothelial lining was swollen and the deeper fibrous stratum was distended with a variable oedema. Scattered at different places in the lesions were small extravasation of blood mixed with leucocytes and a few neutrophils. The degenerated myocardial fibers were separated by serofibrinous exudate.

No organisms could be seen in sections stained by Gram Weigert and Maccallum-Goodpasture's stain. The sections were also negative to Periodic acid Schiff reaction and Gridley Fungus stain.

**Lungs:**—Groups of necrotic foci were surrounded by alveoli having haemorrhages and serous exudate. Thrombi in the blood vessels were present and in a few organization of the thrombus was evident. The bronchial lumen was full of desquamated epithelium and catarrhal exudate. The blood vessels around such bronchioles were extremely congested. The interlobular septae were distended by serofibrinous exudate.

**Kidneys:**—Excessive hyperaemia and nephrosis of the renal tubules.

**Liver:**—No significant microscopic lesions.

**Udder:**—No significant lesions.

#### Discussion

The gross and microscopic lesions observed in the case under report correspond to the description of vegetative endocarditis given by Runnells (1956), Evans (1957) and Smith and Jones (1958). Unfortunately no cultural examination from the vegetations could be done and also no organism in the tissue sections could be demonstrated resulting in the uncertainty about the etiological factors. However the gross and microscopic lesions are suggestive of chronic non-suppurative vegetative valvulitis.

The clinical symptoms of respiratory distress associated with pneumonia, sub-normal temperature and extreme weakness can be related to anoxic condition as a result of general stasis of venous blood in the tissues and organs due to the stenosis of right atrio-ventricular orifice.

#### Summary

Pathology of vegetative endocarditis in a Haryana cow has been described and attempts have been made to relate the clinical symptoms to the lesions.

#### Acknowledgment

Grateful thanks are due to Sri C.V.G. Choudary, Principal, for the facilities provided.

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#### PATHOLOGY OF VEGETATIVE ENDOCARDITIS IN A HARIANA COW By B. S. RAJYA



Fig. 2



Fig. 4



Fig. 1

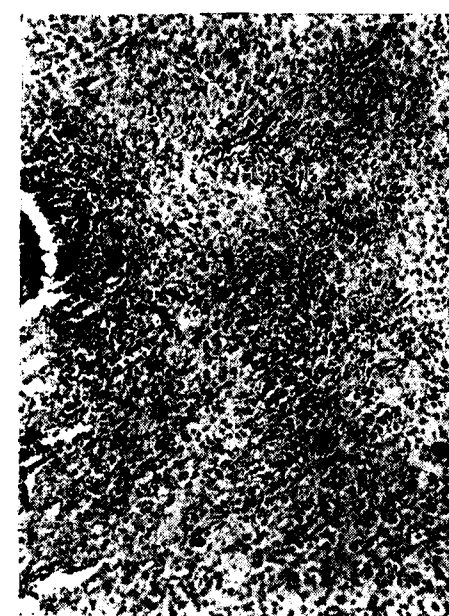


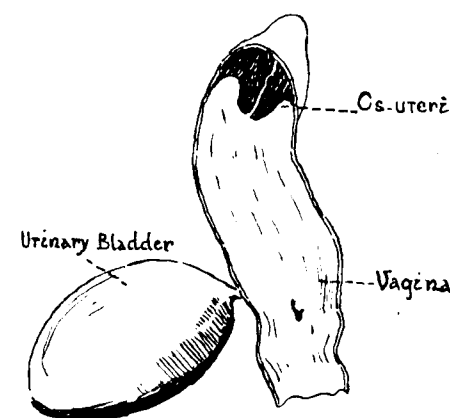
Fig. 3

## Malformations of the Genitalia in Cows

By B. B. MOHANTY and M. M. PATNAIK



Fig. 1  
Uterus Acornis.  
a: Os uteri; b: Urinary bladder;  
c-d: Vagina; e: Body of the uterus.



Schematic diagram of Fig. No. 1—  
Uterus Acornis.

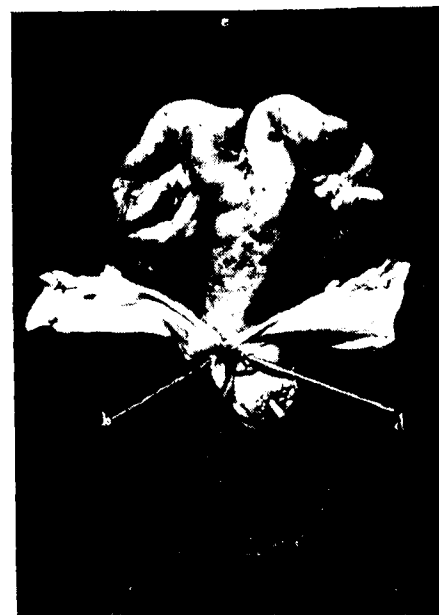
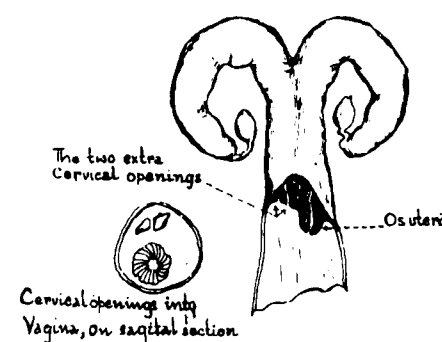


Fig. 2  
Cervix-triplex.  
a: Cornua; b-d: Two glass-rods in  
two extra cervical openings.



Schematic diagram of Fig. No. 2—  
Cervix-triplex.  
Uterus with three cervical openings.

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## LEGEND TO FIGURES

- Fig. 1. Heart showing vegetations on the tricuspid valve.  
 Fig. 2. Section of the vegetation showing laminated thrombus with necrosis and cellular reaction in the centre (Haematoxylin and eosin).  
 Fig. 3. Higher magnification of Fig. 2 showing the area of organisation of the thrombus with cellular infiltration. (Haematoxylin and eosin).  
 Fig. 4. Section showing the oedematous endocardium with serofibrinous exudate (Haematoxylin and eosin).

EFFECT OF CROSS-BREEDING ON GESTATION PERIOD  
OF COWS IN HILLY AREAS

By

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## Introduction

Since the beginning of this century many attempts have been made to cross European breeds of cattle with indigenous stock in India so as to combine the high milk yield and good dairy temperament of the foreign breeds with the heat-tolerance, draughtability and resistance to endemic diseases of the indigenous breeds.

In early days work on cross breeding was mostly confined to the Defence Department where it was quite successful under expert management and feeding. Later on, Civil Government Farms also followed suit where it was noticed that though the foreign blood did increase the yield in crosses, the animals tended to become very delicate and were not able to stand the tropical climate and rough conditions of maintenance and poor feeding prevalent in the villages of India.

In the year 1933 Animal Husbandry Wing of the Board of Agriculture and Animal Husbandry in India condemned the policy of cross breeding and recommended that breeding policy for the country should be selective breeding, with the result that the Military Farms continued their cross breeding work but the civil authorities gradually discontinued their cross bred herds which ultimately resulted in the scarcity of bulls with foreign blood in backward areas especially the hilly areas with heavy rainfall. The upgrading of local inferior cattle was tried with Sindhi or other Indian bulls which proved unsatisfactory, as

increase in milk production was extremely slow as far as non-descript cattle were concerned. The results undoubtedly indicated that the cross bred cattle thrived very well in hilly and heavy rainfall areas. The Animal Husbandry Wing of the Indian Council of Agricultural Research again revised their decision in 1953 and changed the breeding policy in such areas. Under a planned scheme about a dozen research-cum-development (breeding) units in different parts of the country have been established in hilly and heavy rainfall areas so as to investigate the potentialities of cross breeding in India i.e. how far it increased milk production and with what proportion of foreign blood, animals would thrive well in such areas.

