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(The Journal of the Indian Veterinary Association)

*A Monthly Record of
Veterinary Science*



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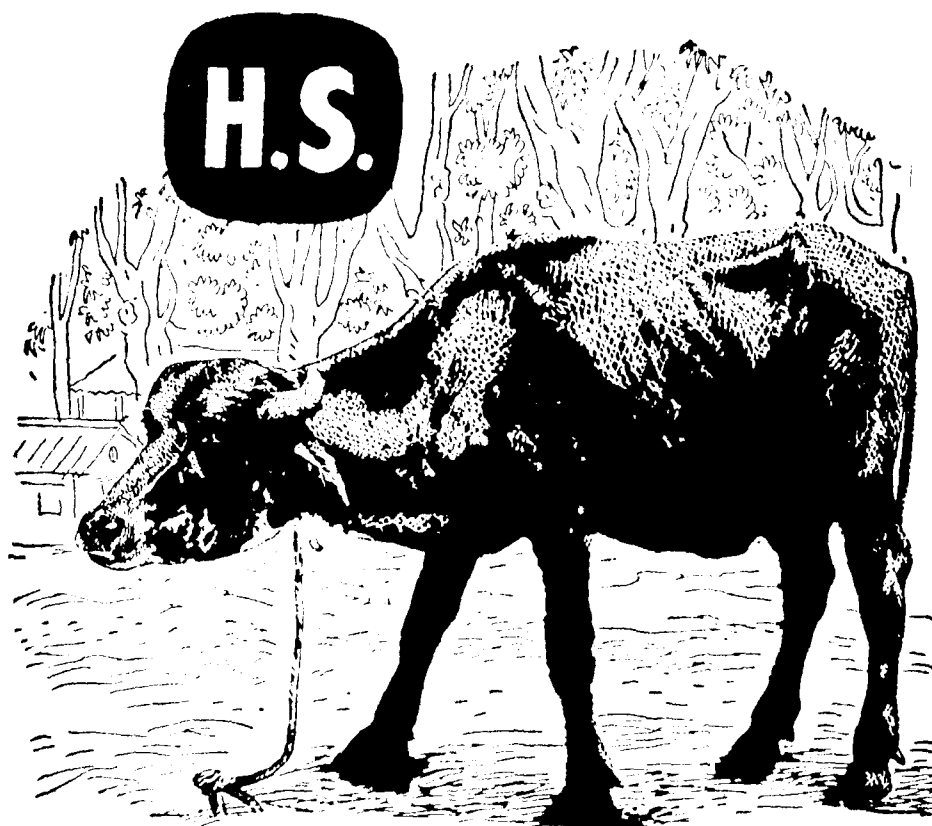
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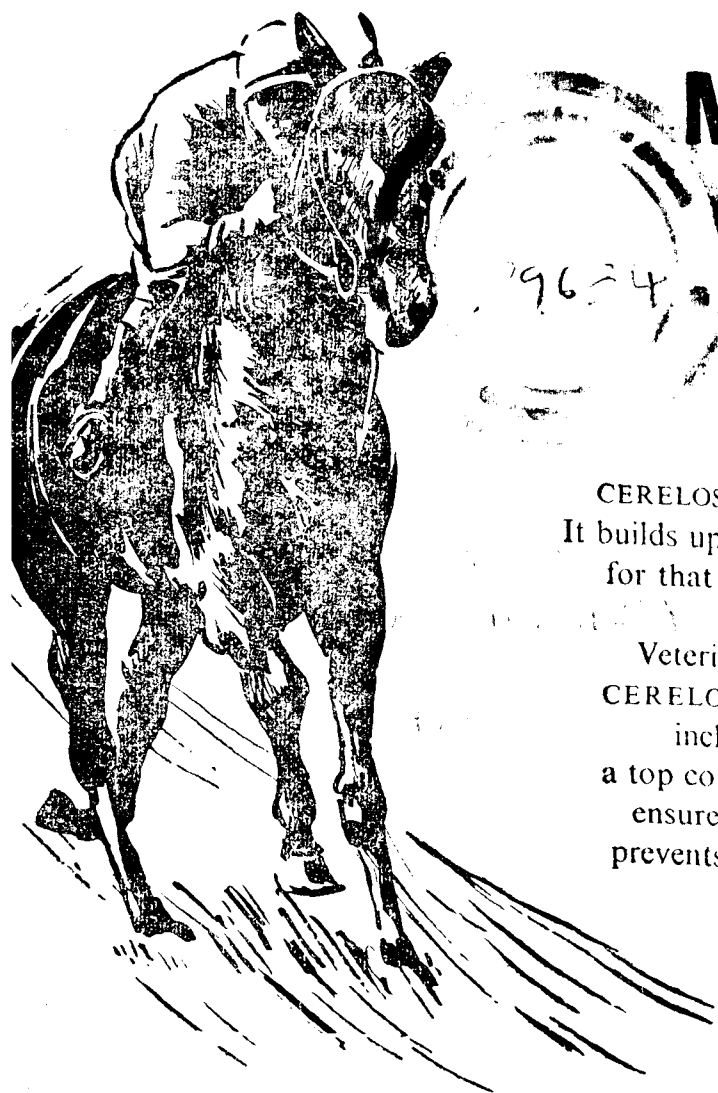
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Vol. 38	AUGUST 1961	No. 8
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CONTENTS

I. Editorial	PAGE
Expansion and Reorganisation ...	E-19
II. General Articles	
Effects of egg-yolk Phosphate, milk and egg yolk Boric acid-sodium Bicarbonate dilutors on the morphology of ram Spermatozoa.—By A. K. Rathore and D. P. Mukerjee. ...	383
Effect of air temperature and humidity on the pulse rate, respiration rate, and rectal temperature in buffalo bulls.—By G. V. Raghavan and D. N. Mullick ...	391
Photosensitized Keratitis in calves and kids following administration of Phenothiazine.—By G. Biswal and B. Patnaik ...	400
Detached epithelial cells in the preputial washings of buck.—By Girish Chandra and Amreek Singh ...	404
Deviation in fixation of lateral Meniscus in buffalo.—By Amreek Singh and Girish Chandra ...	407
Effect of egg yolk levels and rate of freezing on survival of Bovine Spermatozoa after storage at -79° C.—By K. J. Eapen ...	408
Efficiency of feed utilisation of <i>Desi</i> versus Yorkshire graded pigs from three months to six months of age.—By O. P. Agarwala ...	412
A technique of preparing meat meal suitable for feeding livestock.—By R. H. Sundaram and R. Natarajan ...	415
III. Clinical Articles	
A case of Chondromyxoma in a bullock.—By A. J. Aneglo, D. C. Kulshrestha and Y. S. Bhatia.—	420
Ranula in a German Shepherd (Alsation).—By Jose V. Tacal, Jr. ...	422
IV. Abstracts	
Infection of laboratory animals with <i>Mycobacterium Johnei</i> -1. ...	424
The Animal Hospital as a source of Antibiotic-resistant Staphylococci. ...	425
The Anthelmintic Efficiency of fine particle Phenothiazine against the Gastro-Intestinal Strongyles of Nigerian Zebu Cattle ...	425
Early cut hay has many advantages ...	426
Cows can't use finely Ground Pellets ...	426
Feeding straw to dairy cows ...	426
V. News and Views ...	427
VI. Association News	
The Indian Veterinary Association — The Reserve Fund — List of Contributors ...	427

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Vol. 38	AUGUST, 1961	No. 8
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Editorial

EXPANSION AND REORGANISATION

It is now a matter of common knowledge that India has been making rapid progress in every field of her activities, after her independence. The Animal Husbandry field is no exception to it. The Animal Husbandry Department in every State has expanded beyond all recognition. This is indeed, a matter to be proud of. The achievements in some of the States have been remarkable. But as is to be expected, expansion carries with it, the seeds of haphazard growth, unless it is properly planned and wisely directed. We should not therefore be rest content with National Planning but carry such planning to the departmental level as well. We should not be satisfied with mere multiplication of work.

We are moved into such thoughts when we see the vast amount of work that each State Animal Husbandry Department is handling to-day. A comparison of the figures of work-load a decade ago and what is obtaining to-day, will convince even a casual observer of the immediate necessity for the reorganisation of such Departments. But most of them do not seem to keep pace with the rate of growth that has been thrust on them, under the Five-Year-Plans. We can't move fast continuing to sit in our old bullock-carts. We do need more modern conveyances. The agencies detailed for work at all levels within the Department require to be modernised and re-organised, if the increased volume of work is to be properly handled. Re-organisation is the need of the hour. Any delay in such re-organisation will seriously hamper the national progress and the Departments themselves will stand condemned before the public eye.

It is unthinkable that in these days of hectic progress, only one Director for each State could manage things in an effective manner. We feel there ought to be at least two or three Joint Directors, dealing with Education, Research, Disease Control, Livestock Development in the Districts, Government Livestock Farms, Key Village Schemes, Extension work, Livestock Fairs and Shows and even Dairying, suitably

divided amongst them. *Such specialised work, it is hardly necessary for us to remind the Government, can only be handled by duly qualified Veterinarians, if greatest benefit to the country is the only consideration.* All other make-shift arrangements are doomed to failure as has been the bitter experience of a few of the States that had tried such experiments. The division of work amongst the Joint Directors has necessarily to be on a functional basis for purposes of proper administration and control.

Next in order, perhaps, may come the Deputy Directors placed on a regional basis so as to enable them to come in closer contact with the public. The present system of having only one District Veterinary and Animal Husbandry Officer at the District level is fast getting out-moded. There ought to be one such Officer for two or three taluks. That will enable them to do more intensive and extensive work within their jurisdiction. A Veterinary Dispensary and a Touring Billet in each *firka* ought to be the ideal to be aimed at.

We have merely indicated in a general way on what lines re-organisation could take place. We fully well realise there is room for difference of opinion on a matter of this kind. Our purpose would have been served if our suggestion kindles thought in every State on this important question. The division of labour suggested above on a functional basis at administrative level should not be allowed to penetrate into other grades of Officers. In other words, there ought not to be any division of the Department into Livestock and Veterinary Sections. Such artificial barriers only serve to sow seeds of dissension between members of one and the same profession. Some Officers may specialise in particular subjects but they must be able to work side by side with others as members of the same family. Any attempt to label them as belonging to one group of Officers is unnecessary and is positively harmful. They are part and parcel of one and the same Department and do not make them appear as a separate entity. If such divisions are allowed to take root, the Department itself will sooner or later present the sad spectacle of a house divided against itself.

We do not claim infallibility in our suggestions; but they are placed before the profession for whatever they are worth. What we have said above regarding the executive staff, equally applies to the Ministerial staff of the Department. They need re-organisation as well, on suitable lines. Unless we move with the times and bring about a certain amount of re-orientation in all spheres of our work, we are likely to lose all the benefits of expansion going apace with such rapidity.

General Articles

EFFECTS OF EGG-YOLK PHOSPHATE, MILK AND EGG-YOLK BORIC ACID-SODIUM BICARBONATE DILUTORS ON THE MORPHOLOGY OF RAM SPERMATOZOA

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Introduction

Although various dilutors have been recommended to be used for the preservation of ram semen, no satisfactory dilutor has yet been evolved which would ensure unimpaired fertility of diluted semen over a period of 12 hours or more. Among the dilutors recommended egg-yolk citrate (E.Y.C.), egg-yolk glycine (E.Y.G.), egg-yolk phosphate (E.Y.P.), milk and boric acid-sodium bicarbonate have been used to preserve ram semen. It has been observed that preservation of ram semen for 72 hours in E.Y.C. or E.Y.G. decreases the size of the sperm head and the viability of spermatozoa. Decrease in the size of the sperm head of bull spermatozoa preserved for the same length of time in the two dilutors has also been reported by Mukherjee and Dott (1960). The decrease in the size of sperm head of ram spermatozoa preserved in E.Y.C. or E.Y.G. is due to alterations in the acrosome (Rathore, 1961). It may be due to the morphological changes and decrease in the viability of the spermatozoa that lower conception rate is obtained with semen preserved either in E.Y.C. or E.Y.G.

