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(The Journal of the All-India Veterinary Association)



Editor

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Devoted to the Cause of the Veterinary Profession.

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EDITOR:

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THE Indian Veterinary Journal

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Vol. XVI

JANUARY, 1940

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THE Indian Veterinary Journal

Vol. XVI

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General Articles

FACTORS INFLUENCING LACTATION

BY .

J. D. SAMPATH KUMARAN, B.S.A., L.V.P., MEM. N.I.R.D.,

Manager, Palace Dairy Farm, Mysore.

Sciences grow and develop at different rates of speed. There are no epoch-saving short-cuts and no triumphs in Biology. But the discovery of the secrets of nature in biology indeed leads to the betterment of animal productivity to a great extent. Nature is full of complexities and to unravel those deep mysteries is not at all a path strewn with roses. Every research or discovery has its own significance however minor it might look at the beginning since the cumulative effects of such researches may result in a far reaching value. This factor is very well seen in the phenomena of lactation. Various workers have sought to find out the exact role played by different organs of the body in the production of milk, and as such in the fitness of things this subject has to be traced from the earliest recorded works.

Seligmann (1) observes that the association between the mammary gland and the womb is so obvious that it has not escaped many savage peoples. Among the primitive people at

least the activity of the mammary gland at impregnation seems to be clearly recognised. Griffiths (2) states "that the changes begin to occur in the breast, changes which are just as well worked out as are changes in the uterus and the vagina, which prepares for the labour which ought to follow nine months afterwards." There are changes in the direction of marked activity of function. An organ which was previously quite passive without activity of circulation, begins to grow in activity and continues to grow in activity and size as pregnancy advances.

It is natural to assume that this connection between the activity of the womb and the glandular activity of the breasts is a *nervous* connection, by means of the spinal cord, and such connections certainly exist and play a very important part in the stimulating action of the breasts on the sexual organs. But that there is more direct channel of communication even than the nervous system is shown by the fact that the secretion of milk will take place at parturition, even when the nervous connection has been destroyed. Mcronoff (3) found that when mammary gland is completely separated from the central nervous system, secretion, though slightly diminished, still continued. In two goats he cut the nerves shortly before parturition and after birth the breasts still swelled and functioned normally. Ribbert (4) again cut out the mammary gland of a young rabbit and transplanted it into the ear: five months after the rabbit bore young and the gland secreted milk freely. The case has been reported of a woman where spinal cord was destroyed by an accident at the level of the fifth and sixth dorsal vertebrae, yet lactation was perfectly normal. We are driven to suppose that there is some chemical change in the blood, some internal secretion from the uterus or ovary which acts as a direct stimulant to the mammary gland. "The chief parts in the drama of sex, alike on its psychic as on its physical sides, are thus supposed to be played by two mysterious protagonists, the hormones of the testes and of the ovary. There is a tendency moreover to

extend the sexual sphere so as to admit the influence of the internal secretions of other glands, the thymus, the pituitary, the adrenals, the thyroid and even the kidneys. It is possible that internal secretions from all these glands may combine to fill in the complete picture of sexuality as we have known it in man and woman."

The function of the breast as the great secreting organ of milk must begin immediately the young one is cut off from the nutrition derived from direct contact with the dam's blood. It is therefore essential that the connection between the sexual organs proper, more especially the womb, and the mammary glands should be exceedingly intimate, so that the mammary gland may be in a condition to respond adequately to the demand of the new born's sucking lips at the earliest moment after birth. As a matter of fact this connection is so very intimate that it takes place directly through the blood.

Houzeau (5) reports that it is only during lactation that the female animal can derive physical gratification from her offspring. "When turning on a farm I have ascertained that cows somehow though not frequently, exhibit slight signs of sexual excitement, with secretion of mucus, while being milked; so that as the dairy maid herself observed it as if they were being "bulled". Such phenomena have been observed in many cases in the Palace Dairy Farm, Mysore. This is more common in the cross-bred cows than in the pure local cows. The local cows though poor yielders have a better constitution than the cross-bred ones. Yellowlees (6) speaks of the overwhelming character of "the storms of sexual feelings sometimes observed during lactation." Thus it may be seen that there is a close relationship between mammary glands and the sexual organs.

During recent years very many brilliant discoveries have been made in the field of endocrinology. These scientific discoveries, apart from adding a great deal to our knowledge, of the development of the mammary gland and other sexual periodicity, yet form a sound basis for further works which may be of practical

utility in the improvement of livestock. It is quite possible not only to control the sex and lactation but also the composition of milk itself.

Stricker and Grueter (7) are responsible for this most brilliant discovery. They found that the anterior lobe of the Hypophysis or pituitary—a small endocrine gland situated near the brain, manufactured some six or seven hormones and that the hormone called Prolactin or mammatropin or galactin, was mainly concerned with lactation. Further searches by various workers prove that the pituitary not only has a definite action over lactation but also stimulate the other endocrine organs thereby functioning as the "Master gland". Turner (8) and Nelson (9) opined that the development of the mammary gland is due to the influence of the two oestrogenic hormones of the ovary and that the main function of prolactin is to control lactation. It is assumed that prolactin is either a protein or else is associated with protein 'carrier'. Allan and Wise (10) proved that by the removal of pituitary gland from the pregnant animals lactation does not occur. It indicates that prolactin supplies the stimulus which initiates lactation. Smith (11) suggests there is a particular mechanism which causes the release of the lactation hormone into the blood at appropriate time, otherwise it is inconceivable how lactation begins the moment pregnancy ends. This particular mechanism is caused by the ovarian hormone. During pregnancy the concentration of ovarian hormone will be high which checks the reaction of prolactin. During the parturition this falls low giving place to prolactin and thyroxine. On the assumption that the concentration of prolactin and thyroxine will be high and that certain excess amount will be available in the urine of the cows which have calved, certain experiments have been tried in the Palace Dairy Farm, Mysore, with very favourable results. Urine was collected twelve hours after parturition and after detoxicating it, four cows in the last phase of lactation were injected subcutaneously at 10 C. C. per 100 lbs. body weight, for a period of six days. In another set, the urine

was only filtered and administered per os at 8 oz. per cow weighing about 600 lbs. for a period of 15 days. The increase in the daily yield after the treatment was nearly 10% and the lactation period was also lengthened by about *two weeks*. This experiment is being continued with a larger number of animals and the detailed results will be available after some months when there will be time to consolidate all the available records.

Jones and MacGregor (12) report a decrease in the urinary excretion of gonodotrophic hormone after Oestrogen treatment in the human. Fevold et al (13) indicated that the lutenizing potency of the pituitary is increased by administration of oestrogen. Zondek (14), Folley and Kon (15) affirm that when a large dose of oestrogen is given milk secretion is inhibited. Bates et al (16) found that prolactin treatment caused an increase in body weight of adult pigeons. Folley and White (17) found that simultaneous injections of prolactin and high doses of oestradiol monobenzoate caused loss in body weight, while control pigeons receiving prolactin alone gained in body weight. Folley (18) gives the effect of the interaction of oestrogen and prolactin as follows: "Oestrogens inhibit the pigeon crop gland response to prolactin but at the same time causes some development of certain crop tissues. Prolactin exerts two distinct effects on the pigeon crop gland, both leading to an increase of weight, but one only of which is inhibited by the oestrone. "That the inhibition is due to the suppression of the pituitary functions by the injected oestrone." Folley affirms that oestrone and prolactin exert antagonistic effects on the body weight of the pigeon, prolactin tending to increase the body weight while oestrone exerts the opposite tendency. (This increase in the size of the crop gland of pigeon following the injection of prolactin is widely used for biological assay of the lactogenic activity of the anterior pituitary extract.)

Parkes and Young (Annual report 1937. Nat. Institute for Research in Dairying, Reading) conducted investigations with pituitary extracts rich in prolactin and also glycotrophic

(antiinsulin) activity but free from any gonodotrophic and thyrotrophic influences. Such extracts when administered to the cow in declining lactation has been shown to result in increased milk yield, the increase lasting for sometime after the stopping of the injection. During the period of increased milk yield the non-fatty solid contents of the milk appears to be slightly increased, principally on account of an increase in the secretion of lactose.

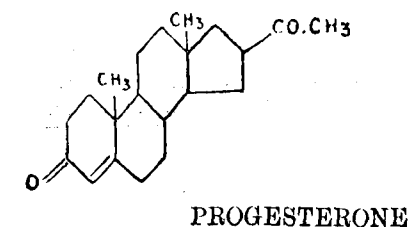
But the cost of such extracts may not be equal to the cost of such extra milk gained. But the urine experiment tried in the Palace Dairy Farm, if proved, may have a hopeful augury for the future.

Another important and distinct pituitary hormone which is excreted during pregnancy in the human and mare (but not in the cow), has given rise to the famous "Ascheimi-Zondex reaction." A small quantity of the urine from a pregnant human or mare is injected into a mouse which is too young to come naturally into 'heat', the pituitary hormone present in the urine quickly brings it into season.

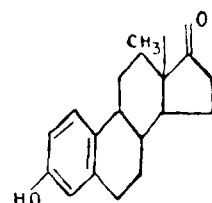
Parkes and Bellerby (19) injected ovarian extracts to lactating mice and found reduction in milk. Copeland (20) tried on cows and found a decrease in yield. Staffe (21) found that the milk yield of ovariectomized cows exceeded that of the controls. Folly (22) confirmed the above results and further found considerably higher percentage of fat and non-fatty solids. He also found a temporary fall in the serum Ca, quickly followed by an equally transient though considerable increase in the serum phosphate, thereby indicating a generalized effect on the skeletal system. Later et al (23) described a process of 'brown degeneration', occurring in the adrenal cortex of the mouse following administration of certain oestrogens. Bacsich and Folley (24) found a state of hyperaemia in the cortex, in the pituitary the pars glandularis the chromophobe cells were increased at the expense of eosinophiles and basophiles. In the ovariectomized rats, signet-ring cells only occasionally could

be distinguished. There was marked hyperaemia of the anterior lobe together with numerous haemorrhages and some vascular degeneration. It is now evident that the hormone from the cortical portion of the adrenal, which is produced when the pituitary is functioning properly, has an important bearing on lactation.

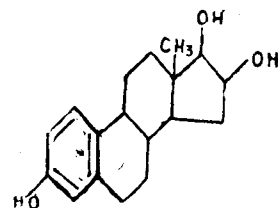
Throughout the vegetable and animal kingdoms the sexual functions are periodic. "From the usually annual period of flowering in plants, with its play of sperm-cell and germ-cell and consequent seed-production, through varying sexual energies of animals, up to the monthly effervescence of the generative organ in the woman, seeking,—not without shedding of blood for the gratification of its reproductive function, from first to last we find unfailing evidence of the periodicity of sex. In many species the mature female exhibits a rhythmically recurring condition during the height of which only, the female mates with the male. Such an oestrus cycle is correlated with a cycle of happenings in the ovary which culminates in the rupture of a follicle containing ripe ovum and the liberation of the latter into the abdominal cavity, whence it passes into the fallopian tubes where fertilization may take place. Ovulation is followed by the formation in the ovary of a new structure called the 'corpus luteum' or yellow body. This body secretes a hormone called 'Progestin' or Progesterone which controls the development of the mammary gland. Butenandt and Fernholz have succeeded in producing this artificially from stigmasterol, a sterol found in plants. They have given the following formula :—



The ovarian hormones exist in many forms, and two of which are well known, are Oestron or theelin and Oestrol or theolol. Butenandt has given the following formulae:—



OESTRON
(Theelin)



OESTROL
(Theolol)

It is reported that the simultaneous injections of oestrus producing hormone and progesterone are effectual in bringing about lobular development of the mammary gland of the castrate immature female equal with that associated with early pregnancy, but does not initiate lactation. Moore and Price (25) and Zondec (26) have found that consequent on the administration of oestrogens the development of the testes in the young male is arrested: Zondec (27) found a diminution in the growth rate of the young animals. Halpern and D'amour (28) found the mature male testes undergoing atrophy. Bacsich and Folley (29) observed enlargement of the pituitary, hypoactivity of the thyroid, hyperaemia of the adrenal cortex, and increase in size of ovary and corpora lutea after the administration of oestradiol monobenzoate.