The object of this paper is, therefore, to present certain observations made on the gestation period in local non-descript cows inseminated with semen of Jersey bulls.

#### Material and Methods

In the Panjab State, Palampur has been selected as one of the centres under the scheme with sub-centres at Kangra, Nagrota, Pror and Dharamsala. The area covered by these sub-centres is hilly with heavy rainfall varying from 100-130 inches annually and the altitude from 2500 feet to 4000 feet above sea level. The climate practically throughout the year is damp and cold with occasional hail-storms.

In each sub-centre 500 to 600 cows above three years of age and fit for breeding have been registered. These cows are spread over an area comprising of 4-5 villages within a radius of four to five miles. There is no definite breed in the area except a few Sahiwal cross-bred animals, maintained by well to do families. In general the animals are poor in condition, small statured and mature at the age of 4-5 years with an average milk yield of 2-3 lbs. per day. The lactation period varies from 200-300 days and the calving interval is 2-2½ years. Thus the dry period is extraordinarily long. The people of this area are poor and due to scarcity of quality fodders, cannot offer their animals a rich and balanced diet. The animals are generally fed on grasses such as Kharali, Dholu, Lamp and Saila, in rainy season only, but to meet the fodder shortage in other parts of the year, the cattle are fed leaves such as those of Bamboo, Karal, Dhaman, Khirak and paddy straw. Practically no concentrates and salts are fed to these animals except a small quantity of oil cakes, to a few selected animals yielding comparatively more quantity of milk.

Under the working of the scheme registered cows are brought to the sub-centres for artificial insemination with Jersey Bull semen and completely followed up till parturition. The semen collected from

Jersey Bulls and diluted with egg yolk citrate in ratio of 1:15 is obtained from the Central Artificial Insemination Station, National Dairy Research Institute, Bangalore, South India. It is received, packed in iced thermos flasks, by air to Delhi from where it is transported to Pathankot by train and from Pathankot to Kangra sub-centre by bus. Thus the semen received at Kangra for distribution to other sub-centres is about 30-33 hours old. The semen is then tested and if found potent is distributed to other sub-centres by Jeep to ensure quick supply. The quality of semen received at Kangra is generally poor having motility + 1 to + 3½ and rarely + 4½, which is probably due to jolting in transit. The semen was received once a week to start with but the frequency of supply has since been increased to thrice a week now. Thus the cows in heat are inseminated with 30-150 hours old semen which is stored in ice after receipt till the time of use.

#### Observations

Approximately 2000 cows have been inseminated with semen of Jersey bulls during the last three years, out of these about 50% were from areas not included in the scheme. One hundred and sixty one cows have given birth to cross bred calves, till May, 1960; with definite characters i.e.

- (a) Absence of hump and straight back ending abruptly into tail.
- (b) Short tail upto hocks ending into a heavy switch.
- (c) Dished out fore-head.
- (d) Small head and ears.
- (e) Comparatively longer body.
- (f) In majority of the progeny there was a light-coloured ring around the muzzle.
- (g) Colour varied from fawn to red. Black colour was un-common.

**Breeding Season:**—Though the cows come in heat throughout the year, the study of month-wise inseminations during the last three years reveals that the peak breeding season in this area is from March to June.

**Heat Symptoms:**—These are similar to those found in cows of plains except that the duration is generally shorter i.e. about 18 hours or so.

**Gestation Period:**—The gestation period as worked out by Lazarus and Anatakrihnan (1951) in Sindhi cows was 283.0 days and in Gir cows 285.09 days. Kumaran (1947) stated that gestation period in Tharparkar cows was 290 days (Male calf) and 288 days (Female calf)

Ragab and Asker (1951) reported average gestation period in Egyptian cattle as 289.5 days with no significant difference in male and females. Gulati and Tulsa Ram (unpublished) reported the gestation period in Haryana/Hissar cows as 285.24 days. Livesay and Bee (1945) have given the average as 277.9 days in Jersey cows.

In order to determine the length of gestation period the data on 161 cross-bred calves are grouped with a range interval of 3 days, with the minimum gestation period of 259 days and maximum 299 days as presented in Table I.

TABLE I

| Gestation period range in days | No. of C. B. calves born |        | Total |
|--------------------------------|--------------------------|--------|-------|
|                                | Male                     | Female |       |
| 259-261                        | 2                        | 3      | 5     |
| 262-264                        | 1                        | 1      | 2     |
| 265-267                        | 4                        | 2      | 6     |
| 268-270                        | 9                        | 8      | 17    |
| 271-273                        | 17                       | 10     | 27    |
| 274-276                        | 18                       | 18     | 36    |
| 277-279                        | 18                       | 14     | 32    |
| 280-282                        | 3                        | 7      | 10    |
| 283-285                        | 8                        | 2      | 10    |
| 286-288                        | 6                        | 1      | 7     |
| 289-291                        | 1                        | 1      | 2     |
| 292-294                        | 4                        | 1      | 5     |
| 295-297                        | —                        | 1      | 1     |
| 298-above                      | 1                        | —      | 1     |
| Total                          | 92                       | 69     | 161   |

From the above table it is observed that largest percentages (69%) of cross bred calves were born between 268-279 days with an over-all average of 275.99 days.  $\pm 56$ .

TABLE II

*Average gestation period for carrying male and female calves (Cross bred Jersey).*

| Sex of calf | No. of calves | Mean gestation period |
|-------------|---------------|-----------------------|
| Male        | 92            | 276.66 $\pm$ .77      |
| Female      | 69            | 275.22 $\pm$ .80      |

The difference between the gestation periods for carrying male and female calves is non-significant.

## Summary

The gestation period in local non-descript hilly cows, for carrying a male and female calf when impregnated with Jersey bull semen by artificial insemination technique, living under village conditions in the valley of Kangra has been worked out.

The insemination is possible in this remote area only when semen is 30 or more hours old.

Data on 161 cows are available up to date and has been statistically analysed. The findings are:—

The average gestation period is 275.99 days.

The male is carried for 276.66 and female for 275.22 days and is much less than the generally accepted average of 283 days in Indian breeds of cattle. This is most probably due to the effect of Cross Breeding with bulls of Jersey breed which has a comparatively shorter gestation period amongst European breeds.

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## MALFORMATIONS OF THE GENITALIA IN COWS

By

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Imperfect or inhibited development of Mullerian duct is generally regarded as an inherited abnormality manifested as an anomaly of reproductive organ.

Anomalies of uterus in cow are considered to be not uncommon. Several records of common developmental anomaly of Mullerian ducts

have been made by Fincher (1947), Gilmore (1952) and Lagerlof & Boyd (1953) on non-patency of one or both horns, uterus unicornis, uterus Didelphus, persistence of median walls at the os-uteri externus as two cervixes simulating uterus bipartitus, Uterus Duplex with four horns (Williams-1943), Uterus Unicornis (Teige-1956), Cervix Duplex (Reddy-1959) having various degrees of development of Mullerian ducts. Abnormalities due to improper fusion of Mullerian duct with urino-genital cleft result in a commoner anomaly as White Heifer's Disease and a newer type of nonpatency of vaginal vestibulum having a swollen structure posterior to os-uterus or involving the os uterus and uterus proper as reported by Nordlund (1956) in Swedish cattle. The latter two types have full development of genitalia with functioning gonads and ducts.

While examining the slaughter house genitalia for class demonstration, we came across two specimens of rare anomalies. Review of earlier literature reveals little information on the occurrence of such rare anomalies. They are described and their possible mode of occurrence is described.

*I. Uterus Acornis* :—(Uterus Rudimentarius, Corpus Uteri-Solidus)—The uterus was rudimentary and almost a solid mass in the immediate proximity of os-uteri, with a conical apex and aplasia of both the horns. The cervix was of 2½" long which terminates externally into a well developed os-uteri. Of the vagina the vestibulum was well developed up to vulva, so also the gonads (Fig. 1 with a schematic diagram).