Egg-yolk phosphate developed by Phillips and Lardy (1940) for bull semen has also been used for diluting and preserving ram semen. Hill, *et al* (1958) used milk as dilutor for ram semen. They observed that although ram semen could be preserved for a period of 15 days, at 38°C in both E.Y.C. and reconstituted milk, the survival in the latter was better than in the former. Goat milk has also been found to be a good diluent for ram semen (Macpherson, 1957). Recently Jakobsen and Mann (1960) studied the motility of spermatozoa of bull, ram and boar in milk dilutor. To study the motility, the usual microscopic method was replaced by the biochemical means *viz.*, the rate of sperm respiration and fructolysis which are correlated with motility (Mann 1954). They observed that oxygen uptake in milk dilutor was higher than in Ringer's phosphate. Fructose utilization as

measured by the rate of lactic acid production was higher in milk than in Ringer's phosphate during the later stages of 4 hours incubation period. The difference, observed in the rate of respiration and fructose utilization was considered to be due to "life preserving" effect of milk rather than the additive nutrient substrate preset in milk. No comparative test of fertility of ram semen preserved in milk and in any other dilutor appears to have been made.

Yoshioka, *et al* (1951) studied the effects of boric acid-sodium bicarbonate and RH solution on the conception rate of ram and goat semen. They observed that by diluting semen with boric acid-sodium bicarbonate (containing 2 parts of 2% boric acid and 1 part of 1% sodium bicarbonate) in the ratio of 1 part of semen to 3 parts of the solution, the conception rate was higher than with the untreated semen. Higher conception rate has also been observed by diluting semen with equal volume of RH solution containing 0.3% sodium sulphamerazine and 0.2% homosulphamine in equal volume.

Preliminary work (unpublished data) showed that the motility of ram spermatozoa could not be preserved at 5°C for 24 hours in boric acid-sodium bicarbonate solution. It was observed that by adding equal volume of egg-yolk to the solution, the resulting mixture designated in the present work as egg-yolk boric acid (E.Y.B.) was as efficient as E.Y.P. or milk in maintaining the spermatozoal motility. The present work was undertaken with a view to study the effects of E.Y.P., milk and E.Y.B. on the viability and morphology of ram spermatozoa.

Materials and Methods

Experimental animals consisted of four Bikaneri rams used for breeding purpose. Sixteen semen collections were made, four from each ram using an artificial vagina. Soon after each collection a drop of semen was withdrawn, mixed with three drops of nigrosin-eosin stain and out of the mixture of stain and semen four thin smears were made on slides. The smears were dried and mounted in neutral Canada balsam. The composition of stain was nigrosin (G.T. Gurr) 10 g., eosin (G.T. Gurr) 1.67 g., and 100 ml of distilled water (Hancock, 1951).

The rest of the semen was divided into three equal parts. One part was diluted in E.Y.P. another in milk and the remaining part in E.Y.B. The ratio of dilution was 1 part of semen and 3 parts of the dilutor. The E.Y.P. dilutor contained equal volumes of egg-yolk and phosphate buffer (0.2 g., KH_2PO_4 and 2.0 g. $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$ in 100 ml glass distilled water, pH adjusted to 6.75 by M/15 buffer). The milk dilutor was fresh cow's milk heated to 97°C for 10 minutes and then brought to room temperature prior to use. The E.Y.B. dilutor comprised of equal volumes of egg-yolk and boric acid-sodium bicarbo-

nate solution (2 parts of 2% boric acid by volume with 1 part of 1% sodium bicarbonate). The diluted semen samples were covered with liquid paraffin and preserved in a refrigerator at 5°C for 72 hours. At the end of this period they were warmed by rotating between palms for a few minutes till motility of the spermatozoa was observed under a microscope. From each preserved sample four nigrosin-eosin slides were made. Thus from each semen sample collected, sixteen slides were prepared, four of the fresh (F) and four slides after each of the three treatments. There were sixteen collections and altogether 256 slides were prepared. The slides were then coded and the code was withheld till the following observations were completed.

Slides were examined under a microscope using artificial light with blue filter. In each slide four unstained spermatozoa with a clear outline of the head were selected at random in a field where the nigrosin-eosin stain was thin. The thickness of the stain did not affect the proportion of stained spermatozoa (Campbell, *et al* 1956). The head length and head breadth of the selected spermatozoa were measured by using a 15 x ocular screw micrometer and oil immersion (1.8 mm) objective (final magnification x 1455). The head length and head breadth included only the maximum length and breadth of the sperm head as described by Mukherjee and Bhattacharya (1949). From the four measurements the average head length and head breadth was calculated for the slide. The proportion of stained spermatozoa was estimated by counting hundred spermatozoa in each slide from a field chosen at random. Fully stained and partially stained spermatozoa were counted separately. The partially stained spermatozoa included those with stain in the posterior half of the head and designated as posteriorly stained spermatozoa.

Results

The main results based on the data are summarised in Table I. It will be seen from the Table that the mean head length of spermatozoa preserved in E.Y.P., milk and E.Y.B. was 0.1442, 0.1654 and 0.1552 micron shorter than those without preservation. The mean head breadth of spermatozoa preserved in the three dilutors was 0.1623, 0.1725 and 0.1706 micron shorter than those without preservation.

Preservation in the three dilutors decreased the proportion of unstained spermatozoa and increased the proportion of fully and partially stained spermatozoa.

Difference in the size of spermatozoa and the percentage of unstained, stained and posteriorly stained spermatozoa were studied in analyses of variance, the details of which are given in Table II.

TABLE I
Treatment means of head length and head breadth in micron of unstained spermatozoa for each ram.

Ram No.	Head length				Head breadth			
	F	EYP	M	EYB	F	EYP	M	EYB
1	9.6439	9.5551	9.4775	9.5158	6.1454	6.0543	6.0493	6.0753
181	9.5598	9.5112	9.5158	9.4962	6.1413	5.9771	6.0039	5.9842
310	9.5700	9.3308	9.3495	9.3420	6.1617	5.9456	5.9322	5.9286
340	9.5448	9.3448	9.3140	9.3439	6.1325	5.9549	5.9170	5.9105
Mean	9.5796	9.4354	9.4142	9.4244	6.1452	5.9829	5.9727	5.9746
S. E. of Mean				0.0016			0.0018	

TABLE I—(Contd.)
Treatment means of percentage unstained, stained and partially stained spermatozoa for each ram.

Ram No.	% unstained			% fully stained			% posteriorly stained			
	F	EYP	M	F	EYP	M	F	EYP	M	EYB
1	61.75	57.00	56.12	3.00	3.87	4.00	35.25	39.12	39.87	44.87
181	58.87	53.25	52.75	3.37	5.12	5.50	37.75	41.62	41.75	43.87
310	63.50	54.25	53.00	3.12	4.87	5.50	33.87	40.87	42.50	45.50
340	69.50	59.25	53.62	2.87	5.00	4.87	27.62	35.75	41.50	41.37
Mean	63.40	55.93	53.62	3.09	4.71	4.96	33.49	39.34	41.40	43.90
S. E. of Mean			0.6362			0.2237			0.3648	

TABLE II
Analyses of Variance of head length, head breadth, percentage unstained, stained and partially stained spermatozoa.

Source of Variation	D.F.	Mean squares			
		Head length	Head breadth	% unstained +	% fully stained + % posteriorly stained +
Between treatments	3	0.0044612**	0.0052103**	647.980**	495.158**
Between rams	3	0.0050273**	0.0155860**	111.173	23.796**
Between collections within rams	12	0.0007866**	0.0000811	65.111**	3.804
Treatments x rams	9	0.0003695	0.0002246*	25.914*	3.682
Treatments x collections within rams	36	0.0002726	0.0000992	9.128	4.149
Pooled interactions	45	0.0002920	—	—	4.056
Between slides within treatments	192	0.0001584	0.0009705*	6.410	3.005
Pooled interactions	237	0.0001797	—	—	3.205

+ Transformed to angles before analysis.

** Significant at 1% level.

* Significant at 5% level.

— Interactions not pooled (see text).

For *head length*, percentage of fully stained and posteriorly stained spermatozoa, treatment interaction mean squares with ram did not exceed significantly the interaction mean squares with collection within rams so they were pooled. The pooled interaction mean squares did not exceed the mean squares between slides within treatment and so they were pooled together and the pooled mean squares with 237 degrees of freedom were used for testing the main effects of treatments and for calculation of standard errors. Mean squares between collections within rams were tested against the treatment interaction mean squares with collections within rams and mean squares with collections within rams and mean squares between rams were tested against mean squares between collections within rams.

For *head breadth* and percentage of unstained spermatozoa treatment interaction mean squares with rams were considerably higher than the interaction mean squares with collections within rams, and so the treatment interaction mean squares with rams were used for testing the main effects of treatments and for calculation of the standard errors.

The analysis of data showed that *head length*, percentage of unstained and posteriorly stained spermatozoa varied significantly (significant at 1% level) between treatments. When tested individually they differed significantly between any two out of the four treatments. The *head breadth* of spermatozoa varied significantly (significant at 1% level) between fresh and preserved samples. No significant variation was found between milk and E.Y.B. dilutors. Fully stained spermatozoa varied significantly (significant at 1% level) between fresh and preserved samples. Between the dilutors used for preservation no significant variation was found.

Discussion

From the results of the present experiment it is evident that preservation of ram semen in either of the three dilutors *i.e.* E.Y.P., milk and E.Y.B. for 72 hours decreased the size of the sperm head. The decrease was least in E.Y.P. than in the other dilutors. It has been observed (Rathore, 1961) that preservation of ram semen in E.Y.C. and E.Y.G. decreased the size of the sperm head and caused shrinkage and morphological alterations in the acrosome. It seems, therefore, that the decrease in the size of the sperm head as has been observed in the present experiment may be due to shrinkage and morphological changes in the acrosome during preservation. Judged from this point of view, there is also an indication that among the three dilutors used, E.Y.P. was better than the other two dilutors as the shrinkage in it was the least. Whether or not the morphological changes in the

acrosome of ram spermatozoa preserved in E.Y.P. are comparatively less than those preserved in milk and E.Y.B. are still to be determined. Between milk and E.Y.B. the *head length* was significantly less in the former than in the latter dilutor. In the two dilutors the *head breadth* remained unchanged.

The present results also show that preservation of ram spermatozoa in either of the three dilutors decreased the percentage of unstained (*i.e.* living) spermatozoa. The decrease was the least in E.Y.P. than in milk and E.Y.B. This result further shows that E.Y.P. is better than the other two dilutors for the preservation of ram semen.

Preservation for 72 hours increased the percentage of fully stained and posteriorly (partially) stained spermatozoa. This may be due to the reason that an ejaculated semen sample consists of spermatozoa which are formed at different times. Some are formed earlier than others before they are ejaculated. Like all cells, spermatozoa soon after they are formed undergo aging process. With the passage of time the potential viability of the spermatozoa will become less and less. As a result, an ejaculated sample may contain viable (unstained) dead (stained) and those which are in the process of losing their potential viability and acquiring the physicochemical properties which constitute death. Pande, *et al* (1961) consider the partially stained spermatozoa as those which are in the process of losing their viability. It seems, therefore, that the increase in the proportion of fully stained spermatozoa due to preservation in the three dilutors without any significant difference of such spermatozoa in the dilutors used may be ascribed due to the aging of the sperm. The significant difference observed in the proportion of partially stained spermatozoa preserved in the three dilutors may be due to the difference in the prevailing conditions for sperm in the dilutors used to acquire the physicochemical properties which make them partially eosinophilic. If it is presumed that partially stained spermatozoa are less viable spermatozoa, the results of the present experiment show that after 72 hours of preservation their proportion in E.Y.P. is less than in milk and E.Y.B. This further confirms that E.Y.B. is comparatively better dilutor than milk and E.Y.P. Between milk and E.Y.B., the former is better than the latter in maintaining the viability of ram spermatozoa.

Summary

Sixteen semen samples were collected by means of the artificial vagina from four Bikaneri rams. In each sample, the *head length* and *head breadth* of unstained spermatozoa, their percentage and the percentage of fully stained and posteriorly stained spermatozoa in nigrosin eosin preparations were studied before and after 72 hours of

preservation in egg-yolk phosphate, milk and egg-yolk boric acid. The following results were obtained from the study :

1. The head length and head breadth of preserved spermatozoa were significantly less than those without preservation,
2. Preservation significantly decreased the proportion of unstained spermatozoa and increased the proportion of fully and posteriorly stained spermatozoa.