Zuckerman et al (30) found that in the female (Rhesus monkey) during the first menstrual cycles after puberty which are usually anovular, only mammary duct growth occurs. Alveoli only form after ovulation, and, therefore luteinization has occurred. Male hormone (testosterone propionate) administration appeared to stimulate the occurrence of duct development of an abnormal type accompanied by some alveolar proliferation. No carcinomatous changes were observed in the mammae of six animals which were injected about daily with oestrone for periods up to 938 days, indicating that under

ordinary circumstances clinical administration of oestrogens is not likely to cause mammary carcinoma in woman.

The influence of androgenic substances seems to be limited only to the development of the teats with no action whatsoever on the mammary glands. But some view that it might shed some light on the causes of 'gynaeco mastria' in the male.

The hormone produced by the thyroid plays an important role in milk production and its composition. "If cows are fed on small quantity of dried thyroid glands daily the milk yield increases during the period of thyroid feeding, and the milk becomes richer in fat and non-fatty solids, which show that the thyroid gland governs to some extent the chemical composition of milk. Fat contents of milk depends to a large extent on the activity of the thyroid gland and that variation in thyroid activity between day and night may be responsible for difference in the fat contents of morning and evening milk." It may be of interest to mention here that in the autopsy of 15 local cows and 19 cross-bred cows, of the Palace Dairy Farm, the thyroid gland of the local cows were far better developed than that of the cross-bred. Incidentally it is of interest to note that the butterfat percentage of the local hallikar cow is about 5½%, whereas the cross-bred has only 3½%, though in point of yield the cross-bred is far more superior to the hallikar.

Folley and White (31) found that subcutaneous injection of 0.02 mg/kg of thyroxine into cows in declining lactation causes marked increase in secretion with an increase in the serum phosphatase. It causes also a sharp decline in the concentration of phosphatase in the milk of cows undergoing it. This response is greatest in milk from those cows whose initial level of milk phosphatase is highest.

Bacsich and Folley (29) believe that the effects on the thyroids of prolonged administration of oestrogen resemble in many respects those associated with the hypothyroidism which

follow hypophysectomy. According to Bialek-Lapida and Benazzi, the thyroid epithelium after oestrogen administration is low and the vesicle larger and their lumina are filled with colloid. Further oestrogen administration leads to a decrease in weight of the thyroid of the rat. Folley and White further suppose that mammary gland phosphatase is necessary for the synthesis of milk and that the demands of the increased milk flow resulting upon thyroxine treatment leave very little superfluous enzyme to be excreted from the mammary gland in the milk. Governing the quality as well as the rate at which milk secretion proceeds seems to be the work of the thyroid hormone.

There are two hormones from the adrenals. From the medulla we get 'adrenaline' or adrenine. Lockwood & Hartman (32) made a cortical extract and derived a hormone called 'cortilactin'. Bottomley, Folley and Walker (33) implanted three 50 mg. tablets of adrenaline in goats and 500 mg. tablets in a cow. After 24 hours the blood sugar had reached a high level; after 48 hours it was falling, but had not reached its original level. Blood lactic acid also rose temporarily. A coincident rise occurred in milk lactose percentage. The milk yield did not increase; in two experiments it fell sufficiently to reduce the total lactose output. By this they have found it possible to raise the blood sugar (and blood lactic acid) of lactating animals for well over 24 hours. Tablet implantation greatly prolongs the hyperglycaemic action of the adrenaline. It also supports the view that lactose may originate from the blood sugar and possibly also from the lactic acid of the blood.

The role of each hormone has been well nigh worked out, their contradicting action on each other has been found out; their more selective and less harmful effects have been experimentally studied by innumerable workers. Their role in the control of the growth and development of the mammary gland, the initiation of the secretion of milk, and the control of the volume and chemical composition have been investigated by a number of researchers. But the quest for an increased animal productivity is still there unsolved.

Apart from the hormones, there is another factor which cannot be underrated for obvious reason. In the Hindu Sacred Scripture it is recorded that notes from the Divine flute of Sri Krishna had a marvellous effect on the lactating cows and that the milk was overflowing on hearing the sweet music. Some recent experiments in U.S.A., indicates that music has a beneficial influence on lactation. In the Palace Dairy Farm the above view was confirmed. Scientifically musical sounds are both physiological stimulants as well as of anatomical consideration. The roots of the auditory nerves have extensive connections. We all experience that music penetrates to the very root of our being. It influences both the central and somatic mechanism by associational reflex paths. There can be scarcely any function of the body which may be unaffected by the rhythmic pulsations and harmonic combination of musical notes. It is quite probable that the musical notes may influence the lactation.

There is yet another factor which may influence lactation. Nakahara and his colleagues in Japan following the works of Mapson report that there is a concentration from the liver of a specific dietary factor necessary for lactation but this has not been confirmed by any other worker so far. In so far as my observation in the Palace Dairy Farm, is concerned, it has been found that green fodder with very high Carotene contents influence lactation to a very fair extent. It is a further proof of the existence of some specific dietetic factor essential for lactation.

Summary.

1. The theory of nervous control over lactation is untenable.
2. Hormones have the supreme control over lactation.
3. Prolactin, thyroxine and cortilactin? encourage and maintain lactation; thyroxine is particularly concerned with the control of composition of the milk; the ovarian hormones have an inhibitory action over lactation but they are responsible for the teat and mammary gland development.

4. Music has a beneficial influence so also green fodder having a high carotene contents, in other words some special dietary factor.

Conclusion.

In several respects definite conclusions have been arrived at regarding the functions of the various hormones and their relationship with the phenomenon of lactation. The investigations have entered that phase when their positive or negative qualities stand out with greater clearness. However the central question which has to be investigated is the possibilities of utilizing these for the improvement and greater productivity of the livestock.

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BENGAL CHEMICAL

CALCUTTA : BOMBAY

EXAMINATION OF URINE AS AN AID TO DIAGNOSIS

BY

M. A. RANGASWAMI AIYAR, B.A., G.M.V.C.,
(Lecturer in Physiology, Madras Veterinary College).

All the tissues in the body consist mainly of proteins and urine is the medium through which all the products of metabolism of proteins are excreted. By the analysis of urine one can study the metabolism taking place in the body. Moreover the abnormal constituents sometimes present in it will give an idea of the derangement of normal activities of tissues and the particular organ or tissue involved and the contributory causes. While it is considered necessary to examine the urine in clinical diagnosis of cases in human beings the same has not been appreciated to the extent to which it ought to be in Veterinary practice. It is all the more necessary to carry out such investigation in animals as they are unable to give out their symptoms and the practitioner should be solely guided by the examination of the patient and the information which he is able to gather from the examination of such excretory materials as urine. As I consider a systematic examination of the urine will be highly advantageous in the diagnosis of diseases I give below a method using simple reagents which will be within easy reach of all.

If possible, collect the urine for 24 hours, measure and take a sample from it for examination. Otherwise the first urine collected in the morning will serve the purpose. Filter the urine if not clear and note the following:

1. *Colour*: The urine usually presents different shades of yellow colour. It is due to urochrome and urobilin. Urochrome is derived from food and urobilin from disintegrated hæmoglobin. The colour therefore will depend partly upon the nature of food and partly on the amount of disintegration of red blood corpuscles taking place in the body. It also depends upon the quantity excreted which is more in winter and less in

summer, presenting a lighter colour in winter and a darker one in summer.

2. *Consistency*: It is watery and clear in all animals except in the horse where it is viscid and turbid. The viscosity is due to mucus derived from glands in the pelvis of the kidney and the upper part of the ureter and the turbidity is due to calcium carbonate present. The urine of ruminants becomes turbid on standing due to precipitation of carbonates.

3. *Reaction*: Easily tested by litmus papers. It is normally acid in Carnivora and alkaline in Herbivora. Acidity is due to acid phosphates derived from proteins and alkalinity is due to citrates and malates present in the food of herbivora, giving rise to carbonates of potassium and sodium when utilised in the body. The urine of calves getting milk will give an acid reaction. The urine of herbivora during starvation is acid in reaction as the animal is eating away its own tissue. The urine of horses getting a highly concentrated nitrogenous food will tend to become acid. In carnivora the urine tends to become alkaline in reaction in cases of cystitis and cystic calculi.

4. *Specific gravity*: This can be taken with a Urinometer. Horse: 1.040; Cattle: 1.030; and Dog: 1.025. It depends upon metabolites present and partly upon the quantity of urine passed which is again influenced by the weather conditions.

5. *Albumin*: A trace of albumin which is sometimes normally present cannot be detected by ordinary methods. So it may be taken that there is no albumin in normal urine.

Heat Coagulation test: Take about 5 c. c. of urine in a test tube, add 2 drops of dil. acetic acid and boil upper layer. A cloudiness or precipitate will indicate presence of carbonates, phosphates or albumin. Add 3 drops more of acetic acid and boil; the precipitate will dissolve if due to carbonates or phosphates, but will persist if due to albumin.

Heller's test: Take about 3 c. c. of Nitric acid (conc.) in a test tube, layer on top 3 c. c. of urine and allow it to

stand for 5 minutes. A white ring forms at interface if albumin is present.

Esbach's test: Take 5 c. c. of Esbach's reagent in a test tube and add urine drop by drop. A cloudy precipitate will be formed as the drop comes down to the bottom.

Quantitative estimation can be done by using Esbach's Albuminometer by putting urine upto 'U' and reagent upto 'R'. Shake the tube gently and keep it for 24 hours. The amount of albumin can be read off the scale provided.

Albumin is present in urine under physiological conditions such as introduction of foreign protein through routes other than the alimentary tract, violent exercise or exposure to cold. Under pathological conditions it may be due to inflammatory conditions of the kidney and urinary passages, fever etc.

6. *Sugar:* It is not present in any appreciable quantity in normal urine to be detected by ordinary methods. It may therefore be taken that sugar is not normally present in urine. A small quantity of lactose may be found in urine *in advanced stages of pregnancy and during lactation in cows*. In other conditions if sugar is present in urine it is glucose.

Fehling's test: Take 3 c. c. each of Fehling's solutions Nos 1 & 2 in a test tube and boil. An intense blue coloured clear solution is obtained. Add to it 3 c. c. of urine and boil for 3 minutes. A red colour indicates presence of sugar.

Benedict's test: Take 5 c. c. of Benedict's reagent and boil. Add 8 drops of urine and boil for 3 minutes. A green, yellow or brown colour is obtained *depending* upon the quantity of sugar present.

Nylander's test: To 5 c. c. of urine add $\frac{1}{2}$ c. c. of Nylander's reagent and boil. A brown or black precipitate indicates presence of sugar. This is a reliable test for detecting sugar in dog's urine.

Sugar is present in urine under physiological conditions, when excess of sugar is taken into the system, and under

pathological conditions such as deficiency of insulin, certain morbid lesions of the brain and of the kidney. In all cases except the last there is hyperglycemia and glycosuria and in the last one there is hypoglycemia and glycosuria.

7. *Acetone:* It is not normally present in Urine.

Rothera's test: Saturate 5 c. c. of urine with solid Ammonium sulphate, add 2 drops of freshly prepared Sodium nitroprusside solution and 3 c. c. of strong Ammonia. Keep for 10 minutes. A purple colour indicates the presence of acetone. The intensity of colour depends upon the quantity of acetone present.

Acetone is present in urine in advanced cases of diabetes and also in acetonæmia in cattle. Its formation in the body is due to faulty metabolism of fat.

8. *Blood:*

Peroxidase reaction: Take 5 c. c. of urine, boil and cool. Add 2 drops of Tr. Guaiacum. Mix. Add 3 c. c. of ozonic ether or hydrogen peroxide and keep for 5 minutes. A blue colour develops if blood is present.

Blood may be derived from the kidney or urinary passages in inflammatory conditions.

9. *Bile:* Bile contains bile salts and bile pigments.

Test for bile salts. Hay's test: Sprinkle some flowers of sulphur on the top of urine in a test tube. The sulphur comes down readily to the bottom due to the reduction of surface tension if bile salts are present in the urine.

Bile pigments. Huppert's test: Take 10 c. c. of urine in a test tube and boil. Add 2 c. c. of sodium phosphate and 2 c. c. of barium chloride and heat. Filter. Pour over the residue 5 c. c. of warm alcohol to which 6 drops HCl (Con.) have been added. To the filtrate from the latter add 2 drops of potassium chlorate solution and boil. A blue or greenish blue colour indicates the presence of bile pigments.