*II. Triple os-uteri Externus or Cervix Triplex* :—Uterus having three separate openings into the cranial part of the vagina; of them the cervix proper was well developed with muscular folds and the other two openings were on the floor slightly posterior to os-uterus in vagina independently establishing communication with uterus into two canals. Thus there were three cervical canals and three external os-uteri. All the three canals including the cervix proper after a short distance merge together into common opening at the point of bifurcation of the uterus into two horns. The gonads, horns, uterus, and vagina including the cervix proper were well developed (Fig. 2 with a schematic diagram).

#### Discussion and Conclusion

Malformations of the organs of reproduction in cow are refuted as either due to imperfect development of cranial or caudal part or arrest in development of Mullerian duct and their manner of fusion during their developmental embryonic stage. Gilmore (1953) and Roberts (1956) attribute that these developmental anomalies are of genetic origin through autosomal dominant or recessive genes.

The uterus acornis could be regarded as due to the inhibited development of the cranial part of the Mullerian ducts but from the point of fusion to ectodermal urinogenital sinus are well developed in embryonic developmental stage which resulted in a patent well developed vagina as observed.

Of the triple external os which is very rare could be regarded as failure of fusion of Mullerian ducts into one, thus maintaining separate canals and three apertures owing to the improper fusion with urino-genital sinus with a muscular band on the opening.

Such subjects in life may appear as obscure cases of infertility because it would have been very difficult to detect this condition clinically. Animals with three or two external os uteri may not be infertile but prove to be problematic in all gynaecological and obstetrical operations. The affected animals usually conceive and calve normally; occasionally a portion of the foetus will pass through two of these passages and result in dystokia. At times, after-birth may be caught in these canals. Hence abortions, dystokia and retained placenta are more common in this condition.

This condition is hereditary and may be transmitted as a recessive gene. They need early detection in life and elimination from breeding herds.

#### Summary

Two rare anomalies are described, viz Uterus Acornis and Cervix Triplex.

Their possible cause of occurrence is discussed.

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# ESTIMATE OF GENETIC CORRELATION BETWEEN GREASE FLEECE WEIGHT AND GRADE IN SHEEP

BY

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## Introduction

Hazel and Lush (1942) concluded that the greatest progress in livestock improvement is made when selection is made for total score—a method whereby a selection index or score is used to evaluate all desired traits simultaneously. The principle underlying the construction of selection index is to predict animals net genetic merit or breeding value by means of the knowledge of its various characteristics or even the characteristics of their relatives, and is, therefore, used as a criterion for selecting or rejecting that individual.

For the purpose of constructing selection index four bits of information are needed for each characteristic. They are relative economic importance, heritability, Phenotypic and genetic correlation between the characteristics. Lush (1947) mentions that genetic correlation is most likely to be lacking when an index is to be constructed. The present study was an attempt to estimate genetic correlation between grease fleece weight and grade in Sheep.

The linear relationships between a set of variable may be described by the variance and covariances and similarly the relationship between the genic (additively genetic) causes of variation and covariation in different characters may be described by genetic variances and covariances. A genetic correlation is thus a description of the relationship between the additive deviations caused by genes in the two characters. In rather more precise term a genetic correlation is the ratio of the genetic Co-Variance between two characters to the product of their genetic standard deviations.

i.e.,  $r_{Gi Gj} = \frac{\text{Cov. } Gi Gj}{\sigma_{Gi Gj}}$  where  $Gi$  and  $Gj$  are the genic values of individuals for traits  $i$  and  $j$ . The most important cause of genetic correlation would be that some of the genes which affect one trait also affect the other. This is what is meant by pleiotropy, other usually minor causes include linkage and that previous selection may have been practised with varying emphasis in different partially isolated portions of the population.

*Source of data*:—The data for the present study were taken from flock of sheep at Michigan State College (U.S.A.) collected over the period from 1933 to 1949. They belonged to Shropshire, Hampshire and Oxford breed of Sheep. All 149 daughter-dam pairs that had record for Grease fleece weight and grade at 2 years of age were included in this study. Grease fleece weight is the weight of fleece immediately after shearing expressed in pounds. The weight includes not only wool substance, but also wool wax, suint, dirt, vegetable matter, moisture and other materials. Grease fleece grade denotes the quality of fleece and the data included American system of grading. In order to facilitate Statistical analysis of grease fleece grade the following numerical figures were assigned to the different grades:—

| Grade                   | Numerical figure assigned. |
|-------------------------|----------------------------|
| $\frac{1}{2}$ blood     | 5                          |
| $\frac{3}{8}$ blood     | 4                          |
| $\frac{1}{4}$ blood     | 3                          |
| Low $\frac{1}{4}$ blood | 2                          |
| Common                  | 1                          |
| Braid                   | 0                          |

*Analysis of Data*:—Hazel (1943) described the basis of methods of calculating genetic correlation and gave the following formula:—

$$r_{Gi Gj} = \sqrt{\frac{(\text{Cov. } i_2 j_1) (\text{Cov. } j_2 i_1)}{(\text{Cov. } i_2 i_1) (\text{Cov. } j_2 j_1)}}$$

when the subscripts (1) and (2) represent the parental and filial generation respectively and  $i, j$ , are two characters. Lush (1948) stated that sampling error of 'r' when computed thus is large and likely to be complex. He suggested taking the arithmetic mean of the numerator rather than the geometric mean as indicated here, especially when sampling errors are a major concern or where the volume of data is small. That would avoid such difficulties as would arise when one of the observed covariances in the numerator is negative and the other is positive. Therefore, the following formula was used with the same meaning of the subscripts:—

$$r_{Gi Gj} = \frac{(\text{Cov. } i_2 j_1) + (\text{Cov. } j_2 i_1)}{2 \sqrt{(\text{Cov. } i_2 i_1) (\text{Cov. } j_2 j_1)}}$$

The statistics to be used for the estimate of genetic correlation is given in Tables I, II, III, and IV.

TABLE I  
Statistics for the estimation of Covariance of Fleece grade.

| Breed          | Number | Sum of Dam's Grade | Sum of Offspring's Grade | Sum of Cross Product |
|----------------|--------|--------------------|--------------------------|----------------------|
| Shropshire ... | 65     | 237.0              | 288.0                    | 894.0                |
| Hampshire ...  | 60     | 225.0              | 205.0                    | 742.0                |
| Oxford ...     | 24     | 73.0               | 77.0                     | 241.0                |
| Total ...      | 149    | 585.0              | 520.0                    | 1877.0               |

Intrabreed Covariance = 0.04.

TABLE II  
Statistics for the estimation of Covariance of Fleece weight.

| Breed          | Number | Sum of Dam's Fleece Weight | Sum of Offspring's Fleece Weight | Sum of Cross Product |
|----------------|--------|----------------------------|----------------------------------|----------------------|
| Hampshire ...  | 60     | 447.2                      | 452.7                            | 9410.6               |
| Shropshire ... | 65     | 514.2                      | 480.1                            | 3898.6               |
| Oxford ...     | 24     | 214.5                      | 216.5                            | 1944.7               |
| Total ...      | 149    | 1175.9                     | 1149.3                           | 9253.9               |

Intrabreed Covariance = 1.01.

TABLE III  
Statistics for the estimation of Covariance of Fleece weight of Dam and Fleece Grade of offspring.

| Breed          | Number | Sum of Dam's Fleece Weight | Sum of Offspring's Fleece Grade | Sum of Cross Product |
|----------------|--------|----------------------------|---------------------------------|----------------------|
| Hampshire ...  | 60     | 451.6                      | 207.0                           | 1558.6               |
| Shropshire ... | 65     | 538.8                      | 283.0                           | 1930.6               |
| Oxford ...     | 24     | 216.5                      | 74.0                            | 668.1                |
| Total ...      | 149    | 1206.9                     | 514.0                           | 4152.3               |

Intrabreed Covariance = (-0.04).