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REFERENCES

1. Cambell, R. C., Dott, H. M. and ... *J. Agric. Sci.* **48**, 1.
Glover, T. D. (1958)
2. Hancock, J. L. (1951) ... *Nature*, **167**, 223.
3. Hill, J. R. (Jr.), Hurst, V. and ... *Amer. Jour. Vet. Res.*, **19**, 132.
Godley, W. C. (1958)
4. Jakobsen, K. F. and Mann, T. ... *J. Agric. Sci.*, **54**, 166.
(1960)
5. Mann, T. (1951) ... *Biochemistry of semen*. Methuen and Co. Ltd., London.
6. Macpherson, J. W. (1957) ... *Canad. J. Comp. Med.*, **21**, 161.
7. Mukherjee, D. P. & Bhattacharya, P. (1949) ... *Proc. Zool. Soc. Beng.*, **2**, 141.
P. (1949)
8. Mukherjee, D. P. & Dott, H. M. ... *J. Agric. Sci.*, **55**, 225.
(1960)
9. Pande, P. G., Mukherjee, D. P. ... *Ind. J. Physiol. & Allied Sci.*, **15**, 6.
and Bhattacharya, P. (1961)
10. Phillips, P. H. and Lardy, H. A. ... *Jour. Dairy Sci.*, **23**, 399.
(1940)
11. Rathore, A. K. (1961) ... Thesis submitted to Agra University for
M. V. Sc. degree.
12. Yoshioka, Z., Inudo, Y. and ... *Bull. Natl. Inst. Agric. Sci. (Chiba)* **G (1)**,
Torizuka, T. (1951) 53. (Citation from *A. B. A.*, **20**, 245).

EFFECT OF AIR TEMPERATURE AND HUMIDITY ON THE PULSE RATE, RESPIRATION RATE, AND RECTAL TEMPERATURE IN BUFFALO BULLS

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Presently, a good deal of attention has been given by the animal husbandry workers in this country to utilise the buffalo species for milk and work production. In order to maintain their optimum productive level, systematic investigations for their physiological behaviours under different variable conditions are highly desirable. Mullick (1960) and Bhatnagar and Chaudhury (1960) reported the effect of atmospheric conditions on the pulse and respiration rates and body temperature in buffalo cows and calves respectively, though buffalo bulls are largely used for draught purposes in this country but there are no data to show their physiological reactions under different climatic conditions.

In the present communication, an observation has been undertaken to correlate the changes of the air temperature with the variations in the pulse and respiration rates and body temperature of the adult healthy buffalo bulls.

Experimental

Eight adult Murrah buffalo bulls weighing between 850-900 lb. were fed with maintenance ration according to the recommendations of Morrison (1959) for a period of 12 months. The ration consisted of ground nut oil cake as concentrate and wheat bhoosa as roughage. Water was given *ad. lib.*

Standard dairy managements were followed. Weekly records were made on pulse rate, respiration rate and rectal temperature in the afternoon between 2 to 3 P.M. On the days of observations, the animals were not allowed to go out for grazing and the feed and water were withheld till the observations were over. The methods for recording these physiological reactions were the same had been described by Mullick and Kebar (1952). The dry and wet bulb thermometer readings were recorded just after the observations and relative humidity was calculated from these readings. The statistical analysis of the data was calculated according to the methods described by Snedecor (1946).

Results

Climate :—The minimum and maximum values of air temperature were 52°F in January and 106°F in June with an overall average of

77.5°F±18.57. The figures for lowest and highest humidity were 33% in June and 86% in August with an overall average of 58.54% ± 15.57 (Table 1).

Pulse rate:—The mean values with their standard deviations of the pulse rate per minute for all the animals at different levels of air temperature and humidity are shown in Table 1. The range of the mean values of the individual animal varied from 50 to 54, whereas, between the months the maximum and minimum figures were 57 and 45 with an overall average of 52 ± 3.92 beats per minute.

The figures were treated statistically according to the analysis of variance and the 'F' value showed that the differences due to the months as well as between the animals were highly significant at 1% level (Table 4).

Respiration rates:—The mean values with their standard deviations of the respiratory rate per minute between the months and as well as animals are shown in Table 2. The range of the mean values of the individual animal varied from 18 to 22, whereas, between the months, the maximum and minimum figures were 38 and 10 with an overall average of 20 ± 8.76 beats per minute. The figures of the standard deviations showed highest value of 6.02 during the highest temperature, indicating maximum variations of the rate between the individual animals. According to the analysis of variance, the differences between the monthly averages as well as between the animals were significant at 1% level (Table 4).

Body temperature:—The mean values with their standard deviations of the body temperatures between the months as well as animals are shown in Table 3. The range of the mean values of the individual animals varied from 99.9 to 100.7°F, whereas, between the months, the maximum and minimum figures were 101.5° and 99.1°F, with an overall average of 100.4° ± 0.97. The figures treated statistically according to the analysis of variance and the 'F' value showed that the monthly differences were highly significant at 1% level and the differences between the animals were significant at 5% level.

Discussion

There was variation in the pulse rate with the change in the air temperature and humidity. The first few average values showed a positive relation but afterwards, it did not follow any regular trend. On the otherhand, the rate declined at the highest temperature with lowest humidity and it again increased when the humidity was considerably high at the same range of temperature. Though the variations in the rate due to the change in the atmospheric condition did not maintain any regular relation but statistically, the differences between the mean

TABLE I
Showing the average values of pulse rate per minute of animals during experimental period.

Air temperature °F	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Av.	S.D. ±
Relative humidity %	68	54	46	54	43	33	75	86	73	56	54	61		
Animal No.														
2	46	49	56	56	56	52	57	53	59	59	54	49	54	3.97
25	46	48	49	58	55	49	56	50	55	57	52	49	52	3.97
26	48	50	48	52	55	47	52	51	53	57	52	49	51	3.73
27	40	49	47	50	49	47	53	49	53	56	54	50	50	3.97
276	46	49	54	57	52	51	53	48	56	58	52	51	53	3.84
1207	46	49	50	55	57	46	51	47	56	57	53	49	51	2.85
1209	45	51	57	60	50	52	56	52	55	55	52	49	53	3.84
1964	48	53	50	56	55	49	53	51	55	57	52	50	52	3.66
Average	45	50	51	56	54	50	54	50	56	57	52	50		
S.D. ±	2.29	1.47	3.53	3.00	2.71	2.30	2.03	1.90	2.00	1.11	0.27	0.22		

Average — 52
S.D. ± 3.92

TABLE II

Showing the monthly averages of respiration per minute of animals during experimental period.

Air temperature °F.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Av.	S.D. ±
Relative humidity %	52	54	64	88	94	106	104	86	80	80	71	56		
Animal No.	68	54	46	54	43	33	75	86	73	56	54	61		
2	11	10	13	22	31	37	26	27	20	18	14	12	20	6.10
25	10	10	11	19	22	32	27	27	19	19	11	13	18	7.55
26	10	10	13	20	26	37	25	33	21	20	14	13	20	10.06
27	10	10	11	19	31	32	23	27	19	20	14	18	19	7.87
276	9	10	12	21	29	38	23	24	21	19	12	12	18	8.72
1207	10	10	11	19	31	32	23	27	19	20	14	13	19	7.87
1209	10	12	12	19	31	47	29	24	21	20	13	12	21	5.06
1964	10	11	13	21	38	46	27	35	21	20	14	13	22	11.10
Average	0.53	0.73	0.92	1.12	3.39	6.02	2.26	4.16	0.99	0.75	1.17	0.51		
S.D. ±														

Average — 20
S.D. ± 8.76

TABLE III

Showing the monthly averages of body temperature (°F) of animals during experimental period.

Air temperature °F.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Av.	S.D. ±
Relative humidity %	52	54	64	88	94	106	104	86	80	80	71	56		
Animal No.	68	54	46	54	43	33	75	86	73	56	54	61		
2	98.6	98.6	101.7	101.0	101.8	101.7	101.2	101.2	101.6	101.2	98.7	99.6	100.5	1.26
25	99.8	99.0	100.1	100.6	101.2	101.5	101.3	100.4	101.0	100.8	99.8	100.5	100.5	0.73
26	99.7	99.4	100.1	100.6	101.0	101.5	101.2	100.8	100.8	100.8	100.4	99.8	100.5	0.66
27	98.6	98.2	98.8	99.9	101.0	101.3	101.0	101.1	100.9	101.0	100.1	100.0	100.1	1.10
276	97.5	97.9	99.7	101.4	100.9	101.5	100.6	100.5	100.3	99.9	100.0	99.0	99.9	1.22
1207	99.3	99.7	100.3	100.5	101.8	100.7	100.2	100.4	100.4	100.4	100.1	100.0	100.3	0.81
1209	99.8	99.1	100.8	101.3	101.6	101.6	101.2	101.5	101.1	100.2	100.0	99.9	100.7	0.26
1964	100.0	100.6	99.7	100.8	101.7	101.8	101.3	101.2	100.8	100.1	100.1	99.8	100.6	0.72
Average	99.1	99.1	100.1	100.8	101.4	101.5	101.1	100.9	100.7	100.5	100.0	99.9		
S.D. ±	0.86	0.86	0.84	0.47	0.35	0.33	0.40	0.42	0.02	0.45	0.50	0.02		

Average — 100.4
S.D. ± 0.97

TABLE IV
Showing the results of analysis of variance of various characters: Physiological reactions.

Source of variance.	Degree of freedom	Pulse		Respiration		Body temperature	
		Sum squares	Mean squares	Sum squares	Mean squares	Sum squares	Mean squares
Between months	11	1035.90	94.17**	6715.28	610.48**	54.80	4.9818**
Between animals	7	125.20	17.88**	131.24	18.76**	4.90	0.7000**
Error	77	318.60	4.14	443.14	5.75	20.89	0.2712
Total	95						

** Significant at 1% level.

* Significant at 5% level.

values at different temperature and humidity levels were significant. Similar observations were recorded in foreign bred cows and calves in temperature controlled chambers by Kibler and Brody (1950) and Beakly and Findlay (1925) respectively. It seems that the reactions in the pulse rate of foreign cattle and Indian buffalo bulls due to variations in the atmospheric conditions were similar. The possession of functional sweat glands is another important factor which can be considered for variations in the pulse rate. In a non-sweating species like foreign cattle and buffalo, the atmospheric heat is absorbed in the body through skin instead of dissipation by evaporative mechanism as sweat. Moreover, the number of sweat glands is directly proportional with the number of hairs of the skin (Findlay and Yang, 1950). Thus the black, hairless, tough skin of the buffalo is more helpful in absorption of the atmospheric heat when it comes in contact with the skin. In order to minimise the adverse effect of absorption, the surface capillaries are constricted with the result of slowing of heart beat. With the onset of the rainy season, just opposite reactions took place. The same trend of variations in the pulse rate in Egyptian buffaloes has been reported by Badreldin *et al.* (1951). Climatic conditions are generally thought to be the principle factors to cause appreciable variation in the pulse rate but due consideration should also be given to the plane of nutrition of the experimental animals (Ritzman and Benedict, (1938).

The respiratory rate maintained a significant positive correlation with the change in the air temperature. Higher temperature and humidity had a temporary depressing effect but it seems air temperature was a major factor in causing variation in the rate more than humidity. The increase in the respiratory rate was conspicuous at 88°F and it maintained a regular upward trend with further rise of temperature. This finding clearly demonstrates that in a non-sweating species like buffalo, one the chief mechanisms of thermolysis is the adjustment of the respiratory rhythm. Though in all the experimental animals, the rate registered an increase with the temperature but variations within the individual animals varied differently at 106°F as evidenced by the highest values in the standard deviation, which showed that the animals used their heat dissipating mechanisms differently under climatic stress.

In a non-sweating species like buffalo, the chief mechanism of dissipation of extra heat load at climatic stress is to accelerate the respiratory rhythm. It was found out that the variation in the rate due to change in atmospheric conditions was the most sensitive physiological index. Thus this relation can be usefully utilised to measure the heat tolerance capacity of the animals. Greater variations in the rhythm between two levels of higher temperature in any breed or

species will be considered as possessing inferior physiological mechanisms for adaptation or acclimatisation and thus unsuitable under the prevailing atmospheric conditions in the particular zone or area.

The present findings were in agreement with those of Badreldin *et al.* (1951) in Egyptian buffalo cows and of Mullick (1960) and Bhatnagar and Chowdhury (1960) in Indian buffalo cows and calves respectively.

The body temperature maintained a significant positive correlation with the change in the air temperature and the onset of monsoon had a depressing effect. This was in agreement with the findings in buffalo cows by Badreldin *et al.* (1951) and Mullick (1960) and in buffalo calves by Bhatnagar and Chowdhury (1960). The differences in the mean values between the temperature levels and within the animals when treated statistically by analysis of variance, were found to be significant. The variations in the rectal temperature of the experimental animals on exposure to the direct sun is considered as a good index for measuring the heat tolerance capacity of the animals (Rhoad, 1944). In tropical countries under normal management, rarely the animals are exposed to the direct sun in summer months. So an index for adaptation or acclimatisation of animals under tropical conditions should be worked out under the prevailing conditions of management that is in the shed.