Both bile salts and bile pigments are present in urine in cases of obstructive jaundice. Bile pigments alone are present in cases of hæmolytic jaundice.

10. *Indican*: Though normally present in small quantity it is increased in cases of excessive putrefaction taking place in the intestines by the action of bacteria on proteins. It is a measure of intestinal putrefaction.

Test: Mix equal volumes of urine and Obermeyer's reagent (3 c. c. each), add chloroform 1 c. c. and shake well. Allow it to settle. The chloroform layer gives blue colour, the intensity of which depends upon the amount of indican present.

11. *Urea*: It is sometimes necessary to estimate the amount of urea in urine. This can be done by using freshly prepared hypobromite solution and Doremus Ureometer. One c. c. of urine is gently allowed to pass to the hypobromite solution. Nitrogen is given off and collects in the upper limb. After half an hour the amount of urea is read off the scale provided.

12. Centrifuge the urine and examine the sediment under the microscope for casts, epithelial cells, white blood corpuscles, red blood corpuscles, crystals etc.

Reagents and appliances required:

1. Litmus paper (red and blue).
2. Acetic acid dil (5 %).
3. Nitric acid (Con.)
4. Esbach's reagent.
5. Fehling's solution No. 1.
6. Fehling's solution No. 2.
7. Benedict's reagent.
8. Nylander's reagent.
9. Ammonium sulphate.
10. Sodium nitroprusside sol 1%.
11. Ammonium hydroxide (Liq. Ammonia Fortis).
12. Tincture Guaiacum.
13. Ozonic ether or Hydrogen peroxide.

14. Sulphur (Flowers).
15. Sodium Phosphate (Dibasic—2%).
16. Barium chloride (2%).
17. Alcohol, pure or Spiritus Rectificatus.
18. Hydrochloric acid (Con.).
19. Potassium chlorate (1%).
20. Obermeyer's reagent.
21. Chloroform.
22. Sodium hypobromite solution.
23. Urinometer.
24. Albinometer.
25. Ureometer.
26. Filter paper.
27. Funnel.
28. Test tube stand with a dozen test tubes.
29. Test tube holder.
30. Spirit lamp.
31. Measuring cylinder 100 c. c.
32. Pipette.

Preparation of reagents:

Esbach's reagent:	Picric acid		1 gm
	Citric acid		2 gms
	Water	upto	100 c. c.
Fehling's Soln No. 1:	Copper sulphate		6.9 gms
	Water	upto	100 c. c.
Fehling's Soln No. 2:	Sodium hydroxide		13 gms
	Sodium potassium tartarate		34.6 gms
	Water	upto	100 c. c.

Benedict's reagent (Qualitative):

Copper sulphate		1.7 gms
Sodium citrate		17.3 gms
Sodium carbonate		10.0 gms
Water	upto	100 c. c.

Dissolve Sodium citrate and Sodium carbonate in 80 c. c. of hot water. Filter if necessary. Cool. Dissolve copper sulphate in 10 c. c. of water. Mix the two and make upto 100 c. c.

Nylander's reagent: Boil 2 gms of Bismuth subnitrate and 4 gms of Sodium Potassium tartarate in 100 c. c. of 10% solution of Potassium hydroxide for 5 minutes. Cool and filter.

Obermeyer's reagent:

Ferric chloride 0.3 gms
Hydrochloric acid (con.) 100 c. c.

Hypobromite solution: Mix 2.5 c. c. of Bromine little by little with 25 c. c. of 40% Sodium hydroxide solution, keeping the solution cool while mixing.

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THE MADRAS CITY MILK SUPPLY*

BY

V. D. RATNAM, G.M.V.C.,

Veterinary Assistant Surgeon on Glanders Duty, (who is also in Charge of H. R. the Governor's Bodyguard horses), Madras.

The Madras City has got a human population of seven lakhs and thirtyfive thousands (7,35,000) and the supply of pure, wholesome milk in adequate quantities to this population has been a great problem. From local studies and calculations arrived at therefrom, the writer of this note was able to arrive at a conclusion that the average consumption of milk for a man in the City is about 3 ozs. a day. This works out roughly to 7 gallons per year. 90% of the milk supply is from the urban cow-stables in the City and 10% from the neighbourhood of 15 to 20 miles from the City. 90% of the supply of milk is directly supplied from the cows to the consumer by the door to door service, the balance of the 10% of the supply being in bottles and cans.

Preliminary

For a correct understanding of the conditions in which milch cattle are kept in the City, the following facts must be borne in mind.

(1) There is no need to obtain any license to keep milch cows or buffaloes nor for selling milk obtained from such animals. A person can without let or hindrance keep any number of cows or buffaloes.

(2) Only cattle yards are licensed. But even this license is granted as a simple matter of routine. The conditions relating to sanitation and hygiene may not be seen in such cattle yards. Ventilation and drainage may even be non-existent but still, the license appears to be granted as a matter of routine. Again the license will be in the name of only one individual but he would be sub-letting the premises to a number of persons. Each one of the sub lessees will pay a nominal rent but pack in

* Received for publication on 3-9-1939.

as many animals as he can within the space allotted to him. As a result of this, some of the cowsheds are packed up with cattle like sardines in a tin. In most houses, human beings and cattle are allowed to live together in one place. One has only to step into one or two cowsheds either in Chintadripet, George Town, or Purasawalkam to realise the above mentioned facts.

There are about 15,000 milch cattle in the City and there are nearly 1,400 cattle yards licensed by the Corporation. In addition to the above there are ever as many milkmen and private owners who keep cows in their dwelling houses with absolute disregard to sanitary points while there are many gentries who keep a number of cows in their bungalows for their own private use.

Milking

Most of the milking is done in the open road, exposed to the road dust etc., and it is a common sight to see the cows being milked with their back portions and udders soiled with dung and urine. The milkman neither washes his hands nor the udders of the cows before milking, nor is the can cleaned thoroughly. During the process of milking he rubs his hands any where on his half naked body and begins to milk again with dirty and unclean hand. Consequently instead of getting pure milk, the people get a solution of cow dung, urine, road dust etc.

Adulteration of Milk

Even though the Food Adulteration Act is in force, and there are some cases of convictions every year for adulterating the milk, yet they do not seem to check adulteration of milk in the City of Madras. It is indeed a task to get pure and unadulterated milk from a milkman. The adulteration is done cleverly in many ways. The general thing is to add water to the milk without the knowledge of the consumer. To make diluted milk look thicker they add to it milk of ground wheat or mix fine wheat flour itself. Buffaloes' milk is added with water and sold as cow's milk. There are a few societies and some cattle owners who sell milk in a can with a stop cock at the bottom

and with a seal at the top cover to prevent adulteration. But even here, the process of adulteration goes on. An enema can like apparatus is attached to the stop cock, the enema can is filled with water, and then it is raised to a level higher than the sealed can which contains milk. Now the stop cock is opened; according to the simple Syphon method, water in a higher level gets into the sealed milk can which is in a lower level. Thus the milk even in the sealed milk-can is easily diluted or adulterated.

Suggestions

It is suggested that the Corporation should have as many model cattle yards as required in the different localities of the City. No one should be allowed to have private cattle yards, including private yards, unless such yards satisfy the conditions of model yards. It should be made incumbent on cattle owners to have their cattle in the model cattle yards, by paying some nominal fees to the Corporation. *Good breeding bulls* should be maintained in some of the model cattle yards and a *register should be maintained to record the yield of good milch cattle with an idea of improving the livestock*. The cattle yards should be under the immediate control of a qualified Veterinary Surgeon. The feeding of the cattle can be done according to the advice given by the Veterinary Surgeon. Those cows which are in healthy condition and free from diseases (specially Tuberculosis) and which are inoculated against rinderpest should be admitted into the model cattle yards. Milking should be done under the supervision of a qualified man. The owners of the cattle should not be allowed to sell milk directly to the consumer by taking the cow outside the yard. *The milk selling should be licensed* and must be sold only through licensed vendors.

For instance, milk collected from a particular yard from different cattle owners should be sold only to a licensed milk vendor, who should be allowed to sell the milk to the public. This makes the number of people who sell milk smaller and it will be easy to have a control over the sale of milk. The milk

can be supplied in sealed bottles and cans to the consumers with the seal of the licensed milk vendor. The health staff can seize any sealed bottle and take a sample of milk for examination. Such arrangements will ensure control over milk supply and the question of supply of pure milk to the public will be solved. If the Corporation can afford, it may go a little further and instal a few pasteurisation plants and pasteurise the milk collected from different cattle yards before it is made available for sale to the public; or the pasteurisation scheme can be given to private companies imposing conditions about the price of the milk. There is the other alternative scheme whereby the Corporation can open a few model Dairy Farms. This will no doubt help to maintain the purity of the supply, but it effects very many people who own a few milch cattle and make a living out of it.

So, in the interest of the public and the cattle owners in the City, it is better to open model cattle yards in the different parts of the city and to have official supervision over those cattle yards and milking cows, and the sale of pure milk. Finally if the above suggestions of opening model cattle yards in the different parts of the City are carried out it will be very easy to control infectious and contagious diseases among the milch cattle in the City. Rinderpest has been prevailing in the City for the last one year and it has been found very difficult to control the disease for the following reasons:—

(1) *There is no proper provision made by the Corporation authorities to report immediately the occurrence of contagious disease among cattle to the Principal, Madras Veterinary College.* More than once the Principal, Madras Veterinary College has requested the Health Staff to report the occurrence of contagious diseases through their sanitary inspectors in the respective divisions. Even though Rinderpest has been prevalent in almost all divisions of the City for the last one year and a half, and even though a considerable number of animals have died during this period, still the Health Department of the Madras Corporation submits a Nil statement regarding deaths due to contagious disease in their monthly cattle mortality report.

(2) In an infected cattle yard, when a man loses some of his cattle, he buys fresh cattle to replenish his stock and houses them in the already infected yard and thus the disease is allowed to run in the cattle yard.

(3) Some cattle owners are still conservative in their ideas about preventive inoculations against contagious diseases in general and Rinderpest in particular and they have to be educated.

(4) Some people are afraid of the milk yield decreasing temporarily during the reaction period of the inoculations. Hence they avoid getting their cattle protected against Rinderpest.

Owing to these causes great difficulty is being experienced in controlling the disease among cattle in the city. The writer was able to inoculate only a little over 5,000 cattle during last year with great difficulty. The cattle population in the city is to a certain extent a floating one, as most of the cattle when they go dry are either sold off to the butcher or sent to the moffusil and fresh stock obtained for use.

All these disabilities can be remedied by opening model cattle yards, and by proper control in the sale of milk in the interest of public health in these days of "*drink more milk campaign.*"

COPY OF THE LETTER FROM

Rao Bahadur DR. C. S. GOVINDA PILLAI, M.B. CH.B.,
L.R.C.P. & S., D.P.H. (Edin.),
Health Officer, Corporation of Madras.

To

DR. P. SRINIVASA RAO, G.M.V.C.,
Editor, Indian Veterinary Journal, Madras.

With reference to your letter C. No. 87/39-40 dated 19th September 1939, I enclose herein a copy of the letter sent to the Principal, Veterinary College, Madras, with regard to the points raised in the note on the Madras City Milk Supply by Dr. V. D. Ratnam, Veterinary Assistant Surgeon on glanders duty. You will find from the letter sent by me to the Principal, Veterinary College, Madras, that the Corporation has been making serious attempts to remedy the defects with regard to the insanitary

cattle yards and milk supply. Reforms of this nature will naturally take some time because it depends on various factors, particularly finance, public opinion etc.

C. S. GOVINDA PILLAI,
Health Officer.

16-11-39

COPY OF THE LETTER FROM

The Health Officer, Corporation of Madras.

To

The Principal,
Madras Veterinary College,
Madras.

Sir,

Ref: Your letter No. 3147/39 dated 28-8-39 forwarding a copy of the note prepared by the Veterinary Assistant Surgeon on Glanders duty on milch cattle in the city.

I generally agree with the suggestion contained in the note of the Glanders Inspector. But I find that there is an element of exaggeration in some of his statements.