TABLE IV  
Statistics for the estimation of Covariance of Fleece grade of Dam and Fleece weight of offspring.

| Breed          | Number | Sum of Dam's Fleece | Sum of Offspring's Fleece Weight | Sum of Gross Product |
|----------------|--------|---------------------|----------------------------------|----------------------|
| Hamshire ...   | 60     | 220.0               | 458.7                            | 1674.1               |
| Shropshire ... | 65     | 241.0               | 509.4                            | 1878.4               |
| Oxford ...     | 24     | 76.0                | 219.0                            | 694.7                |
| Total ...      | 149    | 537.0               | 1187.1                           | 4247.2               |

Intrabreed Covariance = (-0.11).

Substituting the above values of Covariances in the formula:-

$$r_{GiGj} = \frac{(-0.11) + (-0.04)}{2} = \frac{-0.075}{2} = -0.0375$$

The standard error of  $r$  was estimated according to the formula  
 $\sigma_r = \frac{1-r^2}{\sqrt{n-2}}$  and the estimate comes to  $\pm 0.05$ .

Therefore, the genetic correlation between grease fleece weight and grease fleece grade is  $-0.37 \pm 0.05$ .

#### Discussion

There are mainly three factors which account for genetic Correlation. They are (1) linkage of genes, (2) different pressure or direction of selection in non-interbreeding groups of population and (3) manifold effect of genes. Linkage would be a major factor in a population where either coupling or repulsion phase of the double heterozygote is far more abundant than the other and such condition will not be found in freely interbreeding population. Different pressure or direction of selection in non-interbreeding subgroups affect the gene-frequency in different groups and would not cause genetic Correlation within the groups, each considered as an unit by itself. Manifold effects of genes is one factor which contribute largely to the genetic correlation regardless of the type of population concerned provided the population is not homozygous for the genes with manifold effects. Gruneberg (1938) discussed the diversity of action of a single gene and proposed the various ways in which a gene may produce manifold effects. Gruneberg calls genuine pleiotropy and

5L  
KZ m2, n24  
n60.32.10

and spurious pleiotropy when the two characteristics are affected indirectly as chain effect. This classification of pleiotropism is contested by Dobzhansky and Holz (1943) since the primary effect of no genes are known. It may be stated, however that manifold effects of a single gene do contribute to genetic correlation regardless of whether pleiotropy is genuine or spurious. Dobzhansky (1926) Russell (1949) have reported on the manifold effects of single gene. Though Lindstorm (1924, 1929) and Green (1931) attributed genetic correlation between qualitative and quantitative characteristics to the linkage of a qualitative gene with quantitative genes but the results could have been due to the manifold effects of gene. Touchbery (1950) concluded that some single genes do affect several quantitative characters such as size and weight. It seems, then evident, that some genes do have manifold effect, thus causing genetic Correlation.

The computed estimate of genetic correlation ( $-0.37$ ) shows that selection for fleece weight will be accompanied by decrease in fineness. Prasad (1951) showed that high fleece yield is accompanied by low fleece grade in his study of fleece production for the same three breeds of sheep. Lush (1948) (Chap. 26) suggested that past selection for two or more traits is likely to have caused genetic correlation to become pre-vaillingly negative rather than positive, where the direction of past selection has been positive. The hypothesis requires that pleiotropic effect of genes be reasonably common and that selection has increased the frequencies of genes favourable to all traits to near unity. Most of the genetic Variance will then come from genes with frequencies near 0.5. For genes frequencis to remain near 0.5 inspite of continued selection requires that genes affect one character favourably, the other unfavourably. The situation, then, would appear as a paradox, wherein genetic variance would still exist for each character, but possible improvement in both characters simulatneously would be limited or even Zero.

It would be indeed surprising if some of the characters studied were not determined in part by the same genes. For example, the weight of fleece is partly determined by diameter of fibres composing the fleece, so that genes affecting fibre diameter would probably also affect fleece weight.

Mather (1943) suggested an alternative reason for unfavourable correlated response. Polygenic combinations in which balance was achieved by linkage of plus and minus genes along the chromosome were postulated. Selection imposed on a population in equilibrium will tend to destroy the balance of polygenes so that unfavourable combination for apparently unrelated character may limit progress until new favourable combinations are formed by selection of suitable

cross-over types. But there appears to be an important distinction between the results expected from selection in *Drosophila* and in domestic animals. Because of the small number of chromosomes and because there is no crossing-over in the male, *Drosophila* has relatively few segregating units. Extremely intense selection can be practised and there is a distinct possiblity that the effect of linkage may be important. Selection in sheep, which have several times the number of segregating units is unlikely to be affected by linkage to the same extent. In sheep, selection for any one seggregating unit is unlikely to be sufficiently intense to seriously distort the random order of gene combinations. In *Drosophila* it possibly could be so intense that *Drosophila* with the preferred linkage combinations would have more descendants than those with unbalanced combinations. Mather's theory seems unlikely to apply to domestic animals because in these selection for desirable linked gene combination must necessarily be weak particularly where large number of genes influence the character in question. Yet another possible reason for negative genetic correlation is provided by physiological limitations. If two traits require a substrate which is available only in limited quantity the selection for genes favouring the expression of one trait must also cause a decrease in other.

### Summary

In this study 149 dam-daughter pairs belonging to Hampshire, Shropshire and Oxford breeds of Sheep were used. On each animal the records of grease fleece weight and grade made at 2 years of age were used. The genetic correlation between the two characteristics were derived on an intra-breed basis and the estimate was  $-0.37 \pm 0.05$ . The possible causes of genetic correlation were discussed and it was proposed that some single genes do affect these two characteristics and consequently selection for increased fleece weight will be accompanied by decrease in fineness.

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#### A PRELIMINARY NOTE ON THE DIAGNOSIS OF TUBERCULOSIS AMONG DUCKS\*

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Tuberculosis in a large number of Ducks was noticed in the Duck Centres of the Scheme for the biological control of Fascioliasis in cattle in the State. In an attempt to eradicate the condition in the large Government stock maintained, it was thought fit to undertake diagnosis of the affected birds in the flocks, as it was not practicable to destroy the entire flock owing to obvious reasons. From the information gathered so far, it appears that ducks are more prone to Tuberculosis than fowls, since batches of ducks purchased from different sources in the State from the duck traders also had the disease in some of them.

#### Review of Available Literature

Craig and Davies (1937) concluded that "the test (using synthetic medium Avian Tuberculin) as applied intradermally to the web of the duck's foot, was of no practical value in the diagnosis of Tuberculosis". Downham and Venn (1938) reported that the skin of the neck was a suitable site for testing ducks for Tuberculosis. According to Gordon *et al.*, (1941), who performed the tests intradermally in the

\* (Paper read at a meeting of the Andhra Pradesh Veterinary Association on 20th June 1960.)

skin of the neck, in the cloaca, and intraocularly using synthetic medium avian tuberculin, on about 100 ducks, it would appear that none of the tests was of value in the diagnosis of tuberculosis. Zargar (1946), testing on 82 ducks of the Military Dairy Farm, Nagpur, did not consider this allergic test to be of any value in the diagnosis of tuberculous infection in the ducks.

It would therefore appear that there is no suitable diagnostic agent at the moment that could be used to pick up cases of infected ducks in a flock. However, it was proposed to try these tests once again, in view of the insidious mortality among the stock.

#### Materials and methods

286 ducks of one duck centre were tested by the single intradermal method, choosing the neck of the bird as the site for inoculation and using synthetic medium avian tuberculin obtained from the I.V.R.I., the dose being 0.2 m.l. per bird. Careful watch of the birds upto 72 hours did not reveal any positive reactor to the test and yet a few ducks of this lot died of the disease later.