Of all the changes in the physiological mechanisms of heat regulation under climatic stress, the variations in the respiratory rate was first noticed with the slight increase in the atmospheric temperature. This relation can be suitably utilised to measure the heat tolerance of the animals.

Summary

Observations on pulse rate, respiration rate and body temperature were made at weekly intervals on eight adult healthy Murrah buffalo bulls on maintenance ration. Records of dry bulb temperatures and relative humidity were also noted.

Changes in the air temperature appeared to be the major cause for affecting variations in these physiological reactions of animals. Higher values of pulse rate, respiration rate and body temperature were recorded with the rise in the air temperature.

Analysis of variance of the data showed that the variations of these physiological components due to atmospheric conditions were highly significant.

It is suggested that the relation between the respiration rate and air temperature can be suitably utilized for assaying the heat tolerance capacity of the animals.

The figures of pulse rate, respiration rate and body temperature may be considered as normal values of these physiological constituents of adult healthy buffalo bulls.

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REFERENCES

- Badreldin, A. L., Oloufa, M. M., ... *Bull. Fouad I, Univ. Fac., Agric.* No. 4.
Asker, A. A. and Ghany, M. A. (1951)
- Beakley, W. R. and Findlay, J. D., ... *J. Agric. Sci.*, **45**, 353-356.
(1955)
- Bhatnagar, D. S. and N. C., ... *Ind. J. Physiol.*, **14**, 79-82.
Chaudhury, (1960)
- Findlay, J. D. and Yange, J. (1950) ... *J. Agri. Sci.*, **40**, 126-128.
- Kibler, H. H. and Brody, S. (1950) ... *Mo. Agric. Exp. Sta. Res.*, Bul. 464.
- Morrison, F. B. (1959) ... *Feeds and Feeding*, Morrison, Publishing Works, U.S.A.
- Mullick, D. N. and Kehar, N. D. ... *Ind. J. Vet. Sci.*, **22**, 61-68.
(1952)
- Mullick, D. N. (1960) ... *J. Agric. Sci.*, **54**, 391-394.
- Rhoad, A. O. (1944) ... *Trop. Agric.*, **21**, 162-163.
- Ritzman, E. G. and Benedict, F. G. ... *Carnegei Inst. Washington, Pub.*, 494.
(1938)
- Snedecor, G. W. (1946) ... *Statistical methods*, Collegiate Press, Ames., U.S.A.

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PHOTOSENSITIZED KERATITIS IN CALVES AND KIDS FOLLOWING ADMINISTRATION OF PHENOTHIAZINE

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Introduction

Phenothiazine treatment at times sets up photosensitized keratitis in young animals. Filmer (1946) appears to be the first worker who recorded it as an inflammatory condition of the eye causing blindness after treatment with Phenothiazine. Whitten and Filmer (1947) in an excellent work giving details of the clinical manifestation of the lesion and its histopathology proved it beyond doubt about the etiology of the diseased condition by dosing them with Phenothiazine and subsequently exposing the eyes of the treated calves to sun's rays. Filmer (1946) and Clare *et al* (1947) identified the photodynamic agent responsible for the corneal affection. Clare (1947) observed that Phenothiazine is converted into Leucophenothiazine-etherial Sulphate and is excreted through bile and urine, and some of it is also converted into Phenothiazine Sulphoxide in the systemic circulation. The sulphoxide escapes into the aqueous humour of the eye from systemic circulation and when the eye comes in contact with bright sun light or ultraviolet radiation of 320-380 μ wave length, causes damage to the cornea. Whitten and Filmer (1947) further mentioned that since sheep can better eliminate the drug *via* the liver and kidney the incidence is not noticed in them when the drug is administered in medicinal doses.

Photosensitized keratitis following administration of Phenothiazine has subsequently been reported by Charles (1948), Reik (1951), Clare (1952), Whitten (1952) and Chandler (1956). Even though the condition is stated to be not occurring in sheep and in goats (Whitten and Filmer, *loc. cit*) Gordon and Green (1951) and Clare (1952) have reported that this condition is seen in young sheep also.

Clinical Observations

In fifteen calves between ages 4 months to 1 year, treated with medicinal doses of Phenothiazine at the State Livestock Breeding Farm, Khapuria, Cuttack, photosensitized keratitis was noticed. It was also seen in four of the graded Beetal kids of the Goat Breeding

Farm, Bhubaneswar following administration of Phenothiazine. The condition started with profuse lachrymation on the 3rd to 4th day after dosing, followed by photophobia. The affected animals inclined to remain inside the shed and most of the calves closed their eyes. Corneal opacity with highly injected mucous membrane started to appear in about 6 to 10 days after medication. At this stage, if the cases were not treated for corneal opacity, ulcerations of the cornea developed and once ulcerations set-in the condition was difficult to get cured. The ulcer started at the centre of the cornea and gradually spread involving its entire surface and all its membranes in the mean time became thickened. Fig I shows the ulcer on the cornea where the entire cornea is involved. Treatment at this stage is of no avail.

In the early stages of corneal opacity the calves and kids were treated with either Silver Nitrate Solution followed by saline irrigation or by dusting Calomel-Acid Boric followed by saline irrigation. The opacity is resolved within a period of 6 to 15 days after treatment depending on the degree of damage already done to the cornea. Out of 15 calves which developed the lesion from a total of 95 calves, thirteen had single eye involvement and two had their both eyes affected, while all the four kids out of 29 treated had single eye involvement.

TABLE I

Date	Number of animals treated	Dose of Phenovis (in gms)	No. of animals developed keratitis		Time taken for clinical manifestation of keratitis after dosing (in days)	Time taken to resolve (in days)
			Single eye	Both eyes		
1	2	3	4	5	6	7
Calves						
18-6-58	32	20-30	4	1	7-9	9-12
25-8-58	17	25	2	—	7-10	6-14
21-10-58	39	20	5	1	8-10	6-15
28-10-58	3	30	1	—		12
30-11-59	4	30	1			
Kids						
19-5-58	12	10	2	—	6-8	11-14
22-6-58	17	10	2	—	7-10	12-15

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Of the fifteen calves which showed the opacity only one did not respond to treatment. This calf was treated after ulcerations were formed as shown in Fig 1. Though the ulcerations healed the eye appeared bulged out with complete loss of vision- vide Fig 2.

A group of 28 sheep of various ages were also treated with Phenothiazine but none developed any keratitis. Phenothiazine employed in the treatment was "Phenovis" brand of Phenothiazine of M/s Imperial Chemical Industries.

Discussion

Filmer (*loc. cit.*), Clare *et al* (*loc. cit.*) and Whitten and Filmer (*loc. cit.*) had observed keratitis to occur in about 12 to 36 hours after dosing the animals with Phenothiazine. Observation recorded in this study is that it takes 6 to 10 days for the condition to occur after dosing.

Chandler (1956) while recording toxicity of Phenothiazine in calves had suggested that the pathogenicity may be connected with the bush and herbage eaten by the animals as the condition appeared in certain groups while it did not occur in the earlier treated groups. From the observations of the above workers and that of the one under study it is not known whether the particle size of Phenothiazine which is known to determine the anthelmintic action of the drug is in any way connected with the production of this photosensitisation or as has been suggested by Chandler (1956) nutrition may be also indirectly connected with this condition which fact needs investigation.

From TABLE I, it is seen that while the incidence is noticed in kids during hot summer months, in the calves no such seasonal variation has been observed. This may be due to the less susceptibility of the kids which require the hot tropical sun for the production of the disease, while the calves which are more susceptible to photosensitization develop the lesions even with bright sun light which is a common phenomenon of this country. It is interesting to note that none of the 28 sheep treated with Phenothiazine developed any sort of symptoms although four kids developed the lesions.

The Uni or bilateral involvement of the cornea is dependent on the time and mode of exposure of the eyes to the sun's rays and is not dependent on the dose of Phenothiazine administered. The two calves affected received the drug in doses of 20 gms each.

Since the Photo-dynamic agent concerned in the diseased condition is Phenothiazine Sulphoxide, it is likely that this compound is either formed slowly or takes a longer time to get excreted from the body of these animals which might explain the late appearance of the

lesions. Whatever be the reason for this delayed action, the fact remains that corneal opacity is seen atleast 6 to 10 days after dosing. Hence the prophylactic measure advocated by Whitten and Filmer (*loc. cit.*) of dosing the animals at midnight and keeping them in-doors on the following two days will not hold good in cases under report.

The degree of damage to the cornea is directly dependent on the concentration of Phenothiazine Sulphoxide in the aqueous humour and time and intensity of exposure of the eye to the sun's rays as stated by Whitten and Filmer (*loc. cit.*) is also observed by us. It can be seen from the fact that in a country like India where the tropical sun is almost always bright, the corneal opacity invariably leads to ulceration unless it is immediately treated.

Another interesting point which may be seen from the TABLE I is that while 95 calves and 29 kids suffering from similar helminthic infestations under identical management conditions were treated with medicinal doses of Phenothiazine calculated on body weight and age basis, only 15 of the calves and 4 of the kids developed the lesions. Whether this condition (Photosensitization) is dependent on degree of helminthic infestation or individual susceptibility or is dependent on the functioning capacity of the liver, is a subject which needs investigation.

Conclusions

Photosensitized keratitis was found to occur from 6 to 10 days in a small per centage of calves and kids following administration of Phenothiazine. In a group of 95 calves aged between four months to 1 year, 15 developed corneal opacity (13 single eye and 2 both the eyes) out of which 14 got cured after treatment and one developed corneal ulceration with consequent loss of sight permanently. Out of 29 kids treated with Phenothiazine, four developed corneal opacity which responded to treatment and none of the 28 sheep thus treated with the drug showed any signs of photosensitization.

This condition is not seen in adult animals.

REFERENCES

1. Chandler, R. L. (1956) ... *Brit. Vet. J.*, 112, 387.
2. Charles, G. (1948) ... Year Book. Institute of Inspectors of Stock of New South Wales, 1948, p. 82. (Abst. in *Helm. Abst.* 17, item 242b).
3. Clare, N. T. (1947) ... *Aust. Vet. J.*, 23, 340.
4. Clare, N. T. (1952) ... Rev. Ser. No. 3 of Commonwealth Agril. Bureau of Animal Health, p. 58.
5. Clare, N. T., Whitten, L. K. and ... *Aust. Vet. J.*, 23, 344.
6. Filmer, J. F. (1947) ... *Ann. Rep. Dept. Agric. N. Z.* 1945 p.p. 22-86.

7. Gordon, H. Mel and Green, R. J.... *Aust. Vet. J.*, 27, 51-52, (1951)
8. Reik, R. F. (1951) ... *Ibid.* 27, 197-202.
9. Whitten, L. K. (1952) ... 11th International Vet. Cong. London, Vol. II, p. 56-60.
10. Whitten, L. K., Clare, N. T. ... *Nature*, 156. (3982) 232, and Filmer, D. B. (1946)
11. Whitten, L. K. and Filmer, D. B.... *Aust. Vet. J.*, 23, 336-340, (1947)

DETACHED EPITHELIAL CELLS IN THE PREPUTIAL WASHINGS OF BUCK.

By

GIRISH CHANDRA and AMREEK SINGH

U. P. College of Veterinary Science & Animal Husbandry, Mathura.

The prepuce of buck is lined by stratified squamous epithelium. As the deep-seated cells are pushed towards the surface, the superficial cells, which are usually flattened, scale off (Trautmann & Fiebiger 1952). Some cells, therefore, get mixed with the semen. In case of injuries-mechanical or otherwise, certain cells may be observed in unusual numbers. The morphology, number etc., of such cells and the variations which may be met are not known in the species under investigation. Hence the present work was undertaken to study the desquamated epithelial cells which are normally found in prepuce so that they may be differentiated from cells which are seen in semen in certain non-physiological conditions of the reproductive organs. The paper records the morphological characters of the epithelial cells which could be easily detached from the preputial lining.