He has stated there is no need to obtain any license to keep milch cows or buffaloes or for selling milk obtained from such animals. The fact is that private owners who keep cattle for their own domestic use need not take license. Even here no person can keep more than 10 heads of cattle without a license, *Vide* Schedule VI to Section 287 of the City Municipal Act. Any person keeping one or more animals for the purpose of earning profit by sale of milk has to take out a license for his cattleyard.

The note of the Glanders Inspector states that license for cattleyards is granted as a matter of routine. He is not correct. During the year 1938, 511 cattleyards were condemned as unfit for license and the owners were prosecuted as a result of which 128 yards were vacated by the end of the year. This will show that license is not granted as a simple routine. The bad and insanitary conditions related by the Glanders Inspector may exist in some of the condemned cattleyards about which the Health Department take vigorous action until the yards are either vacated or improved and made fit.

The Corporation is already alive to the various defects that exist at present in regard to cattleyards and milking. A scheme for the construction of model cattleyards in the various divisions of the city is already under the consideration of the council. Until public cattleyards are constructed in all parts of the city it is not possible to eliminate the difficulties existing at present in the matter of control of insanitary cattleyards and milking. In this connection I invite a reference to a copy of the communication from this office to the Government last year in connection with an enquiry from the Committee of Animal Husbandry Wing of the Board of Agriculture and Animal Husbandry of India in which it was made clear that restrictions in the matter of milking could be effected after the model cattleyards are provided by the Corporation.

There is also a proposal under consideration for the opening of a Dairy Farm and opening of milk shops in the city. The Madras Co-operative Milk Supply Union which is the largest concern in Madras for the supply of milk is keeping more than 40 branch shops in the city and they are under sanitary control. Other milk shops also are controlled according to the bye-laws in force.

The bye-laws for the control of cattleyards provide for the notification of contagious diseases among cattle by the owners. The Sanitary Inspectors supervise the cattleyards and see to their maintenance as per bye-laws. Recently the Veterinary Assistants in charge of the cattle depots have been deputed to visit the private cattleyards systematically for the inspection of cattle and I expect that there will be a better control of contagious diseases among private cattle in the city.

I entirely agree with the concluding paragraph of the Glanders Inspector's note that the remedy first lies in the construction of public cattleyards in the city about which the Council is already very keen.

Sd./ C. S. GOVINDA PILLAI,
Health Officer.

16-11-39

VETERINARY PROGRESS IN BARWANI STATE, C. I.

BY

KARTAR CHAND ASSI, G.B.V.C.

Veterinary Assistant Surgeon, Barwani, C. I.

There was a Veterinary Dispensary in a small room attached to the Durbar Military Force, where only the Durbar's animals were treated. The Veterinarian was a Salutry. This went on till the end of 1914.

In September 1915, a Veterinary Hospital (accommodating a dispensing and store room, an office room, residential quarters for the Salutry and a shed for three in-patients) was erected in honour of the safe return of Captain His Highness Rana Sir Ranjit Singhji Bahadur, K.C.I.E., from the Great War. The hospital was under the revenue department till 1930 and the Veterinarian was still a Salutry.

In 1930, the State fell in minority. Sir H. N. Gosalia was appointed Dewan and President, State Council, Barwani. The Veterinary Department was transferred under the supervision of the State Surgeon, Barwani. A Veterinary Assistant Surgeon was appointed and he was assisted by a compounder.

In 1932, a Touring Veterinary Assistant Surgeon was appointed. Regular registers and forms were printed. The Veterinary Assistant Surgeon demonstrated theoretical and practical value of the Veterinary Science to the Rayat. Five years of touring work convinced the Rayat of the usefulness of this science. People started coming to the hospital with their cases from the interior of the state, as well as from different parts of the Holkar, Gwalior, Dhar, Jobat and Alirajpur States. The extension of the building became a necessity and Sir H. N. Gosalia, Dewan and President, State Council, Barwani, very kindly provided Rs. 26,000 in the budget of 1937-38 for this purpose.

A new Hospital was constructed at a cost of Rs. 24,000 and it goes by the name of Maha Rani Tejkuvarba Veterinary Hospital, Barwani. The opening ceremony was performed by Mrs. Kirkbride, wife of Major G. Krikbride, I. A. Political Agent in Malwa Agency. Lt. Col. Muirhead, Under Secretary of States for India and Honourable Mr. Fitze the Resident in Malwa Agency were also present.

The present buildings consist of:—A Laboratory, consulting room, operation theatre for small animals, wash up room and an office room. There were also within the hospital compound the residential quarters for the Veterinary Assistant Surgeon and the compounder, operation theatre for big animals, Trevis double, in-patient ward having 6 sheds and 2 caretakers rooms.

In addition there are outside the compound, residential quarters for the sweeper, two rooms for contagious in-patients and two rooms for goats for the preparation of goat virus tissue vaccine.

The hospital is well equipped and furnished where the cases of rich and poor are treated alike free of charge on modern lines. The Veterinary staff is never lacking in appreciation from the honourable Durbar and it owes a deep debt of gratitude to the sympathy, guidance, appreciation encouragement and timely help to Sir H. N. Gosalia, Dewan and President, Barwani State Council and Dr. A. M. Naqui, M.B.B.S., State Surgeon, the central authority of the Veterinary Department.

At present this hospital is second to none in Central India.



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JANUARY 1940

No. 4

Editorial

VETERINARY AID IN THE CITY OF MADRAS

Elsewhere we publish in this issue of the *Journal* a report depicting the conditions in which cows are kept housed and milked in the City of Madras. The report is by the Glanders Inspector of the City (who is also in charge of H. E. the Governor's Bodyguard Horses), who has had ample opportunities of studying the conditions in the different parts of the metropolis and collecting information first-hand. Along with it, we also publish the remarks of the Health Officer of the Corporation of Madras on that report.

The two reports make very interesting reading and betray a woeful state of conditions in the very capital of the Presidency. To mention the most important of them, a highly infectious disease like Rinderpest—otherwise known as Cattle Plague—has been prevailing in the City for over a year and a half and levying a heavy toll on the cattle population. Hundreds of cattle have died of the disease and the few that have recovered have temporarily become a dead stock to their owners owing to their inability to yield any milk. The economic loss on this account, even at a modest estimate, is at least two lakhs of Rupees. And, all these, from an easily preventable disease! Yet, what do we find? The Corporation of Madras is totally ignorant of even the prevalence of this disease and its officers

“have been submitting Nil statements regarding deaths from contagious diseases in their monthly cattle mortality reports.” This is indeed an amazing revelation and calls for a prompt enquiry. If an illiterate Village Munsiff in an out of the way place in a remote corner of the Presidency is found to have failed to report the incidence of any contagious disease amongst cattle in his village, he is considered to have failed in the discharge of his duties and severely taken to task immediately—and rightly too. But, here, in the very metropolis, in the very head quarters of the Government, a contagious disease has been playing havoc and carrying off hundreds of cattle for over a year and a half and, yet, the authorities who should be responsible for reporting it, seem to be totally unaware of its prevalence even. This clearly shows that there is some lacuna in the organisation which should immediately be attended to.

Some are inclined to blame the Health Department of the Corporation for this state of affairs. In our opinion, it is not fair to do so. It is even unfair. The Health staff have got plenty of their own legitimate work to do. They have got thousand and odd problems to solve for promoting the welfare of the human beings in their charge. Their hands are therefore full and they have scarcely any time to attend to other things. As such, it is not right to saddle them with things with which, strictly speaking, they should have very little to do.

The duty of looking after cattle and of attending to their diseases is primarily and essentially the work of a Veterinarian. None else can do it satisfactorily and therefore none else should be entrusted to do it. In the Districts, this work is being done by the Veterinary Department and not by the Health Department. But unfortunately, the Corporation of Madras has no Veterinary Department of its own and it is in this respect its organisation is defective. There are various Departments in the Corporation such as the Revenue, Engineering, Education, Health etc., but there is no Department to look after the livestock within its limits. And it is this that has been responsible for the present state of affairs.

We, therefore, strongly plead with the Corporation for the immediate organisation of a Veterinary Department which, like other Departments, will be directly under the Chief Executive Officer or Commissioner. This Veterinary Department must consist of a Corporation Veterinary Officer and a number of Veterinary Inspectors under him. Each of these Veterinary Inspectors should be in charge of a Division and be responsible for the welfare of the livestock in that locality. He must be made to look after the sanitary and health problems of livestock in his Division in much the same way as the Sanitary Inspectors are required to do in respect of human beings in their jurisdiction.

This kind of organisation, when set up, will tend to improve the conditions of livestock in the City in a remarkable way in a short time. The Cattle Yards in the City which, at present, are admittedly in a highly insanitary condition can be inspected more systematically and thoroughly and every effort made to educate the people to provide clean cow-houses for the milch cows. The incidence of contagious diseases amongst them will then be promptly detected and steps taken at once to arrest the progress of the disease. In addition to these, there is one very important aspect in which this Veterinary organisation can function for the welfare of the people living in the City. And that is in respect of the detection of diseases which are communicable from animals to human beings. There are many such diseases but the most important among them is Tuberculosis. As every one knows, this is a deadly disease which is generally slow and insidious in its onset. On that account, a good deal of Anti Tuberculosis campaign is being carried on vigorously during the last few years. But there is one aspect of its nature which, we are afraid, is not appreciated to the extent to which it ought to *viz.* its communicability from animals to man. Probably, the reason for this is that the existence of the disease in animals is not well known. If this is so, we are afraid that people are not aware of the real state of affairs. Here, in the City of Madras, the existence of Tuberculosis in the conservancy cattle of the Corporation has been proved

2

Probably, the reason for this is that the cause in animals is not well known. If this is so, people are not aware of the real state of affairs. In the city of Madras, the existence of tuberculosis in the cattle of the Corporation has been proved

over and over again from 1916 onwards. It has been confirmed by microscopical and biological findings. If this were so in animals that are well looked after and kept under sanitary conditions, it does not require any stretch of imagination to presume what the conditions would be amongst the ill-fed milch cows kept in the insanitary cattle yards in the congested localities of the City. But unfortunately no attempt has yet been made to find out exactly the extent of the prevalence of the disease and its eradication wherever present. This is a duty which the Corporation must immediately undertake in the interests of the lakhs of people living in the City. A systematic campaign against Tuberculosis in cattle must be conducted by testing all the animals in the City and eliminating all the reactors at once. This is a duty which the Corporation must have done long ago. It should not therefore be delayed any longer.

For this, as well as for other important functions like improvement in the breeding of cattle, a separate Veterinary Unit as suggested above is very essential and we appeal to the Corporation to organise one at once.

THE PRESIDENTIAL ADDRESS AT THE BOMBAY VETERINARY MEDICAL ASSOCIATION ANNUAL GENERAL MEETING

Though old in age and frail in body, Khan Sahib N. D. Dhakmarwala, President of the Bombay Veterinary Medical Association, has shown a very commendable youthful spirit and enthusiasm in his Presidential Address at the Annual Meeting of that Association held on 30th December 1939, at Poona, which is reproduced elsewhere in this issue of the *Journal*. His innate love for the profession and his keen anxiety to see it progress on right lines have been the only stimuli for the youthful activity displayed during his retired life and he puts many a member of the younger generation to shame by his

ardent desire to do his bit—which is indeed a lot—to the profession. We commend his enthusiasm to the other retired members of the profession in the other Provinces, many of whom are fortunately possessed of better health than the Khan Sahib and who would not have retired but for the compulsory age limit. As we have remarked often in *these pages*, these retired officers could greatly advance the interests of the profession and the country by putting more life and vigour into the activities of the Branch Associations.

The Khan Sahib in his able Presidential Address has given a clear and brief account of the activities of the Association during the past year. He has also usefully incorporated in his account a general survey of the progress of the profession in India and stressed the needs of the services and the served *viz.* the masses.

A number of useful suggestions of a very practical nature have been put up to the Bombay Government in the form of Resolutions and we expect there would not be any difficulty for the Government to act up to those suggestions. We would however like to draw attention to a few of the Resolutions which have an All-India application.