278 ducks were next tested by the Ophthalmic method. Two drops of the synthetic medium avian tuberculin were instilled into the conjunctival sac of one of the eyes and the instillation was repeated after 48 hours with four drops of tuberculin. The birds were observed upto the 72nd hour. Here also, no birds could be picked up as having the infection, though some of the ducks of this lot also died of the disease.

It was then decided to try the Subcutaneous test also, in spite of the fact that it is a laborious process. For this purpose, the normal temperature of each duck had to be determined. Morning and evening temperatures of each duck to be tested were taken for three consecutive days prior to the injection and the average of these six temperatures was taken as the "Normal Temperature" of the duck. Each duck was given 0.1 m.l. of synthetic medium avian tuberculin subcutaneously at the neck at midnight and temperatures were recorded at 3-hourly intervals from the sixth hour onwards. Care was taken to see that the birds were not let out of the duck houses during this period and the minimum excitement caused to the birds during the noting of the temperatures. 208 ducks in all were tested in three duck centres where the disease is known to exist. The results are tabulated in the attached table.

#### Discussion

It may be seen from the Table that the rise of temperature of over 1.4° above the normal of the duck appears to be significant as a 'Reaction'.

TABLE  
Temperature reactions in the subcutaneous tuberculin test on ducks and autopsy results of the reactors.

| Duck No. | Normal Temp. | Group Aver. Temp. | Temp. at 6th Hr. | Temp. at 9th Hr. | Rise over normal at 6th Hr. or 9th Hr. | Rise over Group Aver. | Number killed | Number positive | Number tested in each group |
|----------|--------------|-------------------|------------------|------------------|----------------------------------------|-----------------------|---------------|-----------------|-----------------------------|
| 5        | 106.9        |                   | 107.3            | 108.1            | 1.2                                    | 1.5                   | 1             | 1               | 10                          |
| 6        | 105.9        |                   | 106.6            | 108.3            | 2.4                                    | 1.7                   | 1             | 1               |                             |
| 7        | 106.6        | 106.6             | 107.5            | 108.0            | 1.4                                    | 1.4                   | 1             | 1               |                             |
| 9        | 106.3        |                   | 107.1            | 108.2            | 1.9                                    | 1.6                   | 1             | —               |                             |
| 10       | 107.3        |                   | 109.0            | 109.0            | 1.7                                    | 2.4                   | 1             | —               | 98                          |
| 11       | 106.4        |                   | 109.0            | 108.0            | 2.6                                    | 2.5                   | 1             | 1               |                             |
| 30       | 106.1        |                   | 108.0            | 108.6            | 2.5                                    | 2.1                   | 1             | 1               |                             |
| 80       | 106.7        |                   | 109.2            | 108.4            | 2.5                                    | 2.7                   | 1             | 1               |                             |
| 91       | 106.8        | 106.5             | 108.4            | 107.2            | 1.6                                    | 1.9                   | 1             | 1               |                             |
| 33       | 106.3        |                   | 106.8            | 108.0            | 1.7                                    | 1.2                   | 1             | —               |                             |
| 42       | 106.6        |                   | 106.4            | 108.0            | 1.4                                    | 1.5                   | —             | —               |                             |
| 58       | 106.4        |                   | 106.0            | 108.0            | 1.6                                    | 1.5                   | —             | —               |                             |
| 61       | 106.6        |                   | 108.0            | 107.0            | 1.4                                    | 1.5                   | —             | —               |                             |
| 215      | 107.3        |                   | 109.0            | 108.4            | 1.7                                    | 1.6                   | 1             | 1               | 100                         |
| 226      | 106.0        |                   | 108.6            | 108.4            | 2.6                                    | 1.2                   | 1             | 1               |                             |
| 228      | 106.0        |                   | 108.4            | 108.0            | 2.0                                    | 0.6                   | 1             | 1               |                             |
| 229      | 108.1        | 107.4             | 109.0            | 109.8            | 1.7                                    | 2.4                   | 1             | 1               |                             |
| 245      | 106.9        |                   | 110.0            | 109.8            | 3.1                                    | 2.6                   | 1             | 1               |                             |
| 251      | 106.7        |                   | 108.4            | 106.4            | 1.7                                    | 1.0                   | 1             | 1               |                             |
| 290      | 107.3        |                   | 108.8            | 107.2            | 1.5                                    | 1.4                   | 1             | 1               |                             |
| 299      | 108.0        |                   | 110.0            | 106.8            | 2.0                                    | 2.6                   | 1             | 1               |                             |

} These birds could not be killed due to administrative reasons.

It may also be noted that three were 12 reactors at the 6th hour and 9 reactors at the 9th hour. All the reactors at the 6th hour except one, were sacrificed and it was seen that 10 of them showed early tuberculous nodules or caseated foci either in the lungs or liver respectively. Of the 7 reactors at the 9th hour destroyed, five showed early tuberculous lesions. About two to three non-reactors were sacrificed for each group and none of these revealed any macroscopical lesions nor did any of the smears made from various organs revealed acid-and alcohol-fast organisms. However, ducks in advanced stage of the disease or with generalised lesions did not react to the test.

#### Conclusions

The subcutaneous test using synthetic medium avian tuberculin in 0.1.m.l. doses could be utilised to detect early cases of tuberculous infection in ducks with certainty, in spite of its laborious nature, and in the absence of any other more reliable diagnostic agent in the country.

#### Acknowledgment

My thanks are due to Dr. P. M. N. Naidu, the Director of Animal Husbandry and to Dr. C. Krishna Rao, the Deputy Director (Veterinary), for according necessary facilities and the keen interest evinced during the work; to the Head of Division, Pathology & Bacteriology, I. V. R. I., Mukteswar-Kumaon, for the list of references supplied on the subject as well as advice; to Dr. M. P. C. Rao, Special Officer, Anti-Liver Fluke Scheme, Nizamabad, for the necessary facilities provided at the site of the tests; and to Dr. K. Raghavachari, Veterinary Investigation Officer (General), for his sustained interest and helpful guidance throughout the work.

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## Clinical Article

### A CASE OF INCONTINENCE OF URINE IN A SHE - GOAT

By

D. K. MITRA, T. L. SOM and S. GUPTA,  
Central Livestock Research-cum-Breeding Station,  
Haringhata Centre.

#### History

A Black Bengal and Saanen cross female kid of about 6 months of age belonging to this centre started involuntary urination from 15-5-60. The hind quarters were moistened with urine and there was a constant dribbling of urine. The animal had previously suffered from Pneumonia, but it was otherwise normal at the time of this condition.

#### Observations

The animal manifested the symptoms of cystitis typified by frequent painful micturition, restricted gait and over-distended bladder. In later stage, continuous dribbling of urine was noticed and the urine was of deep colour. The appetite was normal, but the bowels were constipated. The animal showed restlessness and signs of acute discomfort.

#### Differential Diagnosis

The foregoing observations may simulate the following conditions:—

1. *Nephritis*:—In nephritis, constitutional disturbances are noticed first followed by diminished volume of urine. The urine generally changes to dark or dark red in colour and the gait is straddling. The animal shows irregular temperature and palpation on the kidney-region indicates severe pain. But due to presence of dribbling of urine, the overdistended bladder and absence of other typical symptoms, nephritis was eliminated.

2. *Cystitis*:—Distended bladder, continuous micturition and dribbling, change in the colour of urine, all indicated the case to be one of cystitis. Urine analysis prior to operation gave a definite suspicion. Catheterisation was not possible due to the small aperture of urinary meatus and so a quick decision to perform cystotomy was taken in order to relieve the animal.

#### Operative Procedure

Basal anaesthesia was induced by premedication with chloral hydras - gr. XX and followed by administration of Largactil (M & B)

(2.5%) - 1 c.c. intramuscularly about 50 minutes prior to operation. Planocaine with adrenaline (M & B) (5%) - 10 c.c. was infiltrated locally around the site of operation.