Technique

The material consisted of the preputial washings of four normal bucks. The animals were secured. The dirt and dross sticking around the preputial orifice were removed with a damp cotton swab. About 100 ml. of sterile normal saline solution was introduced by an enema pump into the preputial cavity. The tip (nozzle) of the tube of the pump was *mildly* inserted to a depth of an inch into the orifice. It was kept tightly closed by holding the skin fold taut, to prevent the back-flow of the solution. While keeping the orifice closed, the nozzle was withdrawn and the prepuce massaged with to and fro movements. The intention was to wash the preputial cavity thoroughly. The grip was then released and the washings were recovered in a beaker. The method followed was essentially similar to that adopted by Haq and Rollinson (1948).

The washings were stirred and 20 c.c. centrifuged at 2,000 r.p.m. for 15 mts. But for 1 ml. on the top of cell pack the supernatant was discarded and the residual matter was stirred with a rod. A drop of

Photosensitized Keratitis in Calves and Kids following administration of Phenothiazine

By

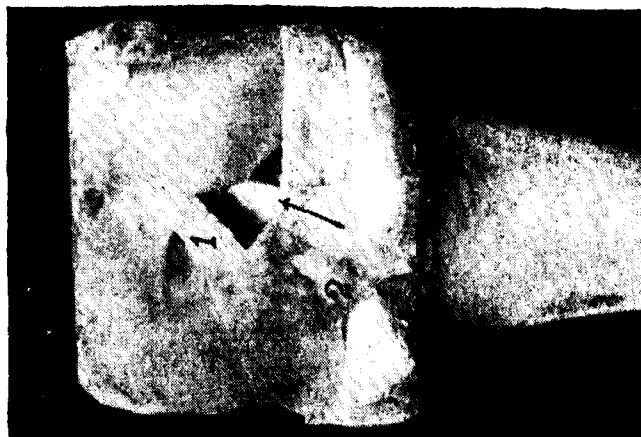
G. BISWAL AND B. PATNAIK



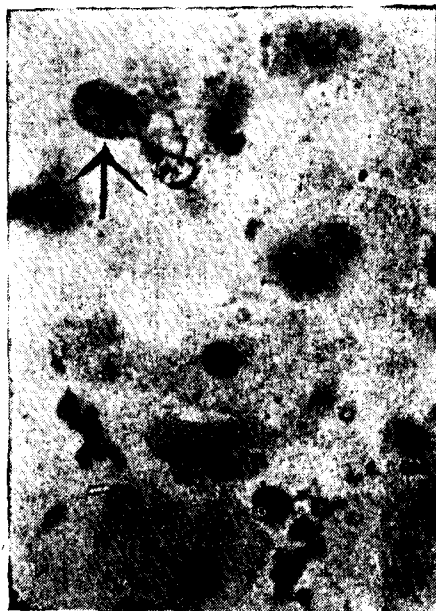
Fig. 1. Showing ulcerated cornea following administration of Phenothiazine.



Fig. 2. The same eye after the ulcer had healed. Note the eye ball has bulged out of the socket. The calf had gone blind completely in this eye.

Deviation in Fixation of Lateral
Meniscus in BuffaloBY
AMREEK SINGH & GIRISH CHANDRA

Legend to illustration
Fig. Left Stifle joint from a buffalo portraying the superior (1) and the inferior (2) slips, and the additional middle slip (pointed) arising from the posterior extremity of the lateral meniscus.

Detached Epithelial Cells in the
Preputial Washings of BuckBY
GIRISH CHANDRA AND AMREEK SINGH

Legend to Figure

Photomicrograph showing the large, faintly-stained squamous cells, small darker polyhedral cell (arrow) and vegetable debris. 630 X.

this cell suspension was put on a clean glass slide to make a thick smear; this was dried in air and stained with haemalum and eosin as recommended by Gunn *et. al.* (1942), for the staining of sperm.

All smears were examined under 4 m. m. objective using 8 X eyepiece and 145 m. m. length of the draw tube. The measurements were made by a Kremp - Wetzlar eyepiece micrometer calibrated against a Carl-Zeiss stage micrometer under the lens system mentioned above.

The observations on leucocytes, sperm, bacteria and the like, which at times made their appearance in the field, were ignored.

Observations and Discussion.

In all 425 epithelial cells, as detailed below, were counted from 4 animals.

TABLE I
Incidence of the epithelia in preputial washings of bucks.

Sl. No.	Buck No.	Total cells	Squamous cells		Polyhedral cells
			Nucleated	Anucleated	
1	W	121	83	29	8
2	110	114	69	31	15
3	83	106	33	40	30
4	94	84	34	28	22

Squamous cells originate from superficial elements of the epithelial sheet lining the prepuce. The cells are large having spherical, ovoid or spindle shapes, (fig). On the average they measure $25-48\mu$ in length and $16-32\mu$ in breadth. Nevertheless, large $55 \times 36\mu$ or small $23 \times 12\mu$, elements are also seen. The cytoplasm is lightly stained. Sometimes the presence of small vacuoles in cytoplasm impart a foamy appearance to the cell. In a few instances more than one cell were found attached to each other in the form of broad scales. Surprisingly many cells (vide Table 1), did not show nuclei. The nuclei, when present, usually are ovoid or spheroid in shape stained darkly. They average a size of $7-12\mu \times 5-22\mu$, although some of them were as large as $20 \times 8\mu$, or as small as $2 \times 2\mu$. Since many such cells are cast off, their nuclei in many instances are in varying stages of degeneration.

The polyhedral cells, compared to the aforesaid cells, are much smaller, (fig.). They are oval, spherical or pear-shaped in outline. One cell with two winged processes as described by Maximow and Bloom (1957), was also found. Polyhedral cells are $13-24\mu$ long and $9-16\mu$ broad, though larger $28 \times 28\mu$, or smaller $12 \times 12\mu$, cells are also seen. Their cytoplasm, compared to squamous cells, is darkly stained.

Unlike the squamous cells, in these cells the nucleus was consistently found and it invariably conformed to the cell outline in shape. On the whole, the nuclei are $6-10\mu$ long and $4-8\mu$ broad. However, $10 \times 9\mu$ or, $4 \times 4\mu$ sized nuclei may be found.

The cytoplasm of the squamous cells is slightly pinkish in colour; this staining character made the cell outline less distinct compared to the polyhedral cells.

The architecture of the cells cast off from the body, could be expected to be different from their normal appearance. The authors did not come across any such gross deviation. Due to the difficulty of discerning between scales and anucleated large cells, the latter were not considered for measurements.

Cells belonging to the basal layer of the epithelia lining the prepuce were not encountered in this investigation.

Conclusions

The shape and size of the epithelial cells, normally shed in the prepuce of bucks, were recorded. Two types of cells, squamous and polyhedral, from the superficial and middle layers of the epithelial sheet were seen. The squamous cells were large spherical, ovoid or spindle shaped, measuring $24-48\mu \times 16-32\mu$, having faintly stained cytoplasm. Their nuclei, when present, were either ovoid or spheroid, $7-12\mu \times 5-11\mu$, and were darkly stained. The polyhedral cells, oval or spherical, $13-24\mu \times 9-16\mu$, with dark-pink stained homogeneous cytoplasm, were observed. Their nuclei, which correspond to the cell-outline in shape, measure $6-10\mu \times 4-8\mu$.

Acknowledgments

The authors are indebted to the Principal, Sri. C. V. G. Choudary, B. Sc., M. R. C. V. S., for constant encouragement and the Farm Manager, Sri. B. Bahadur, B. Sc., Dip. Ag. (Wales), for unstinted cooperation in making the animals available for this study.

LITERATURE CITED

- Gunn R. M. C., Sanders, R. N. and... *Bull. Coun. Sci. industr. Res., Australia;*
Granger, W. (1942) No. 148.
Haq, I., and Rollinson, D. H. L. ... *Vet. J.* 104, 41.
(1948)
Maximow, A. A. and Bloom, W. ... 'A Textbook of Histology'. Philadelphia:
(1957) Saunders. p. 40.
Trautmann, A and Fiebiger, J. ... 'Fundamentals of the Histology of
(1952) Domestic Animals'. Translated and revised by R. E. Hable and E. L. Biberstein, New York: Comstock publishing Association. p. 26.

DEVIATION IN FIXATION OF LATERAL MENISCUS IN BUFFALO

By

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Semilunar fibro-cartilages or menisci, medial and lateral, are interposed between femur and tibia in the stifle joint. The discs are maintained in position by insertion of ligaments or slips in their anterior and posterior extremities.

External fibro-cartilage has been described by Chauveau (1891) to be fixed anteriorly by the insertion of a slip into one of the excavations situated in front of tibial spine. The posterior extremity gives origin to two slips. The superior slip, named Ligamentum femorale menisci lateralis by Sisson and Grossman (1953), is strongest and longest and terminates in posterior part of intercondyloid fossa of femur; the inferior slip is a thin flat cord and is attached on posterior outline of lateral tibial crest just below the rim of articular surface. Hughes and Dransfield (1953) Sisson and Grossman (1953) have also given a similar description for the attachment of lateral meniscus.

Observations

In course of dissections on joints we came across a stifle joint of a buffalo (*Bos bubalis* L.) in which the posterior extremity of lateral meniscus, instead of having the conventional two bands, had an extra third slip (fig.). This additional middle slip was seen to be detached in between the superior and inferior slips and was fixed on the middle of the posterior surface of the medial meniscus near its upper border.

Summary

An additional slip of the posterior extremity of lateral meniscus in stifle joint of a buffalo has been recorded.

Acknowledgment

Sincere thanks are due to Sri C. V. G. Choudary, Principal, U.P. Veterinary College, Mathura for the facilities provided and Sri M. P. Johari, Professor of Gynaecology and Reproduction, for constant encouragement.

BIBLIOGRAPHY

- Chauveau, A. (1891) ... The comparative Anatomy of the Domesticated Animals. 2nd English Edition Translated and edited by George Fleming (J. & A. Churchill, London). p. 217.
Hughes, H. V. and Dransfield, J. W. (1953) ... McFadyean's Osteology and Arthrology of the Domesticated Animals. 4th Edition. (Bailliere Tindall & Cox, London). p. 270.
Sisson, S. and Grossman, J. D. (1953) ... The Anatomy of the Domestic Animals 4th Edition. (W. B. Saunders Company, Philadelphia). P. 238.

EFFECT OF EGG YOLK LEVELS AND RATE OF FREEZING ON SURVIVAL OF BOVINE SPERMATOZOA AFTER STORAGE AT -79°C.

By

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Of late much work has been done on factors affecting freezing and storage of bull spermatozoa at sub zero temperatures. Due to the large number of factors involved, it had not been possible to conduct an exhaustive experiment. Several workers give conflicting reports on factors such as glycerol levels, equilibration time, type of diluent used and several others. Cragle *et al* (1955) found that as equilibration time was decreased, percentage of survival decreased only slowly, and an interaction between sodium citrate and glycerol was noted. Comparing the inclusion of 25% egg yolk in both glycerol and non-glycerol fractions of extenders for frozen semen with 50% egg yolk in non-glycerol and none in glycerol fraction, Hafs and Elliott (1955) observed that the former procedure yielded significant results at 1% level both in respect of motility and 60-90 day non return percent. Saroff and Mixner (1955), in a factorial design experiment with three levels of egg yolk, three levels of glycerol and four equilibration times noted a significant interaction between egg yolk and glycerol levels. In a second factorial design experiment with four egg yolk levels, five glycerol levels and three storage times at 5°C the authors found a significant interaction of egg yolk and glycerol levels. Kinney and VanDemark (1954) obtained optimum sperm freezability with 16% to 32% yolk.

Materials and Methods

The research material consisted of five jersey bulls maintained by the Dairy and Animal Husbandry Department, Oregon State University, Corallis, Oregon. After semen was collected, samples were evaluated for rate of motility and sperm concentration. Immediately semen was extended at 38°C with egg yolk to get the desired yolk levels, the percentage of sodium citrate used being 2.9 in all cases. The partially diluted semen had a sperm concentration of 20 million spermatozoa per milliliter. After dilution, 1000 units of penicillin and 1000 micrograms of streptomycin were added per milliliter of extender. The partially extended semen was allowed to cool slowly to 5°C and an equal volume of glycerol fraction at 5°C was added in three equal instalments at an interval of half an hour to get the desired glycerol level of 7% and sperm concentration of 10 million spermatozoa per milliliter of diluted semen. This was then transferred to 1 cc pyrex glass vials

which were sealed immediately. Freezing was done with ethyl alcohol (99%) and chipped dry ice. Semen thus frozen was held in a vacuum flask with dry ice and alcohol in a deep freeze. After seven days of storage frozen semen was removed and dropped in a water bath at 37°C. The samples were evaluated for rate of motility and differential staining slides were made. No time was allowed for equilibration. Four levels of egg yolk, (60%, 40%, 30% and 20%) and four rates of freezing (1°C, 2°C, 5°C, 10°C) per minute were tested. Semen of only superior quality was used throughout the experiment. Motility rating was based on a scale of 0-10, 10 being the best.