One of these is a suggestion for organising a Publicity Bureau “for disseminating information about the value of the Veterinary Profession and the work done by the Veterinary Department in the Province to the Public from time to time” is a very timely one. We have been frequently deploring that the Veterinarians have got a knack of hiding their light under a bushel and that, on this account, their services often go unrecognised and unmerited. A Publicity Bureau conducted on the right lines would certainly make up this omission and it would further educate the masses on the various problems affecting their livestock.

Another Resolution is for the appointment of *Internal* and *External* Examiners for the examinations conducted in the Veterinary College. This, we are sure, is a very well conceived

resolution. Without meaning any disparagement to the Examiners who have been conducting the Examinations all along, we would like to point out that there is ample scope for improving the standard of Examinations in the Veterinary Colleges, chiefly in the matter of selection of Examiners. It should hardly be necessary to postulate that the first and foremost qualification for a person to be an Examiner is his proficiency in the subject in which he is to be the Examiner. This kind of proficiency is attained not by the additions of a few letters after his name but by the continued practical application of his mind to the particular subject. In fact, it is only by specialising, that one becomes proficient in a subject. As such, who is there better fitted to be an Examiner than a teacher who has been handling the subject year in and year out? None else. But there is just a possibility that this kind of Internal Examiner may develop a bias which may not be quite favourable either to the student or to the standard of Examination. To counteract this possibility, it is essential that this Internal Examiner is co-opted with an External Examiner so that a combined examination by the two Examiners could evaluate the capacity of the student correctly and impartially. This is what obtains in the Medical Profession. A reform of this kind is very long overdue in the Veterinary Profession and we earnestly appeal to the authorities concerned to introduce it at once. This is essential if the test of Examinations is to be kept up at the correct standard.

There are also other Resolutions that were passed by the Bombay Veterinary Medical Association which are of easy application to the other Provinces. We commend them to their consideration.

Clinical Cases

A CASE OF IMPACTION AND AUTO INTOXICATION IN A SLUT

BY

S. L. MANIREKAR, G.B.V.C.,
Veterinary Assistant Surgeon, Ratnagiri, Bombay

On the 15th June 1939, an Alsatian slut was brought to the dispensary for treatment with the history that she had been very dull and off feed for the previous six or seven days. She had passed very little quantity of stools during the last 48 hours.

*Case :—*O.P. No. 224/57.

15-6-39. Symptoms that were observed are :—The mucous membranes were severely congested, urine very high coloured, passed in large quantities. Temperature 105.2°F. Pulse quick and 140 per minute, respirations hurried and 35 per minute.

The lungs were quite clear. One point of importance was that the spleen was enlarged and palpable.

An enema of soap water was given and a dose of mixtura Alba with 5ms. of Tr. Nux Vomica was administered.

The owner was advised to keep the slut on exclusively milk diet, glucose and barley water.

16-6-39. *Symptoms.* She had no good motions; only very little quantity of hard stools was passed by her during the whole of the previous day. Temperature 105.8°F. Pulse 135 per minute, respirations 38 per minute. The animal extremely dull, urine still high coloured.

An enema was given with no effective result. The water was retained.

A dose of febrifuge mixture with Mag. Sulph 30 grains and Tr. Aconite iii ms. was given and two powders containing

Salol, Soda Bicarb and Quinine Sulph were supplied to be given every three hours.

In the evening the temperature rose to 106.2°F. Omnadin 2 c.c. was injected and the attendant instructed to record the temperature every four hours.

17-6-39. The temperature throughout the day was 104°F. but the bowels did not move at all. Took blood-smears, sent to Bombay Veterinary College for examination for Babesiasis. (The report received on 22-6-39 showed that no Babesia was present in the blood). Gave an enema of simple tepid water with a little salt. Very little water was thrown out. Continued the mixture and powder.

18-11-39. The temperature was 105.6°F. at 8 a. m. 105.4°F. at 12 noon, 106.0°F. at 4 p.m., 106.0°F. at 8 p.m. The remaining symptoms were the same, and there was no improvement. Enema was continued. A little quantity of stools was passed. Samples of faeces and urine were examined at the Civil Hospital. Nothing present in the stools, a few R.B.Cs. were noticed in the urine. Repeated the mixture and powders.

19-11-39. The temperature varied between 104.2°F. in the morning and 103.4°F. in the evening. Bowels did not move. Remaining symptoms were the same. Repeated treatment.

20-11-39. The temperature remained between 103.8°F. in the morning and 105.2°F. in the evening. Bowels still unmoved. Animal losing condition day by day. Remaining symptoms same.

Blood smears again examined with negative results. Repeated the mixture without Tr. Aconite and increased the dose of Mag. Sulph to 3 ii. Continued the powder alone. Gave an injection of Omnadin.

21-11-39. The temperature in the morning was 105.6°F. Bowels still inactive, gave an enema of about 3 pints of warm water with soap and salt with the hind feet raised. In about 5 minutes a big hair ball—bigger than an Italian lemon and smaller

than a cricket ball was ejected into the water. The ball was composed of undigested meat, a piece of bone and hairs. The dog felt relieved. Temperature came down to about 103.2°F. at about 8-30 p. m.

22-11-39. The temperature was 102.4°F. in the morning and 101.8°F. in the evening. The other symptoms also began to improve. Mucous Membranes came to normal. But urine still somewhat coloured. Continued the mixture and powder for another two days, but added Tr. Nux Vomica M. v. and Tr. Zingiberis M. xv.

The owner was requested to keep the slut on liquid nutrient diet as liver soup, meat extracts and glucose etc. for another four or five days and then bring it slowly to its normal diet.

The cause of the trouble has been this sort of hair ball which had caused a certain amount of impaction and acute intoxication—these being the cause of high temperature.

The main thing that was followed throughout the treatment was to keep the animal on nutrient diet which kept up the vitality of the animal for so many days.

The slut was discharged cured on the 30th of June 1939.

My thanks are due to Dr. Karode, Civil Surgeon, Ratnagiri, for kindly allowing me to examine the samples of blood, urine and faeces in his Laboratory. My thanks are also due to the Principal, Bombay Veterinary College, for promptly sending the results of the examination of the blood smears sent to him.

ANAPHYLACTIC PHENOMENA FOLLOWING INTRAVENOUS INJECTION OF TRYPAN BLUE IN CATTLE

BY

K. NAGABUSHANAM NAIDU, G.M.V.C.,
Medak, Hyderabad, Dn.

It is on record that this drug has been used by Nuttall and other Veterinarians in the treatment of canine and bovine piroplasmosis. In Central Provinces the above drug has been widely tried by Major R. F. Stirling in animals "showing ill-health with anæmia, general debility and loss of condition amounting to extreme emaciation" irrespective of microscopic confirmation of parasite. Since then, it has become a routine practice with many Veterinary Practitioners to treat bad cases of general debility with this drug in place of tonics and hæmotonics which take considerably a long time to produce the desired effect.

On 18-8-39, four bullocks were admitted in this hospital for general debility and every one of them was given 40 c.c. of freshly prepared 2 per cent. solution of Trypan Blue intravenously. To my surprise, in one case, the bullock developed within a few minutes, symptoms of anaphylaxis showing staring coat, urticaria-like swellings all over the body and drowsiness.

To neutralise this reaction 8 c.c. of Liqr. Adrenalin Chloride was given subcutaneously. In three hours the general condition of the animal became normal and it was sent home.

I was trying this drug for the last few years in good number of cases and this is the only case I witnessed exhibiting symptoms of anaphylaxis.

ACTIVE IMMUNISATION OF CAMELS AGAINST RINDERPEST WITH GOAT BLOOD VIRUS

BY

V. SRINIVASAN, B.A., Dip. Econ., G.M.V.C.,
Veterinary Officer, Alwar.

The experiment was conducted under field conditions in a village in the Alwar State in the month of December 1938, to study the nature of the reactions in camels after goat blood virus inoculation and to ascertain whether they can be safely immunised against rinderpest with goat blood virus alone or whether anti-rinderpest serum is necessary for use with virus. In camels rinderpest is known to run a very mild course; severe symptoms are seldom seen; active immunisation is rarely done. So the literature on this subject is scanty or none.

Camels form an important item in the Animal Husbandry in Rajputana and outbreaks of rinderpest in severe forms are known to occur very often among them; but, due to mistaken diagnosis, they are most often treated for ordinary diarrhoea and dysentery. In December 1938, rinderpest broke out in a severe form in the village of Mainpur, Nizamat Mundawar in the Alwar State. Sheep and goats in large numbers in addition to the cattle and buffaloes were affected, and many animals in all the species died. Simultaneously two camels—a male and a female, of the same village got affected with rinderpest. The chief symptoms noticed were lachrymation, anorexia followed by shooting diarrhoea. Systematic treatment was adopted for these two animals; one died and the other recovered. No post-mortem was held. I advised the Veterinary Assistant Surgeons on duty to inoculate the camels in the village with goat blood virus, in addition to the buffaloes and cattle. In all twenty camels of different ages were vaccinated with goat blood virus on 17-12-38 and 25-12-38 each animal receiving one c.c. of the inoculum. The reactions were observed on the subsequent days.

Only a mild thermal reaction reaching up to 105°F. was noticed. All the animals withstood the reaction well.

The goat blood virus for the inoculation was produced locally in the laboratory attached to the Civil Veterinary Hospital, Alwar, the original brew being from the Imperial Veterinary Research Institute, Muktesar. There was no mortality in the inoculated camels and the outbreak subsided in the village. It should be also noted that the inoculation was undertaken in an actual outbreak of the disease.

On 19-2-39 three more camels were inoculated simply to observe the reactions. Only one camel showed a thermal reaction on the 5th and 6th day ranging from 103°F. in the morning to 103.8°F. in the evening.

Conclusion :—Active immunisation against rinderpest with goat blood virus proved quite safe for camels in the face of an actual outbreak.

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" ASVAVAIIDYAKAM "

BY

SRI MAHASAMANTA JAYADATTA.

Translated from the original Sanskrit with Notes and Commentaries.

BY

NRIPENDRA NATH MAJUMDAR

(Late of Veterinary Service)

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Continued from Page 204, No 3, Vol. XVI

CHAPTER XI

- S'l. 36. Kaseruka (Kunci grass a kind of grass growing in tufts like a brush), S'amī (Acacia suma), Pīlu (Salvadora Indica) Karīr (a kind of thorny shrub very much liked by camels) S'añkar (said to be Calatropis gigantea), Khadir (Acacia catechu), and Vakula (Mimusops elengi) where these grow abundant, and
- S'l. 37. The country that is almost without water and abounds in dry land, is known as Jāngal tract. That which presents the appearance of the (above) two (*ie.*, Anupa and Jāngal) is Sādhārana ordinary and the animals (found) therein are also ordinary.
- S'l. 38. It is to be remembered that the dose of such meat when it has to be given, should also be ordinary. The (dose of) meat, whether of birds or beasts should be known according to the dose prescribed for that country.
- S'l. 39. The meat derived from aquatic animals is rather difficult of digestion, (but) is cooling, corrects the

excess of Vāyu¹ and increases Kapha and strength. The flesh or meat of animals of an Anupa tract is of the same properties, only it is a little more easily digestible.

- Sl. 40. The meat derived from birds and beasts of a Jāṅgal tract corrects the three Dosas,² regulates the flow of fluids³ in the body, (but) reduces the metabolic heat⁴ and is agreeable and nourishing.⁵
- Sl. 41. (The meat derived from) "Ordinary" tract should be known to possess common qualities, strength and properties (after digestion) as those of an 'Ordinary' country.
- Sl. 42. It has been said that the (general) rule for the preparation of Oils and Ghees is that the quantity of Oil or Ghee should be four times the quantity of Kalka (*i.e.*, the pounded drugs) and the extract should be four times the quantity of Oil or Ghee.
- Sl. 43. When the residue (left in the oil or ghee) can easily be made into a stick when rolled between the fingers, and will not produce any sound when thrown into the fire (*i.e.*, burn silently), then it indicates a successful operation.

1. *i.e.*, cures disorders arising from excess or disturbance of Vayu.
2. In Sanskrit Guna and Dosa are auto-nyms. Guna—quality and Dosa—defect. Sattva, Raja and Tama are the three Gunas and Vayu, Pitta and Kapha are the three Dosas. These two words—Guna and Dosa—cannot be properly translated by the words Quality and Defect, which do not convey the exact meaning or force of the words as used in Ayurveda. In Sankhya philosophy too, Sattva, Rajas and Tamas are the three Gunas, but there Guna means the binding ropes, so to say. They are three forces or ropes which keep or bind all substances in their existing form or shape. They are three elements of which the primordial nature is composed.
3. Blood, lymph etc.
4. Or, diminishes digestive heat.
5. The word used here is Valya which means strength giving.