Laparotomy was then performed by making about 5 cm. long incision in the prepubic region along the linea alba. The bowel was duly kept *in situ* by pressing with sterilized gauze. Then the indurated bladder came in vision which seemed to be highly engorged with urine and it could not be manipulated properly due to the pressure of urine inside. A small trocar and cannula was, therefore, used to relieve the bladder by releasing the pressure of urine after which the actual cystotomy operation was conducted. No calculus was found inside the bladder. Mucous layer of the bladder showed catarrhal inflammation and about 8 ozs. of urine were expelled from the bladder. The wall of the bladder was sutured by Lembert's fashion using No. 000 catgut. The muscles were sutured by Glover's stitch by using No. 3 catgut, the fascia was closed with No. 000 Catgut in continuous suture and skin with coarse nylon in Mattress method.

The whole operation was completed within 30 minutes.

#### Post Operative Treatment

| Date    | Temperature   |              | Treatment                                                                                                                                                                                                             |
|---------|---------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | Morn.<br>(°F) | Eve.<br>(°F) |                                                                                                                                                                                                                       |
| 17-5-60 | 100.6         | 102.0        | Streptomycin 0.5 gm.**<br>Procaine Penicillin - 8 Lac.**<br>Coramine - 2 c.c. I/M<br>Glucose Soln. (25%) - 25 c.c.                                                                                                    |
| 18-5-60 | 101.0         | 102.8        | Sodi. Penicillin 5 Lac. IU, I/M, BD<br>Glucose Soln. (25%) 25 c.c. S/c.                                                                                                                                               |
| 19-5-60 | 102.0         | 103.0        | Sodi. Penicillin - 5 Lacs. I/M, BD<br>Diuretic cum Hexamine mist:—<br>R/Pot. Citras - Gr. V<br>Hexamine - Gr. V<br>Tinct. Belladonna - mXX<br>Tinct. Hyoscyamus - mXV<br>Aqua - ad ½ oz.<br>mft., mist. I, sig.; T.D. |
| 20-5-60 | 101.4         | 108.0        | Streptomycin - 0.25 gm. I/M;<br>Diuretic cum Hexamine mist, T.D.                                                                                                                                                      |
| 21-5-60 | 101.4         | 101.0        | do. Strychnine hydrochlor<br>inj-1/240 gr. I/M                                                                                                                                                                        |
| 22-5-60 | 101.4         | 102.6        | do.                                                                                                                                                                                                                   |

\*\* Administered locally at the site of operation.

The above treatment was continued upto 27-5-60 and the animal was declared fully cured on 28-5-60.

#### Acknowledgment

The authors are grateful to Dr. S. Bhattacharya, M.Sc., Ph.D., Deputy Milk Commissioner, Livestock Division, Haringhata Centre for his kind help and encouragement.

### Abstracts

**Semi-field trials with some new organic insecticides for the control of lice on livestock.**—BY CHAUDHARI, R. P. and PAVAN KUMAR (1959). *Ind. J. Vet. Sci. and Ani. Husb.*, 29. 1-9.

The authors conducted a series of semi-field trials for ascertaining the efficacy of a number of modern insecticides, both chlorinated hydrocarbons and organic phosphates in the control of louse infestation on livestock. Buffalo calves infested with *Haematopinus tuberculatus* were treated with 0.5% D.D.T. and 0.1% Lindane. There was cent per cent control of lice in both groups and reinfestation did not occur for at least one and four weeks respectively. Calves parasitised with *Linognathus vituli* were treated with 0.25% D.D.T., 0.1% Lindane, 0.1% Chlordane, 0.25% Dieldrin, 0.05% Diazinon and 0.25% Malathion. Complete control was effected with each of the insecticides and all the calves remained free from louse infestation for at least six weeks. In another trial, when the concentration of the insecticides was reduced, the initial result was similar, but the calves remained louse-free for 1-2 weeks only. Goats infested with *Linognathus stenopsis* and *Damalinia caprae* were treated with 0.2% D.D.T., 0.1% Lindane, 0.2% Toxaphene, 0.05% Chlordane, 0.2% Rhothane, 0.1% Aldrin, 0.1% Dieldrin, 0.05% Diazinon and 0.05% Malathion. All the treatments gave cent per cent control of the ectoparasites and the goats remained louse-free for 12-18 weeks. In another trial with goats though there was complete initial control of lice with reduced concentration of the above insecticides, the effective period was found to be much shorter.

V. S. A.

**A Compound in Silage Reduces Appetite.**—Dairy heifers eat sparingly and grew slowly when fed on silage made from freshly chopped unwilted grass-legume mixtures. Dairy Nutritionists at Beltsville, believe some unidentified organic compound formed during fermentation of silage decreases the animal's appetite. Isolation and elimination of this compound may make unwilted grass-legume silage as valuable

as hay for feeding dairy animals. The compound also affects the appetite of mature cows, causing a decrease in milk production in some cases. (*Agri. Research*, May 1960).

B. PANDA.

**Anti-Bacterial Substances in Placenta.**—Dr. G. S. Coffin and his co-workers have reported that the placenta contains anti-bacterial substances of blood but seems to have little or no detectable bactericidal substance of its own. Apparently it protects the foetus from bacterial infection largely by transmitting protective substances from mother and mechanically impeding access of bacteria to the foetus. (*Exptl. Biol. and Med.*, Vol. 104 (2), June 1960).

B. PANDA.

**Dietary Zinc and Embryonic Development.**—Dr. Blanberg and his co-workers have shown that deficiency of zinc in the diet of breeding hens, results in (1) lowered hatchability, (2) gross embryonic anomalies characterised by impaired skeletal development and (3) varying degrees of weakness in chicks which hatch. (*Exptl. Biol. and Med.*, Vol. 104(2), June 1960).

B. PANDA.

**Adding to our Knowledge of Poultry Cancer.**—One form of poultry cancer long considered not contagious was shown for the first time in recent work to be transmitted by contact. Dr. B. R. Bermester has shown that the virus of Rous sarcoma was transmitted to healthy chickens when raised in direct contact with birds inoculated with the virus.

Tumours in the birds infected by contact were microscopically and pathologically the same as tumours in birds that were inoculated with the virus. Virus taken from the tumours of contact infected birds was capable in most instances of infecting healthy birds and was proven by immunological tests to be the same virus as that used to inoculate the chickens that served as the source of exposure.

This work has provided us with important additions to growing knowledge on the behaviour of poultry cancers, and may be of interest in other types of cancer research. (*Agri. Research*, August 1960).

B. PANDA.

**Heat may not kill foot and mouth disease (FMD) Virus.**—In a recent study conducted by the U.S.D.A. Scientists at the Animal Disease Laboratory, Plum Island, it was found that the disease producing portion of the FMD virus - the ribonucleic acid core - may be more resistant to destruction by heat than what was previously believed to be the case. Earlier work had shown that the disease producing ability

of the FMD virus was destroyed by heating to 140° F or higher. However, Dr. Bachrach has now found that such heat treatment only seals the infectious core within the protein covering of the virus and in this way blocks its ability to infect susceptible animal cells. He found that once the protein covering was chemically removed, the sealed-in cores were still infectious. In fact, infectious cores could be obtained from virus that had been boiled for as long as 5 minutes.

For these reasons, the scientist concludes the FMD virus may be more dangerous than what was previously considered because nature may have ways of matching this chemical method of releasing the infectious core of the heat-treated virus (*Agri. Research*, June, 1960).

B. PANDA.

**Lysine for Ruminants.**—Research works in the nutrition of ruminants by Pfizer and co-scientists indicate that the addition of this amino acid building block of protein has been found quite important when formulating rations for dairy animals and sheep. The improved performance indicated by preliminary research indicates that lysine may lead to "break through" into a whole new area of ruminant nutrition. (*Hatchery and Feed*, July 1960).