Results

The motility ratings and live spermatozoa obtained by differential staining in each treatment after 7 day storage period were subjected to statistical treatment and results given in Table III and IV. Table I and II give the mean motility rating and mean percent live spermatozoa by differential staining after a storage of seven days at -79°C.

TABLE I

Mean motility rating of diluted semen after freezing and storage at -79°C (Average of 12 semen samples)

Rate of freezing	Egg yolk 60%	Egg yolk 40%	Egg yolk 30%	Egg yolk 20%
1°C/minute	5.60	6.25	7.0	7.20
2°C/minute	5.66	6.25	7.0	7.25
5°C/minute	4.40	5.20	5.20	5.50
10°C/minute	4.0	3.33	3.66	3.33

TABLE II

Mean percent of live spermatozoa by differential staining after freezing and storage at -79°C (Average of 12 semen samples)

Rate of freezing	Egg yolk 60%	Egg yolk 40%	Egg yolk 30%	Egg yolk 20%
1°C/minute	50.50	48.10	55.6	56.30
2°C/minute	50.0	49.0	55.6	56.0
5°C/minute	41.40	41.0	39.90	42.10
10°C/minute	31.25	24.10	27.40	22.80

TABLE III

Analysis of variance (Motility rating)

Source	df	M. S.	F ratio
E	3	7.24	3.28*
T	3	9.37	4.24**
Rep.	11	4.23	1.91*
E × T	9	6.18	2.80**
E × R	33	4.90	2.20**
T × R	33	4.0	1.81*
Error	99	2.21	
	191		

TABLE IV

Analysis of variance (Differential staining)

Source	df	M. S.	F ratio
E	3	18.45	4.00**
T	3	13.98	3.04*
Rep.	11	9.20	2.0*
E × T	9	15.18	3.30**
E × R	33	9.23	2.0**
T × R	33	8.90	1.93**
Error	99	4.60	
	191		

Tables I and II show that when egg yolk level is increased there is a progressive decline in motility and live spermatozoa by differential staining. The same holds true for rate of freezing as well. With increased rate of freezing there is a decline in live spermatozoa after freezing and storage at -79°C. When motility rating is subjected to analysis of variance we find an interaction with egg yolk and rate of freezing significant at 1% level. In the same way when live spermatozoa by differential staining are used as a criterion for semen quality an interaction between egg yolk and rate of freezing is also significant at 1% level. This means both rate of freezing and egg yolk levels are important factors in freezing and storage of spermatozoa.

Acknowledgment

The investigation was conducted at Oregon State University while the author was a Graduate Research fellow in the Department of Dairy and Animal Husbandry. The author is grateful to the Oregon Agricultural Experiment Station for financial assistance and to Professors McKenzie and Kruegar for guidance and suggestions.

Summary

In a factorial design experiment with four levels of egg yolk (60, 40, 30 and 20 percent) and four rates of freezing (1°C, 2°C, 5°C, 10°C per minute), bull semen frozen and stored for 7 days at -79°C an interaction significant at 1% level between egg yolk levels and rate of freezing when motility and live spermatozoa by differential staining are taken as criteria for semen quality.

REFERENCES

- Blackshaw, A. W. (1960) ... *Austr. Vet. J.* **36**, 432.
 Bratton, R. W. *et al* (1949) ... *J. Dairy. Sci.* **32**, 604.
 Cragle, R. G. and Myers, R. M. ... *Ibid* **37**, 652.
 (1954)
 Cragle, R. G. *et al* (1955) ... *Ibid.* **38**, 508.
 Hafs, H. D. and Elliott, F. I. ... *Ibid.* **38**, 811.
 (1955)
 Jones, W. M. *et al* (1956) ... *Ibid.* **39**, 1574.
 Kinney, W. C. and VanDemark, N. L. (1954) ... *Ibid.* **37**, 650.
 Li, Jerome, C. R. (1959) ... Introduction to statistical inference, Edward, Bros. Inc. Michigan: U. S. A. pp. 553.
 Mixner, J. P. and Saroff, J. (1954) ... *J. Dairy Sci.* **37**, 1094.
 Saroff, J. and Mixner, J. P. (1955) ... *Ibid.* **38**, 292.
 Smith, A. U. and Polge, C. (1950) ... *Nature*, 166, 668.
 VanDemark, N. L. *et al* (1957) ... University of Illinois, Agricultural Experiment Station Bulletin, 621.

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Background for confidence

DEEBEE BROTHERS

1706, KHADIA JALOWALI NAKA, AHMEDABAD-1

EFFICIENCY OF FEED UTILISATION OF DESI VERSUS YORKSHIRE GRADED PIGS FROM THREE MONTHS TO SIX MONTHS OF AGE

By

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In any livestock enterprise involving meat production it is necessary to make a very careful selection of the breed, and even of the individual animal within the breed so as to secure the maximum gains with the minimum cost of feed. This fact, however, is more true in a swine enterprise.

In India, swine husbandry is still in a very primitive stage. In the villages the pigs of non-descript breed, called *desi*, are raised with little concentrate feed; they live mostly on human excreta. There are very few farms where pigs are raised. In these farms pigs of foreign breeds or graded types are kept because their growth-rate and efficiency of feed utilization are better as compared to those of *desi* pigs and are therefore more economical than the latter. The *desi* pigs are however, more disease-resistant and *desi* sows are better mothers because of a greater number of nipples. Local pork eaters also prefer meat from the *desi* pigs.

So far the author has not come across any literature to justify the superiority of the graded pigs under farm conditions. The present study was designed to compare the rate of growth and the efficiency of feed utilisation of the *desi* pigs with that of graded Yorkshire pigs on a farm ration so as to ascertain the possibility of introducing the *desi* pigs on farms in view of above mentioned good characteristics.

Review of Literature

Extensive work on the performance of pigs as meat animals has been done in the U.S.A. and some of the European countries including U.K. In India, Agarwala and Sundaresan (1956), experimenting with the Yorkshire graded pigs with different rations during two different seasons showed daily gains, daily food intake, and feed intake per pound of gain ranging from 0.6 to 1.0, 2.6 to 3.0, and 3.6 to 4.6 pounds, respectively. Reed and Agarwala (1956) with similar type of pigs with slightly different ration showed an average daily gain and feed intake per pound of gain as 0.8 and 2.9 lbs. respectively.

Experimental Procedure

Ten pigs each of about three months of age were selected for this study. Five of these pigs were *desi* and five were Yorkshire

graded. These pigs were distributed into groups as given in table I below.

TABLE I
Distribution of Pigs into Groups

Group A (Desi)			Group B (Yorkshire Graded)		
Notch No.	Sex	Initial weight in lbs.	Notch No.	Sex	Initial weight in lbs.
1	Castrated	22	416	Castrated	28
3	"	22	430	"	18
5	"	21	431	"	22
2	Female	22	426	Female	26
4	"	22	429	"	32
Total		109			126

Male pigs of each group were castrated on the day the experiment started. Pigs of both group were kept in *pucca* pens throughout the study. Each group was fed *ad libitum* a concentrate mixture of the composition given in table II below :

TABLE II
Composition of Concentrate Mixture

Constituents of ration	Percent
Groundnut cake	47
Wheat bran	20
Arhar	15
Maize	15
Mineral mixture	3
Shark liver oil (Trivax)	2 oz/md.
Total digestible protein	29
Total digestible nutrients	70

Note :—The mineral mixture consisted of 50% common salt, 50% bonemeal and 0.03% potassium iodide.

No green roughage was fed to either group. Weights of individual pigs were recorded at weekly intervals for twelve weeks. Weekly consumption of concentrate by each group was also maintained.

Results and Discussion

Certain observations on each group of pigs for the entire experimental period are given in table III below.

TABLE III
Growth Rate and Feed Cost for Each Group of Pigs.

	Desi lbs.	Graded York- shire (lbs.)
Average initial weight per pig	21.80	25.20
Average final weight per pig	74.20	102.60
Average daily gain per pig	0.62	0.92
Average daily feed intake per pig	2.95	3.33
Average daily feed in take per pound of gain	4.73	3.61
Average cost per pound of gain (July-Oct. '58)	Rs. 0.55	Rs. 0.42
Total feed consumed lbs.	1240	1398

Following the method of Snedecor (1957), the data obtained in this experiment were statistically analysed. The results of this analysis are given in table IV below.

TABLE IV
Results of Statistical Analysis of Differences in Growth Rate & Feed Consumption Between Yorkshire Graded and DESI Pigs.

	SD ²	Sd	$\bar{d}$	S $\bar{d}$ ²	Sd	D.F.	t
Weekly average gain per pig	143.56	11.98	2.08	11.96	3.46	11	0.6012
Weekly average feed intake per pig	34.47	5.87	2.63	0.48	0.69	11	3.8116

It may be noted from the table that the Yorkshire graded pigs gained weight more rapidly than the *desi* pigs. At the same time their intake of feed was also more. The increased intake of feed of Yorkshire graded pigs over *desi* was found statistically highly significant. However, the feed intake for a pound of gain in graded pigs was lower than that of *desi* pigs, indicating that former type of pig is a more economical converter of feed into flesh. The cost per pound of gain in the *desi* pigs is more than in the graded pigs. This confirms the existing opinion that graded pigs are more economical to raise under farm conditions.

Summary

A study was undertaken to investigate differences in growth and efficiency of feed utilization between young *desi* and Yorkshire graded

pigs. The average daily growth rate, daily feed intake and feed consumption per pound of growth in the *desi* and in the graded pigs were found to be 0.62 and 0.92, 2.95 and 3.33, and 4.73 and 3.61 pounds, respectively.

REFERENCES

1. Agarwala, O. P. & Sundaresan, D. ... *Ind. Jour. Vet. Sci. and Anim. Husb.* **26**, (1956) 185.
2. Reed, A. and Agarwala, O. P. ... *Ibid.* **26**, 203. (1956)
3. Snedecor, G. W. (1957) ... Statistical Methods 5th Edition, Iowa State College Press, Ames, Iowa, U.S.A.

A TECHNIQUE OF PREPARING MEAT MEAL SUITABLE FOR FEEDING LIVESTOCK

By

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and

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According to the livestock Census of 1956 Madras State has the following Cattle population :—

Zebu Cattle	9,698,251
Buffaloes	2,040,944
	11,739,195

Out of these it has been estimated that 11% die annually due to natural causes. In the rural parts of the State the hides of fallen animals are flayed only and the flesh and bones are wasted, by not utilising them, resulting in a huge loss of national wealth. This enormous loss can be averted by properly utilising the flesh and bones of these animals. In Japan hide fleshings are reported to be utilised for the production of Cattle and poultry feed (Ushikoshi 1959). Though meat meal is being prepared by Gramodyagikendra, it is not known whether the meat meal has been used as an animal feed.

The chief source of proteins in the rations of our livestock is from different kinds of oil cakes. There is difficulty in getting the required quantity of oil cakes since they are largely used for manurial purposes. As a result of the various Livestock-improvement schemes launched under the Five Year Plans, the demand for a balanced ration for the livestock will be more keenly felt. Without balanced rations, the

various breeding operations may not be very successful in increasing the production, which is the ultimate goal of the plan. In the present day livestock rations, oil cakes mainly provide the protein requirements. Keeping the above mentioned points in view, an attempt was made to find out a suitable if not a superior substitute for the oil cake, supply of which does not fully meet the demand as a livestock feed. According to Ostertag (1913) meat of an animal that has died, not on account of disease but due to other chemical and physical agencies, can be admitted as an inferior food material for human consumption if the animal has been eviscerated immediately after death. So the flesh of cattle which do not die of a septicæmic or any other infectious disease can be made use of for preparing meat meal suitable for animal feeding, provided decomposition has not set in. The process of preparing meat meal is similar to that of dehydrating meat or drying of meat for human consumption. The drying of meat in the wind and sun is a very ancient method. In North America 'Pemmican' is made by smoking the meat before drying which is then pulverised and an equal quantity of fat added (Thornton 1952). Commercial dehydration of beef is made by boning the beef and trimming of fat, then the meat is ground in a grinder and it is cooked in a steam jacketted kettle or upon a steam heated drums at the atmospheric pressure for 30 minutes at 165°F. The cooked meat is then dried in a Roto louvre driver or tunnel driver. In a Roto louvre, air at approximately 300°F and at a velocity of 800 linear feet per minute is forced through the meat. The discharge air has a temperature of about 150°F. Meat is dried in the driver of this type for two hours and the dehydrated meat has about 10% moisture. (von Loe-secke 1955.)