- Sl. 44. (When such oil or ghee is intended) for application on wounds or abscesses, or for administration through the nose, or for injection per rectum or vaginum, the cooking, it has been recommended, should be very mild or slow; medium cooking is (recommended) for massage and for drench or internal administration, the cooking should be a bit brisk.
- Sl. 45. The wise should regulate the doses of drugs according to the size of the body of the class (of horses) Good, Medium or Inferior and according to the age of the animal.
- Sl. 46. The dose should be a quarter (of the prescribed dose) for an one-year colt; two quarters (*i.e.*, half) for a two-year old; three quarters for a three-year old and full dose thereafter.
- Sl. 47. The minimum dose or that prescribed for the Inferior should be given to lean or small-sized animals and (the dose prescribed for) Medium or Good animals should be given to the very stout or large-bodied.
- Sl. 48. The sages have said that water is to be taken where no specific mention of any liquid vehicle has been made in case of any extract, drench or any plaster for external application; and where only salt is mentioned, rock salt is to be taken.

End of Chapter XI on Articles and doses in the Treatise on Equine Science by Sri Mahasamanta Jayadatta.

CHAPTER XII.

Nighantu.....Glossary.

- Sl. 1. Now shall I say about the list of names of drugs according to Sāstras, (by going through) what produces a full knowledge of the articles.

Sl. 2.	Sanskrit names.	Common names.	Scientific names.
	Vatsadani,	Ben & Hind. Gulanca.	Tinospora cordifolia Syn:—Cocculus cord: N. O. Menispermaceae Eng. Heart-leaved moonseed.
	Chinnaruha,	Bom. Ambervel Giroli. Guz. Gado.	
	Guluci, Tantrika,	Pun. Gilo Gulanch.	
	Amrita.	Tel. Tippatego. Tam. Sindilkadi.	
	Vasaka, Vasa,	Beng. Bakas or Basaka.	Adhatoda Vasica.
	Vrsa, Atarusa.	Hind. Basa, Arusa. Tel. Adampaku. Tam. Adatodai. Mah. Adulsa.	Syn. Justicia adhar- toda.

This chapter will be somewhat a tedious reading to our readers, as it is simply a list of names of drugs and their Sanskrit synonyms which will be of little interest or use to our readers specially those who do not know Sanskrit. To make it a bit useful and interesting, a little modification in the arrangement has been made in the following manner:—The whole thing has been represented in a Tabular form, in the first column of which the Sanskrit names (transliteration of text) has been given. There are other Sanskrit synonyms, but only those used in the text have been given. In the second, the Indian common names, so far as could be collected, have been given; and in the third—the scientific Latin names and the common English names, if any, have been given. The following abbreviations have been used, namely, Ben. for Bengali; Hind. Hindustani; Bom. Bombay; Tel. Telugu; Mal. Malay; Tam. Tamil; Can. Canarese; Kas. Kashmiri; Mah. Mahratti; Guj. Gujrati and so on.

Such superfluous words, e.g., "It has been said", "It is to be remembered," etc., which are used in the text simply for the sake of the metre of the sloka (couplet), have been deleted.

(To be continued.)

Hotch Potches

"Warfa" ("Swayback") in Lambs, and its prevention by adding Copper Supplements to the diet of the mother during gestation. *Symptoms:* The disease is confined to lambs during the first month of life. Most are affected at birth and are unable to raise themselves to obtain milk from their dams. Others can struggle to their feet but sway back about in a peculiar manner and collapse or turn somersault if they are attempted to walk. A few become affected at later stages and the symptoms may only be noticed when the young animal is disturbed. Before it has proceeded far the hind quarters are seen to sway as if paralysed and it falls over on its side practically helpless. Mortality rate—about 100 per cent. Symptoms noticed in one ewe out of every 1000 examined. The disease can be controlled by feeding licks containing 0.3 per cent. copper to the ewes during the gestation period.

Vety. Rec. Sept. 10, 1938.

The Treatment of Joint-ill in Foals by the Intravenous Injection of Trypaflavine.—Foals up to three weeks 0.4 grammes; up to 6 weeks 0.6 grammes; over 6 weeks 0.8 grammes. It is injected as a 2 per cent. solution into the jugular vein. As a rule one injection is sufficient. If a second injection is necessary, it is done after three weeks.

Vety. Rec. Sept. 3, 1938.

Skin-tuberculosis of cattle:—Lesions are usually localised and occur on the distal parts of the legs or the ventral aspect of the chest and abdomen, and appear to be tuberculous granulation tissue. In the neighbouring lymph glands tubercle-like changes consisting of Langerhan's giant cells are seen.

Vety. Rec. Sept. 3, 1938.

Tuberculosis of Goats in Uganda:—Sites of Lesions:—Mammary gland. Thoracic, Mediastinal lymph glands, Lungs,

Liver, etc. The glands were enlarged, indurated, containing yellow caseous material with calcification in stages. 10 cases of Tuberculosis in goats in Uganda were caused by the bovine type of bacillus.

Sheep:—Sub-maxillary glands were enlarged and caseous mesenteric, hepatic, bronchial, and mediastinal glands were greatly enlarged and contained yellow caseo calcareous centres. Lungs were also involved.

Vety. Rec. Sept. 3, 1938.

The Treatment of Bovine Sterility:—Examinations of over 1,000 sterile cows revealed that 59 per cent. were suffering from vaginitis or cervicitis or both. In such cases powdered Sodium Bicarbonate applied to the mucosa with a wad or cotton wool appeared to be the most effective treatment, 90 per cent. of cows so treated becoming fertile. It was possible to isolate in every case a nonhæmolytic streptococcus.

In cases of metritis, pyometra, etc., Lugol's solution of iodine followed by lavage of the uterus for ten consecutive days with a sodium bicarbonate solution gives satisfactory results. Prolan injections are of value for the treatment of hypertrophy of the uterus and in cases where there is an absence of heat without specific lesions in the reproductive organs. Persistent corpora lutea may be satisfactorily treated by enucleation but ovarian cysts are much more difficult to deal with and cannot always be removed. A case of vaginal hæmatoma is recorded which was successfully operated upon.

Vety. Rec. Aug. 27, 1938.

The Prevention or Arrest of Lactation:—Lactation can with safety and certainty be artificially terminated by the use of oestrin. In the human being, oestradiol benzoate in oil in 10,000 unit doses intramuscularly every 12 hours for three or four doses, when death of a child or some condition of the mother made it imperative that she should not lactate. If the injections are commenced immediately after delivery no

further treatment is necessary. Milk secretion does not recommence until a subsequent pregnancy.

Vety. Rec. Aug. 27, 1938.

Intra-Articular Therapy in a case of Osteo-Arthritis:—
Yatren Vaccine E. 104 (Bayer)

subcutaneously or R/- Camphor 5 per cent.
Oil of niaouli 20 per cent.
Ether 2 per cent.
Olive oil *ad* 100 per cent.

Optimum dose for man into the knee joint was 0.1 c. c. to be repeated at intervals several times. In dogs 0.5 c. c. was tried.

Vety. Rec. Aug. 27, 1938.

Gapeworm-Longevity:—The *syngamus* larvæ may remain alive and infective in the muscles of earthworms for 4—4½ months; 3½ years is the maximum.

Vety. Journal. Aug. Sep. 1938.

Oestrus in the Ewe:—The intramuscular injection of oest-rasol benzoate induced heat in 74.3 per cent. of 113 of grade Merino ewes. The optimum dose was about 5000—6000 I. U. The hormone induced not merely a single heat period but caused the resumption of the normal oestrous cycle probably through its effect on the gonadotropic activity of the interior pituitary.

Vety. Journal. Aug. Sep. 1938.

Beri-beri in the Dog:—Rough coat, tenderness of musculature, ataxia, inability to stand upright. This is due to lack of Vitamin B. Inject subcutaneously 2-5 mg. of aneurin for cure. (Vitamin B is now known as anuerin).

Vety. Rec. July. 30, 1938.

The Treatment of Bovine Mastitis with Sulphanilamide:—
Chronic mastitis in cows—30 grammes orally twice daily and

treatment continued over periods varying from 5-12 days. 30 grammes of Sulphanilamide four times a day are recommended.

Vet. Rec. Aug. 20, 1938.

* * *

Notes Relating to the Camel:—(i) Mange (*Sarcoptes cameli*).—Apply 11 per cent. solution of Crown Agents "White Fluid". Two applications at intervals of 8 days will be found to be sufficient to cure.

(ii) Tick Paralysis:—Sudden onset, hyperæsthesia, stiffness in movement and a crouching gait. Paralysis ensues.

Treatment:—Remove ticks by 1 per cent. solution of Crown Agents "White Fluid."

(iii) Traumatic Keratitis:—First bathe cornea with a 1:1,000 solution of acriflavine. After this instil a few drops of atropine sulphate (1 per cent.) solution.

Vet. Rec. Aug. 13, 1938.

* * *

Chloral Hydrate as an anaesthetic etc:—For horses and cattle.—25-30 c. c. of a 100 per cent. solution intravenously.

For Dogs:—Use Nembutal.

Others use a diluted solution 2 oz. in 24 oz. of water. Normally a horse goes down when about three-fourth has been injected. Duration of the anaesthesia is 2-4 hours. The solution should not be boiled as it loses strength. The Chloral Hydrate should be added to water which has been boiled and cooled and filtered through cotton wool. Use solution cold.

Vet. Rec. Dec. 18, 1937.

* * *

Distemper:—Use of Omnadin and Tonophosphan in an outbreak of distemper in a fox hound kennel:—When Veterinary aid was called in six young couples were affected, showing symptoms of distemper in all the varying stages of the disease. Intramuscular injections of 5 c. c. Omnadin were given to all the infected animals at the first time of visiting. On the

second visit, two days afterwards, there was a considerable improvement; a second injection of 5 c. c. Omnadin was given to each hound. In the case of five hounds that seemed not to have progressed as well as the others, injections of 5 c. c. tonophosphan were given subcutaneously. A third visit was made two days later. On this occasion it was found that only five hounds required further treatment. These were given simultaneously 5 c. c. Omnadin and 5 c. c. of Tonophosphan. Two days later only one hound was still ill—further injections of 5 c. c. Omnadin and 5 c. c. Tonophosphan were administered. This bitch died four days later from pulmonary oedema.

Vet. Rec. Feb. 12, 1938.

* * *

Acetic Acid Therapy in Canker:—In treating canker of the hoof, Dethloff proceeds by removing all diseased horn until healthy tissue is reached. The wound area is swabbed with a high-percentage trichloroacetic acid solution. The horse shoe is then replaced, the swabbing with the above solution repeated, and a dressing of Plaster of Paris paste is applied. This dressing is changed every three to eight days. Treatment is completed in about three to six weeks. The author is of the opinion that the combined action of the escharotic, the pressure of the bandage, and the exclusion of the air are the curative factors.

Vet. Medicine, Sept. 1939.

* * *

Heterophyidiasis:—Is a disease recently found by Dr. Africa of the Institute of Hygiene to be the cause of certain cases of heart failure in man. The heterophyid is a minute fluke which may be present in the intestines of dogs and birds. The egg of this parasite is passed with the faeces and eaten by certain species of snails. From the snail's body actively swimming forms come out which in time invade and become encysted in the body of certain fishes like *candule*, *tadilong*, *ayungin*, *hito* and other fish. Man contracts the infection by eating raw or partially cooked fish. The cysts develop in the intestines of

man into adult flukes. These flukes invade the sub-mucosa of the intestines and discharge their eggs into capillaries or lymphatics which are then carried to the heart by the circulation, thus causing heart failure in man. This is an example in which the parasite has taken a roundabout and complicated route before exerting its fatal effects on man. It is fortunate that this is so, because otherwise, we would have more cases of heart failure in man due to this parasite than at present.

Phil. Jour. Ani. Ind. Vol. 6, No. 5.