B. PANDA.

**Co<sub>2</sub> and Hatchability:**—Holding eggs in Co<sub>2</sub> gas which they give off resulted in slightly increased hatchability for eggs held 1 to 7 days and 8 to 14 days, according to tests conducted by E. M. Funk and James Forward, Missouri Ag. Expt. Station. The eggs were placed in cry-o-vac (air tight plastic) bags to contain the Co<sub>2</sub> released by the eggs. This was done in both baskets and cases. There seem to be a greater Co<sub>2</sub> concentration surrounding the eggs held in bags in baskets than in bags in cases. (*Poul. Digest*, March, 1960.)

B. PANDA.

**Dairy Cow Metabolism:**—The amount of radio active carbon in the breath of the dairy cow has been measured in studies of energy metabolism in dairy cows at the University of Maryland. Dr. W. F. Williams reported that this method is used to measure the acetic acid use by the cow. Sixty per cent is oxidized for energy, leading to estimates that acetic acid accounts for one-fourth to one-third of the energy needs of the cow. (*72 Hatchery and Feed*, July, 1960).

B. PANDA.

**Hormonal treatment of Bovine cystic ovaries.**—By BECK, C. C. and ELLIS, D. J. (1960). *Vet. Med.* Vol. 55, 6 : 79.

Treatment of cows with cystic ovaries is desirable and economically feasible because such cows are usually some of the best producers

in the herd. Ninety-seven of 100 cows with ovarian cysts and clinical symptoms of nymphomania were successfully treated with approximately 1 mg/lb. of body weight of Repositol Progesterone intramuscularly. The fact that 67 of the cows became pregnant following treatment indicates that this treatment aids in preparing the uterus for the implantation of the fertilized ovum. Because progesterone greatly increases susceptibility of the uterus to infection, intra-uterine antibacterial infusion also should be given routinely. (*Author's Summary*).

**The Formol gel test—An aid to diagnosis of pyometra.**—E. J. COLE (1960). *Vet. Med.* Vol. 55, 6 : 33.

The author performed formol gel test by adding 2 drops of 36% formalin to 1 c.c. of serum of eight dogs evincing symptoms of pyometra (disturbance in general condition, discharge from vulva, abdominal distension and leucocytosis). The results were observed up to 24 hours and were positive in all cases i.e., the mixture attained the consistency of coagulated egg white. No coagulation occurred in 25 control dogs not evincing any signs of uterine infection. It was also negative in a dog with endometritis. The author feels the test is more indicative of pyometra than leucocytosis which is present in acute stages of many conditions.

M. S. J.

## News and Views

**Ban on Horse Racing:**—"The Ceylon Government will shortly serve formal notice on Horse Racing Clubs in Ceylon to wind up their affairs and cease horse-racing activities in four years. The Government is also preparing legislation to ban publication of horse racing news. The decisions are in accord with the policy of the Government to discourage gambling". (*THE HINDU DATED 10-9-60*).

What an unwise step the Government of Ceylon is taking! It is not in the interest of that enterprising island to kill horse-breeding in consequence. For the sake of an insignificant percentage of the population, who with open eyes go to the extreme length of ruining themselves, the Government want to kill sportsmanship itself and deprive the saner section of the population of the pleasure they derive in watching and enjoying what is one of the finest of games ever invented by man. But we live in an age of nostrums and panaceas and want to make people moral through legislative measures! O tempora! O mores!

\* \* \*

**Another Centenarian of International Repute:**—Sometime ago we invited the attention of our readers to the longevity and selfless work

Professor Karve of Poona. He is 102 now and is still going strong. India celebrated the 100th birthday of yet another great Indian, Bharat Ratna Sir M. Visveswaraya, on the 15th September, 1960. He is a scholar, scientist, statesman and administrator, all combined in one. We cannot improve on the following excerpt from "*Indian Statesmen*" published by Messrs. G. A. Natesan & Co., Madras.

"He is middlesized, thin. His temperament is analytical and his statement of facts neither passionate nor ornate. His speeches are like the steady flow of a river; his striking originality is evidenced by the mechanical and economical inventions which stand to his credit. His disciplined life and his steadiness of conduct make him irreproachable, and enable him to enforce obedience even from the unwilling. We rarely see one who has such absolute freedom, such marvellous control over his feelings and passions. He seems the spirit of the 20th century taken shape and composed of the qualities of justice, duty and the idea of national regeneration".

\* \* \*

Here are a few words of wisdom from this great man "The way to build a better nation is to build better individuals. A successful nation is usually composed of citizens, the majority of whom are efficient, of good character and possess a reasonably high sense of duty. An individual who aspires to be trusted should have character."

We pay our homage to this great savant who has benefitted this part of the world in no small measure.

## Association News

### The Indian Veterinary Association

#### THE RESERVE FUND

An event of great importance to the Veterinary profession in India, took place in August 1924. It was the birth of the *Indian Veterinary Journal*. Circumstances were positively hostile and yet the profession took that bold step and the lion-heartedness of the early pioneers cannot be too highly praised. Ever since then, the *I.V.J.* has toiled hard under very adverse circumstances. The *I.V.J.* lives to-day so that the profession could prosper and science advance.

And now the hat is sent round so as to place this journalistic venture on a sounder and firmer basis. The *I.V.J.* is a priceless possession of our profession. It has placed the Indian Veterinary Surgeon, on the map of the scientific world. Just pause and ponder over, how much we owe to the Journal both individually and collectively. Is it too much then to expect the profession to respond to the appeal issued for a Reserve Fund? We hope not.

Some enquiries have come to us asking us to indicate the extent of help expected. We do not want to put the members of the profession to any undue financial strain in these hard days. At the same time, a certain amount of sacrifice is needed to make this fund a great success, so as to make it worthy of our profession. So we feel that the following scale of contribution will be quite reasonable. It could even be paid in two or three instalments.

|                   |     |                      |
|-------------------|-----|----------------------|
| Class I Officers  | ... | Rs. 100/- and above. |
| Class II Officers | ... | Rs. 50/- and above.  |
| All others        | ... | Rs. 25/- and above.  |

It is our ambition that no Veterinary Surgeon in this land should remain without contributing to this fund. Brick by brick, this great edifice of our's should begin to rise higher and higher. On the success or otherwise of this venture, the solidarity of our profession depends: "*Pay and Prosper*" is the slogan we pass on to the members of our profession.

Jai Hind!

T. VINAYAKA MUDALIAR,  
Editor, *The Indian Veterinary Journal*.

### THE I. V. J. RESERVE FUND

#### LIST OF CONTRIBUTORS

|                                                               | Rs. nP.  |
|---------------------------------------------------------------|----------|
| Amount acknowledged                                           | 4,863.67 |
| Dr. S. B. Mohanty, Maryland, U.S.A. (\$ 5.00 amount realised) | 23.30    |
| „ S. Kuppuswamy, Tiruchirapalli                               | 10.00    |
| Total                                                         | 4,896.97 |

Cheques, money orders and all correspondence should be addressed to the Editor, *The Indian Veterinary Journal*, Madras-17.

## THE ANDHRA PRADESH VETERINARY ASSOCIATION

### (Krishna District Branch)

At an extraordinary meeting of the above Association held on 29-8-60, the following condolence resolution was passed :—

“Resolved to place on record the deep sense of sorrow of the members of the Association on the sudden and premature death of Sri K. Durga Prasada Rao, Veterinary Assistant Surgeon, Incharge Minor Veterinary Dispensary, Nagayalanka”.

M. KAMESWARA RAO,  
*President.*

### Another condolence resolution

Members of the staff, Animal Husbandry Department, Nagpur record with grief the sad demise of Shri P. M. Janak, Veterinary Officer, Amravati, on 21st September 1960.