In the Wardha method of preparing meat meal the carcass is chopped into small pieces of the size of the fist after flaying and the meat and bones are stacked on the floor. Then the heaps of bone and meat are boiled in an iron cauldron. The cauldron is heated over a furnace by good fuel or coal. Boiling is done for about 8 to 10 hours or till the meat is soft enough to separate easily from the bones. Afterwards the contents of the cauldron are allowed to cool when the fat is skimmed off. After the separation of the fat, a little quantity of lime is added to the cauldron to remove the remaining fat. Then the meat and bones are laddled out and drained off. The mass is then fried over a frying pan. During the frying the bones get separated. Meat is removed from the pan and is crushed under a thengi and stored. (Satish Chandra Dasgupta and Valunjikar 1942). The meal prepared in this way is used as a manure.

Materials and Methods

Flesh from cattle that die due to natural causes as well as from non-contagious diseases were used for preparing meat meal. In such

cases of natural death a preliminary examination of blood smears was made to eliminate anthrax. Flesh from animals destroyed for experimental purposes and euthanasia was also used. In naturally dead cattle the flesh was taken immediately after death so as to avoid putrefactive changes in the meat. In some cases where immediate removal could not be done and a few hours have elapsed since death, the flesh from the entire body except at the region of the shoulder and the hip were used, since putrefactive changes are likely to be present near the shoulder and hip bones. After flaying the flesh was removed from the bones and the fat was carefully trimmed off. It was then chopped into pieces of 1/2 inch thickness and washed several times in chlorinated tap water to remove traces of blood and other contaminants. Subsequently the flesh was boiled for about three hours in a clean cauldron. The fat and scum which collected over the water were laddled out. After boiling the flesh was drained off and spread in thin layers on clean trays and dried in the sun for three or four days in a dust free place, when the flesh pieces were dehydrated and hardened. It was finally pulverised in a pestle and mortar and stored in a dark dry cool place packed in polyethane paper.

Observations

The following table shows the weight of flesh used for preparing the meal and the weight of meat meal obtained finally.

S. No.	Date	Weight of flesh used	Weight of meat meal obtained	% of meat meal to meat used
1	25-11-1959	17½ Lbs	3½ Lbs	20%
2	4- 1-1960	15 Lbs	3½ Lbs	23.33%
3	28- 1-1960	15 Lbs	Lbs 2-11 Oz	17.92%
4	16- 4-1960	10½ Lbs	" 2-8 "	25%
5	16- 4-1960	85 Lbs	" 9-2 "	27%
6	1- 3-1960	55 Lbs	" 10-0 "	18.18%
7	15- 5-1960	30 Lbs	" 5-0 "	16.66%
8	30- 5-1960	26 Lbs	" 5-0 "	20%
9	1- 6-1960	42 Lbs	" 8-4 "	19.65%
10	4- 6-1960	25 Lbs	" 5-0 "	20%
11	17- 6-1960	60 Lbs	" 12-0 "	20%
12	1- 7-1960	12 Lbs	" 4-0 "	33.33%
13	28- 7-1960	58 Lbs	" 7-8 "	13%
14	5- 8-1960	85 Lbs	" 7-0 "	20%
15	9- 8-1960	31 Lbs 4 Oz	" 5-12 "	18.4%
16	8- 9-1960	118 Lbs	" 22-0 "	18.65%
17	19- 9-1960	180 Lbs	" 36-0 "	20%

From the above table, it is seen that the meat meal obtained is 1/4th to 1/5th the weight of the flesh used. Two samples of the meal prepared were analysed by the Director, Nutrition Research Laboratories, Indian Council of Medical Research, Hyderabad and was found to have the following composition.

Moisture	%	8.2
Protein	%	79.2
Fat	%	10.3
Carbohydrates	%	0.2
Fibre	%	0.5
Mineral matter	%	1.6
Calories (per 100g)		410
Calcium mg.	%	68
Phosphorous mg.	%	324
Iron mg. %	%	18.8
Carotene (I. U. Vitamin A) %		Nil
Thiamine <i>lg.</i> per 100 g.		25
Riboflavin <i>lg.</i> per g.		444
Niacin (mg. per 100g)		5.8
Vitamin C		Nil

Bacteriological examination of the sample showed the presence of the organisms of *Bacillus* sp. and on biological test they were found to be non-pathogenic (Menon 1960). So far 254 lbs. of meat meal prepared in this manner have been fed to poultry in the college poultry unit. The birds fed with meat meal are found to be gaining weight and thriving well.

Discussion

According to von Loesecke (*loc cit*) fat should not be more than 10% in the meat to be dehydrated as it will delay dehydration by encasing the muscle fibres. So the fat was trimmed off the flesh. The intermuscular fat was removed during the cooking of the meat when it collected over the water by laddling it off. The pre-cooking of meat destroys the non-sporulating micro-organisms and inactivates the enzymes. The pre-cooking also removes part of the water and coagulates some of the proteins in the meat juices. Uncooked meat takes a longer time to dry and the reconstitution of the dehydrated product is not as easily done as in the case of dehydrated pre-cooked meat and the reason for this is that cooking alters the colloidal structure of meat proteins and this causes more rapid diffusion of moisture to the surface of the material being dried. Bacteriological tests have shown that heating to 165°F for 30 minutes is sufficient to destroy Staphylococci and other food poisoning organisms if present. Dehydration does not significantly reduce the protein quality although the digestability of the protein in individual lots of dehydrated beef has been found to vary considerably. Vitamins especially thermolabile ones are likely to be destroyed. (von Loesecke *loc cit*). The chemical composition of the meal will depend on the quality of the carcass selected and the amount of fatty tissue trimmed away. According to von Loesecke the chemical composition of the dehydrated beef is water 8.59 to 9.44% Protein 47.68 to 73.14% Fat 14.85 to 40.87% and ash 2.32 to 3.48%.

The above mentioned technique does not involve the use of any costly equipments or any difficult procedure and the technique itself is very simple. However, care should be taken to see that animals dead of septicæmic or infectious diseases are not used. A bacteriological examination of the sample before feeding is essential.

Considering the composition of the meat meal prepared it will be observed that it is rich in proteins and has a high caloric value and so a livestock ration in which this meat meal is incorporated will have a high nutritive value. The meat meal contains appreciable quantity of vitamin B. It is a good source of readily available calcium and phosphorus while groundnut cake meal is somewhat deficient in them. Equal parts of fish meal and meat meal will nearly supply lysine and methionine requirements in poultry rations. Up to a level of 5 to 6% meat meal is a valuable animal protein supplement for feeding of chickens. The cost of production also has been worked roughly on the following manner.

Weight of a raw flesh	100 lbs.
Calculating at the rate of 6 nP. per 1 lb. it works out to	Rs. 6/-
Cost of fuel for cooking the flesh	Rs. 2/-
Labour charges	Rs. 2/-
Weight of meat meal obtained about	20 lbs.

Hence the cost of production of 20 Lbs meat meal is approximately Rs. 10/- i.e. 1 Lb. cost 50 nP.

Summary

A technique of preparing meat meal suitable for livestock feeding is described, and it consists of cooking the flesh of dead animals for three hours and drying them in the sun. The meat meal prepared has the following composition.

Moisture	%	8.2
Protein	%	79.2
Fat	%	10.3
Carbohydrates	%	0.2
Fibre	%	0.5
Mineral Matter	%	1.6
Calories per 100 g	%	410
Calcium m.g.	%	68
Phosphorus m.g.	%	324
Iron m.g.	%	18.8
Thiamine (<i>ug.</i> per 100 g)		25
Riboflavin (<i>ug.</i> per 100 g)		444
Niacin m.g. per 100 g		5.8

Considering the composition of meat meal prepared it will be observed that it is rich in proteins and has a high caloric value and so a

livestock ration in which this meal is incorporated will have a high nutritive value.

Acknowledgment

The authors are highly thankful to the Director, Nutrition Research Laboratories, Indian Council of Medical Research, Tarnaka, Hyderabad for having analysed the meat meal supplied and to Dr. U. K. Menon, D. Sc., Professor of Bacteriology, Madras Veterinary College for the bacteriological examination of the samples. The authors also thank Dr. Bertie, A. D'souza, G.M.V.C., B.V.Sc., M.S., P.G., Principal, Madras Veterinary College for his inspiring guidance.

REFERENCES

1. Director, Nutrition Research Laboratories, Indian Council of Medical Research, Tarnaka, Hyderabad—Personal communication 1960.
2. Menon U. K. (1960) ... Personal communication.
3. Ostertag (1913) ... Hand book of Meat Inspection 4th Edition—Bailliere Tindall & Cox, London p. 743 and 744.
4. Satish Chandra Dasgupta and Valunjikar (1942) ... Dead animals to tanned leather, GO Seva Sangh, GO puri Wardha (pages 8 to 14).
5. Thornton H. (1952) ... Text book of Meat Inspection II Edition—Bailliere Tindall & Cox—London page 486.
6. von Loesecke Harry W. (1955) ... Drying & Dehydration of foods II Edition—Reinhold publishing Corporation—New York (pages 163 to 834).
7. Ushi Koshi (1959) ... *Leather trades Review* 131, 289.

Clinical Articles

A CASE OF CHONDROMYXOMA IN A BULLOCK

By

S. J. ANGELO, M.R.C.V.S., D. C. KULSHRESTHA, M.V.Sc.,
and

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Introduction

Not many reports are available on neoplastic growths affecting the nasal chambers of bovines. According to Plum (1934) Stenstrom was the first to describe an enzootic of nasal cavity tumours in Sweden. Plum (1934) further described a case of periosteal sarcoma in the posterior part of the nasal cavity of a cow.

History of the case

The patient was a country bred bullock aged six years. The animal was presented with the complaint that there was an unilateral bulging of the left nasal chamber, and that the animal had difficulty in breathing through this nostril. This inflammation was noticed since about a year. On visual examination a swelling was noticed towards the left of the bridge of the nose. There was a blood stained mucoid discharge. On introducing the index finger a growth was felt completely occluding the left nasal passage. Radical surgery was undertaken.

Operative Technique

The bullock weighing 600 lbs. approximately was narcotised with 75 ml of a "Cocktail" of Chloral Hydras 2 ozs., Mag Sulph 1 oz., Absolute Alcohol 100 ml. in 250 ml. of distilled water. The site of operation was prepared for aseptic surgery. 10 ml. of a 2% Procaine Hydrochloride solution with adrenalin was locally infiltrated along the line of incision.

The naso-premaxillary junction was trephined using a Horseley's 1/2" trephine. Following this a 5" longitudinal incision was made on the dorsal aspect of the face commencing from the border of the trephined naso-premaxillary junction to the upper border of the nostril. The skin, Levator nasolabialis muscle and nasal mucosa were incised to enter the nasal cavity. A small portion of the growth was removed through the incised wound to enable an embryotome wire saw to be introduced on to the obstructed nasal chamber. The wire saw was introduced through the trephined opening and was positioned with the help of a Dunhill's haemostat so as to embed itself under the attachment of the growth in the anterior aspect of the nasal cavity. By judicious manipulation of the wire saw, half the growth was cut and removed through the surgical incision by traction with a Volkman's retractor.

Having so removed half the growth it was relatively easy to introduce a small hand into the nasal chamber. On doing so a part of the growth was found attached to the posterior wall of the nasal chamber. This was also removed by blunt dissection and gentle traction. Immediately on the removal of the growth the animal was breathing freely through the obstructed nasal chamber. The haemorrhage was surprisingly little. The nasal chamber was douched with cold normal saline. The surgical wound was repaired with interrupted sutures using braided nylon No. 2.

Post Operative Treatment

The patient was admitted as Inpatient No. 2539. Streptopenicillin 1 gm. intramuscularly was administered for three days. The

animal was kept on bran mash avoiding dry and dusty fodder. The wound was dressed daily for about 12 days with a fly repellent dressing. The cutaneous sutures were removed on the ninth day. The animal made an uneventful recovery.

Gross Pathology

The growth removed weighed 5 lbs. (fig. 1). The external surface of the growth was pale pink, smooth and glistening with fissures corresponding to the contour of the internal lining of the nasal chamber. On cutting the growth, small islands of hard, cartilaginous tissues (figure 1 A) were found to be present.