A Simplified Method of Staining Acid-Fast Bacteria.

EIHTO RYU

(From the Division of Epizootics, Kitasato Institute for Infectious Diseases, Tokyo.
Chief: Prof. K. Kasai).

The Author has tried many experiments to improve the acid-fast technic, especially the staining of *Bac. tuberculosis*, and has been able to devise a very simple method omitting decolorization.

The procedure of this method is as follows ;

- (1) Put one loopful of 3 per cent. caustic potash solution on a slide, and mix a small quantity of material to be examined (phthisic sputum or culture of tubercle bacillus) to it. Then spread the mixture in a thin film, and fix it by passing through flame.
- (2) Cover the smeared surface with several drops of 0.05 per cent. solution (without adding carbol) of fuchsin, and pass several times through a fairly strong flame.
- (3) Wash with water, after standing for 20-40 seconds.
- (4) Directly without procedure of decolorization, counter-stain with 2% solution of methylene blue at room temperature for 30 seconds.

The cultures of the human (2), bovine (2) and canine (1) strains of *Bac. tuberculosis* and saprophytic acid-fast bacteria (10) having been treated by the above-mentioned method, the bacterial bodies were found clearly stained and even the bacterial granules distinctly detected.

Then 80 specimens of phthisic sputum were examined by application of both the present staining and ZIEHL-NEELSEN'S method. The results showed that by the former method 11 more positive cases were revealed (69) than by the latter (58), and in the positive cases, larger numbers of bacilli were always detected by the former than by the latter method.

Also, the material of rat leprosy was treated by the author's technic and the body and intracellular granules of the causative acid-fast bacillus were detected to be deeply stained.

The Japanese Journal of Veterinary Science,
Vol. 1, No. 5. Oct. 1939.

College News

MADRAS VETERINARY COLLEGE

THE B.V.Sc., DEGREE OF THE MADRAS UNIVERSITY

What may be called a land mark in Veterinary Education in India took place in October 1939, when the first Final Examination for the Degree of Bachelor of Veterinary Science was conducted by the Madras University. This is an event of outstanding importance in the progress of Veterinary Education which should be a matter for pride and joy to every Veterinarian in this country.

The Examinations which were written and oral were conducted at the Madras Veterinary College, which is an institution affiliated to the Madras University. Twelve students sat for Examination. Three passed and nine failed, giving a pass result of 25 per cent.

We heartily congratulate the successful candidates. They are the pioneers of a new exalted order of things in the Veterinary Profession in this country with the distinctive hall mark of University Degree. Much is expected of them.

We sincerely sympathise with the failed candidates and wish them better luck next time. Is it not often said that failures are the pillars of success? They need not, therefore, feel quite disheartened over their failures.

Association News
BOMBAY VETERINARY MEDICAL ASSOCIATION
PRESIDENTIAL ADDRESS

BY
KHAN SAHIB N. D. DHAKMARWALA,
*President, Bombay Veterinary Medical Association at the
Annual General Meeting, 30th Dec. 1939*

Gentlemen,

As the President of the Bombay Veterinary Medical Association it gives me great pleasure to place before you the Annual Report of the Association for adoption by you at today's Annual General Meeting.

I am sure that it will be a source of great satisfaction and gratification to the Members that for the first time this meeting is being held in Poona—the Capital of Deccan which is a great agricultural District. Poona has the advantage of having an Agricultural College, besides Engineering and Medical Institutions and Arts Colleges. We will therefore have an opportunity to visit these Institutions and learn some of their work.

I am aware that Annual General Meetings are likely to be dull and monotonous but they have important advantages in that they bring together many members who are inspired by a common object. They could exchange views and experience and consider how best to improve the quality of their work and increase its quantity.

With these few introductory remarks I now come to the proper business of today's meeting. Since we met last in April 1938, we held 3 meetings of the Managing Committee and the following resolutions were discussed and most of them forwarded to Government:—

- I. Introduction of Post-graduate Refresher Course in the Bombay Veterinary College and the deputation

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of Veterinary Assistant Surgeons in batches to attend the same with a view to refresh their scientific knowledge and enable them to carry on their duties more efficiently.

- II. Introduction of compulsory vaccination against Rinderpest with goat virus vaccine which is an efficient weapon in dealing with this disease in affected areas and to adopt a three years' plan of eradicating the disease from the Province.
- III. Amalgamation of the Live-stock Department with the Veterinary Department with a view to carry out work connected with animal husbandry, animal health and diseases efficiently in the Province as has been done in Madras.
- IV. Attachment of a small dairy and poultry farm to the College so that these subjects may be taught as recommended by Dr. N. G. Wright, the Dairy Expert from England.
- V. The creation of a cadre in the subordinate Veterinary service of a selection grade with a pay of Rs. 160/- to those who were drawing pay according to the old scale and with a pay of Rs. 150/- to those drawing pay according to the new scale and promotion of 10 p. c. of the staff to that grade.
- VI. Appointment of a trained compounder in each Veterinary dispensary as far as possible to assist the Assistant Veterinary Surgeon to conduct his dispensary efficiently.
- VII. Establishment of a publicity bureau consisting of Khan Sahib N. D. Dhakmarwala and Mr. D. S. Laud for disseminating information regarding the value of veterinary profession and the work done by the Veterinary Department in the Province to the public from time to time.

- VIII. Appointment of a Sub-Committee consisting of Khan Saheb N.D. Dhakmarvala, Messrs. D.S. Laud, R.N. Naik, C. N. Desai and K. Kandade to examine and report the scheme of Life Insurance etc. by the Association as suggested by Mr. R. R. Joshi.
- IX. Appointment of Examiners at the College for all professional examinations from the whole of India, besides the members of the College Staff as internal examiners who should also be paid fees for this work and only one subject to be allotted to each examiner in each examination.
- X. Addition of the word 'medicine' after the word 'surgery' in the Diploma of the College.
- XI. Recording the report of the Sub-Committee in connection with the scheme of Mr. R. R. Joshi that the scheme being impracticable could not be undertaken.
- XII. Appointment of 8 Veterinary Officers in the grade of Veterinary Inspectors for doing propaganda work in connection with the rural uplift.
- XIII. Inclusion of qualified Veterinary Surgeons under the Prohibition rules enabling them to prescribe spirituous medicinal preparations.
- XIV. Requesting all Veterinary graduates to become subscribers of the *Indian Veterinary Journal* which has now been converted into a bi-monthly publication and to contribute articles to the same.
- XV. Passing of Veterinary Practitioners Act on the same lines as that of the registration of Medical Practitioners, with a view to organise veterinary professions and remove the existing handicaps from which the profession was suffering.

In the case of all these resolution forwarded to Government only formal acknowledgements were received stating that they will receive attention. But I am glad to state to that

Government have been pleased to extend the privilege of prescribing and dispensing spirituous medicinal preparations to qualified Veterinary Surgeons under the Prohibition Rules *i. e.* Government had no objection to qualified Veterinary Surgeons possessing and using in their practice spirituous medicinal preparations and rum, brandy etc. The Commissioner of Excise was accordingly authorised to approve them for the purpose on the recommendation of the Director of Veterinary Services. Approval will however be subject to the condition that the use of the spirituous medicinal preparations and rum, brandy etc. be restricted to Veterinary cases only.

During the year our profession had to record the loss of three of its members *viz.* Khan Saheb N. K. Vacha, Deputy Superintendent, Civil Veterinary Department, Baluchistan, Khan Saheb A. I. Shaik, Retired Professor, Bombay, Veterinary College and Khan Saheb D. F. Dubash, Retired Dy. Suptt., Bombay City and Harbour Veterinary Department. These officers rendered great service to our profession and we tender our heart-felt condolences to the members of the bereaved family.

Our membership now is 140 as against 144 of last year. As regards the financial condition of the Association it may be stated that the balance is Rs. 1500/- as against Rs. 1525/- of last year, the income being Rs. 274-5-0 and expenditure Rs. 298-9-9.

In my presidential address of the last two years, I urged the necessity and importance of a pure milk supply in towns and villages. I do so again and would like to mention a few points about our milk-starved city of Bombay. Few people realize that Bombay, despite its wealth is one of the milk-starved cities of India. Its population is nearly 12 lakhs but the daily supply of milk per head comes to only 3 ounces which is not enough for proper nourishment. But the efforts of H. E. the Viceroy have aroused great interest in this problem in India especially in Bombay and a scheme is contemplated which when completed may solve milk famine of this City.

But the problem has many difficulties. Most of the stables are situated in the heart of the city amidst residential buildings or in unhygienic surroundings as gutters and the owners are not willing to shift them to the suburbs. We know that most of the milkmen in Bombay called 'Bhayas' have a monopoly both of looking after the production and distribution of milk and have a scant regard for personal hygiene or cleanliness and therefore the danger of contamination from such unhygienic distribution especially during an epidemic, is always present. Another feature is that most of the milch cattle are sent to slaughter houses after their period of lactation; because, the owners consider the cost of keeping them till the next lactation to be not economic. Thus there is a criminal waste of wealth. Besides this, the cost of milk is very high. Therefore to stimulate public enterprise in the problem, the Bombay Municipality offered a subsidy of one pice per seer of milk for a daily minimum of 10,000 seers of milk imported by any private concern from outside Bombay, the retail price being cheapened to half the current rate. But the scheme failed in spite of refrigerating and other facilities offered at both ends by the Municipality because the Railway companies refused to co-operate on the plea that the freight of 10,000 seers per day was not remunerative to them. However, interest in this problem has been recently revived by a scheme initiated by some well-to-do co-operators whereby it is proposed to construct, on a co-operative basis, stables in a distant suburb of Bombay where they would be let to private owners of milch cattle on hire, finance provided to them to purchase or maintain cattle, provision made for maintaining dry cattle till next lactation and facilities afforded for carrying on the production and sale of milk on a co-operative basis conforming to sanitary conditions. The scheme is on its way to success and a fillip has been given to it by two recent decisions *viz.* decisions of the Bombay Municipality to supply free milk to under nourished children in municipal schools and the introduction of the Prohibition by the Bombay Government. Thus milk business ought to receive the attention of the authorities. With the enforcement of prohibition in the

city some solace ought to be found in this beneficial drink of milk and this is already seen in the several milk-bars opened in Bombay. In saying a good word about cows and buffaloes, an American Scientist said that he saw no reason why pastures if properly fed with all the minerals they need and enough iron, should not enable these animals to produce milk which would be a cure for pernicious anaemia in the human beings. Iodise the pastures and rejuvenate mankind; in other words an improved cow and buffalo which would be a sort of dispensing chemist. The milk habit in Britain has grown by leaps and bounds under the Milk Marketing Board and the National Milk Publicity Council. In a similar manner if some sort of Milk Board were formed in this Presidency it ought to give prosperity to a somewhat chaotic dairying industry by supplying pasteurised milk. In this connection I am glad to say that a draft set of rules have been prepared by the Imperial Council of Agricultural Research to prevent adulteration of dairy products in all Provinces in India. In view of the urgency and importance of this subject it is felt that efforts should be made to secure uniformity in the bye-laws of the provinces, with regard to the sale of adulterated milk and milk products, the inspection of dairy farms, cow-sheds, milk shops and premises where milking is done and the licensing of milk products. Besides it is a matter of satisfaction to note that the question of forming milk recording societies for the development of high milk yielding strains of important breeds of Indian Cattle, is under the consideration of the Imperial Council of Agricultural Research because it was emphasised by Dr. Wright. For this purpose herd books are to be established for systematic recording of milk products. Such milk records will stimulate interest in modern dairying and create a healthy spirit of rivalry in India and also help breeders and buyers both in India and outside in the establishment of a profitable export trade. For this purpose a pedigree registration of imported breeds of Cattle has been collected for the Gir, Red Seindhi, Haryana, Sahiwal, Kankrej and Ongole breeds of cattle and Murra buffaloes through special conveners appointed for the purpose who will inspect nearly 2,000

animals of each type. It may also be of interest to note that there is a common belief that the colour of the cow determines the quality of her milk. This was recently put to the test, and to some extent justified, in an investigation undertaken at the Imperial Dairy Institute at Bangalore. Animals of different colours were selected and the carotene and the vitamin 'A' contents of the milk produced were determined. The data collected so far show that the vitamin 'A' contents of the milk of pure-bred red cow is higher than that of the black cow which in turn is higher than that of the white cow. In cross-breeds the vitamin 'A' value found is low. The carotene content of the milk of the white cow is higher than that of the red or the black. Further investigations are continuing.