We all share in grief of the bereaved family of Dr. Janak and offer our condolences. May his soul rest in peace!

H. V. KULKARNI,  
*Regional Deputy Director of Animal Husbandry,  
Nagpur Region, Nagpur,  
Maharashtra State.*

[We offer our heartfelt condolences to the members of the above two bereaved families.

*Editor, I. V. J.]*

## U. P. VETERINARY ASSOCIATION

### Proceedings of the Executive Committee Meeting held on 9th and 10th Sept. 1960 at Lucknow

*9th September 1960 (11-00 a.m. at Chak-Ganjaria, Lucknow).*

The following attended :—

- |                      |                              |
|----------------------|------------------------------|
| 1. Sri H. C. Joshi   | 7. Sri H. H. P. Saxena       |
| 2. „ K. A. Raza      | 8. „ K. N. Diwedi            |
| 3. „ B. R. Singh     | 9. „ S. N. Rai               |
| 4. „ U. L. Sahani    | 10. „ Tej Bahadur (by Proxy) |
| 5. „ M. L. Bhargava. | 11. „ H. P. Kapoor.          |
| 6. „ R. P. Tangri    |                              |

The proceedings of the last meeting held on 27th July 1958 were read and adopted.

The following resolutions were then passed :—

1. (a) Resolved that the Regional Committees formed (vide resolution No. 3, dated 27-9-58) of the Executive Committee be now dissolved in view of the fact that response from them has been very poor. It is therefore now proposed that the District Livestock Officers be requested to kindly take more interest in the activities of the Association and try to create the same in the subordinate staff working in their respective districts. They may also please help in the collection of the annual subscription of the Association.
- (b) Further resolved that the Deputy Directors be requested to take as well as create more interest in the activities of the Association. The members of the Executive Committee may similarly please try to inculcate the same among their colleagues.

2. Resolved that the District Livestock Officers be requested to hold technical discussions at the time of the monthly meeting in their respective districts and send a report to the General Secretary of the Association for publication in the magazine.

3. Regarding resolution No. 4 (a) and (b) dated 27-9-58 it was resolved that no action is now needed.

4. Regarding resolution No. 5, dated 27-9-58 the report from General Secretary about the inability of acceptance of the post of “Chief Editorship” by Sri K. K. Lal and about certain difficulties in the publication referred to by Sri Tej Bahadur was discussed and it was resolved that Sri H. P. Kapur and K. L. Sahani be entrusted with the work of publication of the magazine.

5. Regarding resolution No. 8, dated 27-9-58 it was resolved that the Director of Animal Husbandry, U. P., Lucknow be again requested to kindly expedite the circulation of the gradation list of the staff as there is great discontentment among them.

6. Resolved that the Government be again moved to expedite the formation and functioning of the U. P. Veterinary Council.

7. On a proposal by Sri H. P. Kapoor seconded by Sri B. R. Singh it was resolved that Sri H. C. Joshi be nominated as State Representative on the Interim Indian Veterinary Council.

8. (a) Resolved that the State Government be moved to create a seat for a representative of Veterinary Science and Animal Husbandry in the Legislative Council.

- (b) Further resolved that the position regarding creation of a similar seat in the Rajya Sabha be obtained from the I. C. A. R.

The General Secretary was empowered to move in this connection.

9. Letters from Shri P. C. Mukerji, Baldeo Sachdeo, Gautum and K. L. Sahani were then considered and it was resolved that no action is needed on the proposals stated therein at present.

10. (a) "Resolved that this Association has been shocked to learn of the sad and sudden demise of Shri Feroze Gandhi and expresses its most sincere sympathies to the bereaved family and further prays that his soul may rest in peace.
- (b) Resolved that this Association has been shocked to learn the sad and untimely demise of S/Shri R. M. Singh & M. S. Malik and expresses its deep sorrow and sympathies to the bereaved families and further prays that their souls may rest in peace.

The resolution was passed all standing and observing two minutes silence.

10th September 1960

All the members present on 9-9-60 attended and the meeting were held at Badshahbagh, Lucknow at 3-00 P.M.

11. It was proposed by Sri H. C. Joshi that the Association should own a guest house in Lucknow where a large number of the members have to frequent for one purpose or the other. The proposal was thoroughly discussed and it was resolved that a building fund be opened by the Association and attempts should be made to obtain large scale contributions for the same.

12. The Graduates from Mathura Veterinary College are being appointed in group II cadre while they are actually given the scale of group I, i.e., 200-15-350. It was therefore resolved that the Government be moved to treat all appointments of Veterinary Assistant Surgeons to have been made in the Group I scale of 200-15-300 from the very beginning and thus remove the existing disparity between the group I & II appointments.

13. Resolved that the audit fee for the period the audit has been done be paid to the auditor.

14. Resolved that the Govt. be moved to expedite the publication of the U. P. Veterinary Manual.

15. Resolved to hold the next annual general meeting at Varanashi at the end of December 1960. The General Secretary is

authorized to take necessary steps in the matter and inform the Executive body as early as possible.

The Dy. Director B. P. Section thereafter gave a talk to the House about the prevalence of "African Horse Sickness".

H. P. KAPOOR,  
General Secretary.

## Reviews

**Diseases of the Swine:**—By HOWARD W. DUNNE, D.V.M., Ph.D., Pennsylvania State University. With an advisory committee of 8 and 48 contributors. 1959. 716 pages, 256 illustrations. Price 100s. Bailliere, Tindall and Cox, Ltd., London, W.C.2.

The profession will welcome Dunne's "Diseases of Swine" as a compendium of the most up-to-date information on the diseases of Swine. Forty eight authors in their fields of speciality have contributed to this attractive volume. Though the emphasis is on the preventive aspect of all diseases affecting swine, it is gratifying to note that sections on surgery, nutrition, feeds and management are also included. As a reference volume for research worker, teacher and student of veterinary science. "Diseases of Swine" approaches the optimum standard particularly with chapters cross-indexed and with extensive reference lists.

The work is profusely illustrated with striking photomicrographs. The get-up is excellent.

M. S. GANAPATHY,

**The inspection of food:**—A Hand book for students of Public Health, Agriculture and Meat Technology - By H. Thornton, B.V.Sc., M.R.C.V.S., D.V.H., F.R.S.H., Chief Veterinary Officer, City and County of New Castle - upon - Tyne. Second Edition (1960). Price 15 Shillings. Publishers:—Messrs Bailliere, Tindall & Co., Ltd. W.C. 2. London.

The production and utilisation of meat and meat products including poultry and eggs are gradually increasing in this Country as a result of the various schemes implemented in the five year plans. So the responsibility of those persons engaged in the inspection of food has also increased manifold to protect the consumer from diseases which are likely to be caused by the consumption of unsound foods. It is essential that the consumer should also know something about the sources of various foods, their methods of preparation and conditions which render them unsuitable for human consumption. The publication of the Second edition of this book at this juncture is quite welcome in this country and is bound to be very useful to the Agriculturists, students and

Veterinarians and Public Health men who are engaged in Food inspection work. The book is written in a simple and lucid language and does great credit to this eminent author. The illustrations are very clear, simple and easily understandable. This book contains a few diagrams which are not found in the "Text Book of Meat Inspection by the same author. Diagrams showing the rise of blood pressure after stunning, diagrams showing cuts of Beef, Veal and Mutton are very illustrative.

There are 12 chapters and 58 diagrams. Every chapter in this book provides a fund of knowledge in clear and unambiguous language. Three chapters have been devoted to the inspection of cereals, Pulses, vegetables, Fish and Milk and Milk products. Thus the book deals in a comprehensive manner the entire aspect of Food Inspection.

The author gives a classified set of questions which enhances the value of the book for the students. The printing and general get up of the book are excellent. Veterinary students and Veterinarians doing Food Inspection work must possess a copy of this book for ready and authoritative reference.

Madras,  
12-9-1960 }

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