Histo-Pathology

Tissue sectioning was done by paraffin embedding method. The section was stained with haemotoxylin and eosin. The histo-pathological picture of the growth revealed two types of tissue reaction. Islands of various sizes and shapes of hyaline cartilaginous tissue with irregularly arranged proliferating cartilaginous cells were seen (fig. 2A), embedded in a myxomatous type of tissue (fig. 2 B). The growth was consequently diagnosed as a chondromyxoma.

Summary and Conclusion

Surgical removal of a tumour affecting the left nasal chamber of a country bred bullock has been described. The removal was done piecemeal. On pathological examination the growth was found to be a chondromyxoma.

Acknowledgments

The authors are thankful to the Department of Pathology for undertaking the pathological examination of the growth and to Sri C. V. G. Choudary, Principal, for providing the facilities.

REFERENCES

- Plum, N. (1934) ... Maanedsskr. Dyrl, 620-632 (Abst. Vet. Bull. 4:766).

RANULA IN A GERMAN SHEPHERD (ALSATION)

By

JOSE V. TAOAL, JR., D.V.M.,
Department of Veterinary Medicine and Surgery,
College of Veterinary Medicine, University of the
Philippines, Quezon City, Philippines.

Ranula (or retention cyst — Brumley, 1950), according to McCunn (1952), is a term applied to a large, elongated, bleblike swelling which appears at the lateral or under surface of the tongue, usually near the fraenum. O'Connor (1952) gives the cause as apparently the result

A Case of Chondromyxoma in a Bullock

By

S. J. ANGELO, D. C. KULSHRESTHA AND Y. S. BHATIA



Fig. 1. A — Cartilaginous tissue.



Fig. 2. A — Cartilaginous tissue.
B — Myxomatous tissue.

Ranula in a German Shepherd (Alsation)

BY

JOSE V. TACAL, JR., D.V.M.



of an obstruction of a mucous gland or of one of the ducts of the sublingual salivary gland. He further states that although seen in all animals, it occurs most often in dogs. Schirmer (1959) claims that salivary cysts occur primarily in the sublingual salivary gland.

This being the first case of a salivary cyst underneath the tongue met with in the small animal clinic of our college hospital, the writer has deemed it worth reporting.

Case Report

A black and brown-coloured male German shepherd (Alsation), one and one-half years of age, and weighing 27.4 kilos, was presented by the owner accompanied by the referring veterinarian for treatment on March 11, 1961, at the College hospital.

History:—Two days before, the dog killed a rat and from that time it could no longer take in solid food although it was able to drink milk or water.

Symptoms:—On physical examination, the animal had a body temperature of 41.2°C; respiration was not counted as the animal was panting; and pulse, 88 per minute. The skin and haircoat as well as eyes and nose looked normal, the latter presenting no discharge or change of structure or color. The owner declared that there was nothing abnormal about the bowels either. An examination of the buccal cavity was performed which revealed a semi-circular, reddish swelling which when palpated, was noted to be of soft consistency and located underneath the tongue. The diameter of the enlargement, which approximated the size of a hen's egg, was about one and one-half inches and had a length of about two inches.

Diagnosis:—Ranula.

Treatment:—The animal was properly restrained by a group of Junior and Senior student clinicians, its mouth held open by means of two pieces of string attached to each jaw, and with the tongue held to one side, an attempt was made to aspirate the contents of the cyst with a sterile 10-cc glass syringe and a 20-gauge hypodermic needle but this failed. The cyst was then immobilised with a pair of artery forceps, as it was very slippery because of the saliva, and a portion of its structure was incised at its most dependant portion with a pair of sharp-pointed scissors. As this was being done, it was discovered that the cyst possessed a double wall so that both the outer, which was heavily interlaced with tiny blood vessels, and the inner walls had to be incised. As soon as this was finished a thick yellowish honey-like flowed out, some into the buccal cavity and the rest outside the mouth. The sac was also pressed to remove all its contents which amounted to approximately

fifty ml. The inner lining of the cyst as well as the edges of the wound were then swabbed with tincture of iodine and the dog was brought home by the owner. The referring veterinarian was instructed to inject a dose of antibiotic to forestall any infection that might set in and to prevent undue inflammation. He was also instructed to return the animal in case the condition recurs.

On March 29, a letter was received from the referring veterinarian informing this writer that the dog is already well.

Summary

A case of ranula or salivary retention cyst in a German Shepherd (Alsation), a rather uncommon clinical entity hereabouts, is herein reported.

Acknowledgments

The writer is indebted to his students who helped in the handling of this case and especially to Mr. John W. Biss, a Junior student clinician, for the photograph.

REFERENCES

1. Brumley, O. V. (1950) ... Diseases of the Small Domestic Animals, Fourth Edition, Lea & Febiger, Philadelphia, Pa., 422 pp., 37 Figs.
2. McCunn, J. (1953) ... Hobday's Surgical Diseases of the Dog & Cat, Sixth Edition, Bailliere, Tindall & Cox Ltd., London, 453 pp., 330 Figs.
3. O'Connor, J. J. (1952) ... Dollar's Veterinary Surgery, Fourth Edition, Bailliere, Tindall & Cox, Ltd., London, 1036 pp., 403 Figs.
4. Schirmer, R. G. (1959) ... Diseases of the Alimentary Tract, Canine Medicine by 43 authors, edited by H. P. Hoskins, J. V. Lacroix, and K. Meyer, Second Edition, Amer. Vet. Publ., Inc., Sta. Barbara, California, 554 pp., 397 Figs.

Abstracts

Infection of Laboratory Animals with *Mycobacterium johnei*—1. Infection in Swiss white mice and its modification by Suramin and Cortisone.—BY R. L. CHANDLER. *The Jour of Comp. Path & Thera*, Vol. 71, No. 2, April 1961.

Research on Johne's disease has long been hampered by the lack of a suitable laboratory animal as an experimental host. More recently several workers have produced specific lesions in at least a proportion of inoculated animals. The present investigation was designed to observe *M. johnei* infection in mice, to ascertain the constancy of the early liver and spleen infections and to detect any modification

of an obstruction of a mucous gland or of one of the ducts of the sublingual salivary gland. He further states that although seen in all animals, it occurs most often in dogs. Schirmer (1959) claims that salivary cysts occur primarily in the sublingual salivary gland.

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REFERENCES

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4. Schirmer, R. G. (1959) ... Diseases of the Alimentary Tract. Canine Medicine by 43 authors, edited by H. P. Hoskins, J. V. Lacroix, and K. Meyer, Second Edition, Amer. Vet. Publ., Inc., Sta. Barbara, California, 854 pp., 397 Figs.

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of the infection by administration of the drugs Cortisone and Suramin. Mice of the Swiss white strain were inoculated intraperitoneally with *M. johnei* and the course of infection studied up to a period of one year. The disease produced was compared with that in groups of mice treated with suramin or with cortisone. The intensity of infection in the liver and spleens of the mice was studied using smear and histological techniques. Liver and spleen infections occurred in all the control mice but the intensity of infection varied between individual mice. Intestinal infection with *M. johnei*, simulating classical Johne's disease, was detected in only a low proportion of mice. Suramin administration enhanced the liver and spleen infections and appeared to enhance intestinal infections to a limited degree. Cortisone administration reduced the liver and spleen infections, and had no observable effect on intestinal infection.

A. MUKERJI.

The Animal Hospital as a source of Antibiotic-resistant Staphylococci—BY I. LIVE and NICHOLS. *The Jour of Infectious diseases*, Vol. 108, No. 2, March—April 1961.

Of 445 dogs from the outpatient clinic 4.9% were found to carry in their anterior nares staphylococci typable with the standard phages. Only 2 of the cultures (0.4%) belonged to phage type 80/81, and a large majority of all the isolates were sensitive to the antibiotics used. Upon hospitalization the carrier rate of antibiotic-resistant staphylococci of phage types 80/81 and 52/52A was found to increase markedly, so that 11.4% of 114 animals confined to the hospital for a protracted period yielded cultures of these 2 phage types, the same as had been isolated from the hospital environment. Coagulase-positive nontypable cultures recovered from hospitalized dogs were predominantly antibiotic-resistant, while a large majority of those from outpatient animals were sensitive to the antibiotic used. The data obtained indicate that antibiotic-resistant staphylococci have become established in Veterinary hospitals, which may act as a source of the organisms for human beings associated with them as well as for hospitalized animals. The latter, by acquiring the carrier state of such staphylococci during hospitalization especially of the epidemic strain, may additionally serve as reservoirs of the bacteria for the human population.

A. MUKERJI.

The Anthelmintic Efficiency of fine particle Phenothiazine against the Gastro-Intestinal Strongyles of Nigerian Zebu Cattle.—Armour, J., HART, J. A. and ROSS, J. G. (1961). *Vet. Rec.*, 73, 485-489.

This paper reports the results of field trials and critical anthelmintic tests carried out with fine particle Phenothiazine of high purity

against gastro-intestinal strongyles in Nigerian Zebu cattle. Three different rates of dosages were employed, namely 110, 220 and 330 mg./kg. body weight. At all the above noted doses, the drug proved highly effective against *Hemonchus* sp. (*H. contortus*, *H. placei*), while against *Cooperia* sp. (*C. pectinata*, *C. punctata*) the drug action in the above doses was not highly effective. Against *Trichostrongylus* sp. (*T. axei*, *T. colubriformis*) and *Oesophagostomum radiatum* doses of 220 and 330 mg./kg. body weight only were found to be highly effective while 330 mg./kg. body weight alone was highly effective against *Bunostomum phlebotomum*. Toxicity developed in some calves dosed at 330 mg./kg. body weight.

V. S. A.

Early Cut Hay Has Many Advantages:—Research done at the University of Wisconsin has indicated that early-cut hay contains more nutritionally important "minor elements" than late-cut hay. The research points up another reason why hay should be cut early. Previous research showed early-cut forage to be highest in protein, carotene, ash, and the important major elements-calcium and phosphorus. Minor elements *viz* iron, manganese, copper, cobalt and zinc are very important for animals though needed in small amount. (Better Farming Methods, May, 1961)

B. PANDA.

Cows Can't Use Finely Ground Pellets:—Research conducted at Ohio shows that pellets made of alfalfa that is too finely ground are not used completely by dairy cattle. Fine particles of roughage, even when alfalfa is of high quality, move too rapidly through the rumen of the cow where the bulk of the cellulose digestion takes place. This reduced digestibility results in the formation of less acetic acid and a lower butterfat production in the milk. The scientists found that three to five pounds of long hay had to be fed daily to cows in addition to pellets in order to hold up maximum feed intake. (Better Farming Methods, May, 1961)

B. PANDA.

Feeding Straw to Dairy Cows:—Two reports from Russia deal with straw as a feedstuff. P. A. Kormstshikov and his associates used 2 to 2½ liters of lime water, plus some common salt per 2.2 pounds of straw. Thus, a feedstuff was obtained which contained per 100 parts of dry straw, 3 parts of $\text{Ca}(\text{OH})_2$. On one of the large community farms, straw so treated and fed to the cows, improved milk production; the average of the increase per cow amounted to more than 4½ pounds of milk daily.

In another test, reported in the same journal by A. G. Timtschenko, straw was treated with a leaven material prepared from 20 parts of water of 85 to 95 degrees of F., 1 part of yeast, and 6 to 8 parts

of concentrated feed. After aging in a warm room, the ripened mass (with all its microorganisms) was fed to cows. This feeding increased the milk production of the cows while increasing milk fat content also. An increase in milk yield upto 25 pounds and fat content 17% more have been recorded. To produce 100 parts of ripened straw mass, 50 to 60 parts of water, 20 parts of concentrate, 2 parts of the abovementioned leaven material, 1.5 parts of common salt, and 0.8 part of lime are needed.

(From a report by Dr. R. Seiden in Feedstuffs, June 3, 1961).

B. PANDA.

News and Views

Dr. C. G. Bhasker, B.V.Sc., M.R.C.V.S., Head of Department of Bacteriology, Andhra Veterinary College, Tirupati, has resigned from the Andhra Animal Husbandry service in April 1961 and has joined the South Indian Turf Club as Official Veterinary Surgeon. In June 1961, Dr. C. G. Bhasker has been appointed as Under study to the Stipendiary Steward, S.I.T.C., Madras. We wish him all success in his new sphere of work.

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 ours 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 (July 1961 issue)	...
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	17.00
Total	6,210.05

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