For cattle-breeding and dairying the Maharashtra Pratinidhik Mandal has drawn up a five year programme which includes the starting of cattle-breeding fund under the guidance of H. E. the Viceroy and the inauguration of a Royal Livestock Society to achieve an all round betterment of the cattle wealth of India. It is suggested that the number of Veterinary dispensaries should be increased and legislation on All-India basis be formulated to regulate the movement of cattle with a view to controlling the spread of disease. Fodder and grazing committees would be established in every Province and these would be asked to study the needs of individual villages. The number of breeding bulls have also to be increased.

Manjri Stud Farm:—Although this farm is in existence for the past nearly 20 years, it is only of late that this establishment, ideal for animal breeding, has come to the fore. Situated a few miles away from Poona, the farm consists of nearly sixty acres of land and is richly endowed with the necessary minerals for a breeding establishment. It was purchased a few months back by Sir Sultan Chinoy—the motor magnate—whose interest and enthusiasm in the cause of Indian-breds is sufficiently known. The stud is registered as a private limited company and will be known as the Manjri Stud Farm Ltd. Sir Sultan has a complete plan ready for placing the Stud on the most

modern lines and, with a plentiful water supply, the stud promises to play an important part in the future of Indian breeds. There are already some good stallions standing at the stud who are well known for their good quality. Also there are some Indian-bred mares who have left their mark on the race-course and negotiations are completed for the importation of some classic mares to do duty at the stud. With the addition of these brood mares the stud will in time produce Indian breds capable of vying with the best imported animals.

The Animal Nutrition:—Research Section of the Imperial Veterinary Research Institute which was lately opened at Izatnagar by H. E. the Viceroy, is a valuable addition to the welfare of our profession. It is organised in four divisions *viz.* physiological, bio-chemical, analytical and pathological, of which the physiological is the main research division of the section. The main functions of the nutrition section are the study of nutrition in relation to the maintenance of health and normal growth of productive capacity of animals in India. The details include analysis of important food stuffs of India, digestibility and utilisation experiments on food stuffs of all India importance, investigation into diet in relation to growth, milk production, wool production, hides and skin and breeding problems, mineral and vitamin requirements etc.

Poultry Research:—This work is also organised at Izatnagar in two divisions, one dealing with scientific subjects and the other with industrial processes. On the industrial side it is desired to investigate such matters as the grading of eggs for the Indian and foreign markets, the preservation of eggs by cold storage, the preparation of table poultry, the best methods of packing and distribution of eggs and poultry and the possibility of introducing such articles as egg powder and egg pulp in the Indian market. For this purpose a large number of unfertile eggs are required daily and it will therefore be necessary to run a large poultry farm with about 1000 birds. It is said that great loss occurs every year through wrong methods of collection, transport and marketing of eggs and yet India contains

10 per cent of the world's poultry. A large income could be earned by the village producers by proper management of the egg trade in India. As a first step, village collectors should be properly organised so that every village is visited daily and the eggs collected at suitable centres, fresh and ready for packing and immediate dispatch and experimental grading and marketing stations started at different places. It is said that circumstances seem to be favourable for producing liquid and frozen eggs. The use of egg yolk and albumen in various forms is also expanding rapidly. Thus by experiment the productive capacity of poultry can be increased by proper selection and feeding.

Indian Drugs for Cattle:—The Imperial Council of Agricultural Research has sanctioned 3 schemes for research in Indian drugs to be used in the treatment of cattle. The scheme will cover investigations into the cultivation of medicinal plants, the efficacy of indigenous drugs and the indigenous treatment of cattle. The researches under the first scheme cover the survey of medicinal plants which can be grown in India, chemical analysis of their pharmacological and therapeutic action and an investigation of food poisons particularly in cereals. The second scheme will be a study of poisonous plants and their doses required in veterinary practice. The object is to examine how far indigenous drugs can replace the imported ones. The third scheme is for collection of literature about cattle treatment by indigenous drugs—the information to be collected from manuscripts and other sources.

Another Veterinary College for Bombay Presidency:—The Government of Bombay have accepted the offer of two trusts, one Gujarati and one Marathi, to finance a scheme for an Agricultural and Veterinary College to the extent of Rs. 15 lacs. Acceptance of the offer involves Government in an annual grant towards the running cost of Rs. 50,000/-. The new College will probably be situated in the Kaira District and will be controlled by an unofficial governing body on which, however, Government will have a majority of nominees. It will have accom-

modation for 50 students who will be drawn from all over the Province and from all communities.

Before concluding, I wish to convey the thanks of the Association to the Members of the Managing Committee and especially to the Secretaries Messrs. P. G. Date and T. R. Kaladkar and the Treasurer Mr. V. N. Kulkarni.

With these few remarks, I now propose that the Annual Report be passed.

Correspondence

To

THE EDITOR,
"The Indian Veterinary Journal,"
MADRAS.

Dear Sir,

I have gone through the full pages of the article, on page 130 of September issue on the problem of private practice in India with special references to rural places, written by Mr. M. V. Pillay, G.B.V.C. and venture to offer some remarks according to my notions. I heartily congratulate Mr. Pillay for having visualised whole situation of the Veterinary profession and suggesting a few thoughts with sincerity and good wishes. Whatever picture of the present condition he has drawn, is doubtless true and appreciable to some extent. He has boldly advocated the idea "go back to villages" for Veterinary practitioners and admonished good many citizens for not paying proper attention to such beneficent work.

The idea, Mr. Pillay has suggested is not new, as it was already discussed unofficially among Veterinary Graduates at the time of the Veterinary Conference held in Bombay some years back, but found to be impracticable owing to the backwardness and lack of support from the ryots. It is no use comparing this country with other nations, which have ample resources to spare for Veterinary profession. In this country the progress of Veterinary profession is greatly hindered by the activities of other bodies.

It is a nice and lofty idea to write and suggest, asking Veterinary surgeons to go back to villages on the analogy of human doctors in rural medical scheme and start a dispensary and propaganda work. But one should consider how far it is practicable in such miserable days when all villages are stricken with poverty and illiteracy. To understand and grasp the full situation of the inner things in the villages one should visit and see personally the exact conditions on the spot and then form opinions.

In my opinion, before accepting the nice idea and sincere suggestion of Mr. Pillay for opening the dispensary in the villages there should be lot of

propaganda work in villages in order to make the people understand the real benefits derived from the Veterinary services. Lately, the Service Association as well as Veterinary Graduates' Association, Bombay, have suggested a scheme for propaganda work in the mofussil to the Government and let us wait and see the result of it.

It is no use blaming the Veterinary Institutes and Investigation Departments when proper support and good response are wanting. It is not imaginary but considered to be a solid fact that the services of Veterinary surgeons compared with human doctors do not run smooth but always meet with great obstacles, due to want of co-operation and lack of thorough understanding of the public.

It is most note-worthy and undisputed fact that the condition of the animal in health and wealth, is very poor comparing them with those of other countries; hence encouragement to do anything in the interest of livestock goes unheeded.

The conception of Mr. Pillay about private practice in cities is not correct. In Bombay, I know there are about a dozen private practitioners out of which a number are quacks, who only make both ends meet by other means than Veterinary. Equine and Bovine practice is dying, while Canine is thriving moderately. When one is unable to find sufficient work in cities due to mechanisation, it is impossible to get enough remuneration for a Veterinary Surgeon in villages. Generally responsibility of a person increases when he becomes old, and the Veterinary Doctor will be obliged to find out other means to support and provide his family for future and thus his interest and attention will be diverted from duties to selfishness.

In my opinion time is not ripe to risk to opening such dispensaries unless a full propaganda work is spread throughout the rural area and try to minimise the illiteracy of the ryots.

I thank you sir, and Mr. Pillay for putting forth this promising proposition of work in rural area and thus set a ball rolling for discussions. Of course, we may derive something from discussions and suggestions received from all parts of India.

Bombay }
3-12-39 }

Yours faithfully,
D. B. KHOLE,
Hospital Surgeon, B.V.C. Parel.

To

THE EDITOR,
The Indian Veterinary Journal.

Dear Sir,

I beg to enclose herein true copies of the correspondence — passed between the President of the the Bombay Veterinary Medical Association and the Government of Bombay.

I shall feel obliged if you will kindly publish the same in the next issue of our Journal.

Thanking you in anticipation,

Bombay }
2-11-1939. }

I remain,
Yours faithfully,
P. G. DATE,
Jt. Hon. Secretary,
Bombay Veterinary Medical Association.

From

KHAN SAHEB N. D. DHAKMARWALA, G.B.V.C.,
President, B. V. M. A.

To

THE SECRETARY TO GOVERNMENT,
Revenue Department,
BOMBAY.

Sir,

Subject:—Inclusion of Veterinary Surgeons under the Prohibition Rules to enable them to prescribe spirituous medicinal preparations.

I have the honour to state that at a meeting of the Managing Committee of the B.V.M.A. held on the 27th August, a letter received from the Secretary to the Committee of Manufacturers and Importers of Pharmaceutical Preparations was discussed in connection with the new Prohibition Rules omitting the names of Veterinary Surgeons from prescribing spirituous medicinal preparations and it was resolved to send a representation in this matter to Government.

Under the circumstances, I am directed by my Committee to approach Government and request them to include the names of qualified Veterinary Surgeons in the list of Medical Practitioners eligible to prescribe spirituous medicinal preparations classified under the Sections applicable to the Act.

I have the honour to be,

Sir,

Your most obedient servant,

Bombay }
19-9-39 }

(Sd.). N. D. DHAKMARWALA,
President.

(TRUE COPY)

From

THE SECRETARY TO THE GOVERNMENT OF BOMBAY,
Revenue Department.

To

THE PRESIDENT,
The Bombay Veterinary Medical Association.

Subject:—*Spirituos medicinal preparations, etc.* Request for extension of privileges of prescribing and dispensing—to Veterinary Surgeons.

Sir,

With reference to your letter dated 19th September 1939 on the subject mentioned above I am directed to inform you that Government has no objection to qualified Veterinary Surgeons possessing and using in their practice spirituous medicinal preparations and rum, brandy, etc. The Commissioner of Excise has accordingly been authorised to approve them for the purpose on the recommendation of the Director of Veterinary Services. Approval will, however, be subject to the condition that the use of the spirituous medicinal preparations and rum, brandy, etc., is restricted to Veterinary cases only.

I have the honour to be,

Sir,

Your most obedient servant,

(Sd).

BOMBAY, }
23-10-1939 }

For Secretary to the Government of Bombay,
Revenue Department.

From

KHAN SAHEB, N. D. DHAKMARWALA, G.B.V.C.,
President, B. V. M. A.

To

THE SECRETARY TO GOVERNMENT,
Revenue Department,
BOMBAY.

Sir,

Subject:—Registration of *Veterinary Medical Practitioners.*

I have the honour to forward herewith the following resolution passed by the Managing Committee of the Bombay Veterinary Medical Association at their meeting held on 27-8-'39 for favour of moving the Government to take necessary steps in the matter :—

"Resolved that the Government be requested to pass Veterinary Medical Practitioners' Act on the same lines as that of the Registration of Medical Practitioners with a view to organising Veterinary Profession and removing the existing handicaps from which the profession is suffering."

The necessity for this Act has been keenly felt by the Profession because at present the Profession does not enjoy any status comparable to

the sister Professions and in our opinion, without the Act, our Profession cannot make any headway to do useful service for the welfare of the livestock of the country. If this act is passed it will bring our Profession and the country on a par with the status of the Profession in other civilised countries.

I have the honour to be,

Sir,

Your most obedient servant,

(Sd.) N. D. DHAKMARWALA,
President.

BOMBAY, }
19-9-'39 }

From

THE UNDER SECRETARY TO THE GOVERNMENT OF BOMBAY,
Revenue Department.

To

THE PRESIDENT,
The Bombay Veterinary Medical Association.

Subject:—*Veterinary Medical Practitioners*—Registration of

Sir,

I am directed to acknowledge receipt of your letter, dated 19th September 1939, on the above subject, and to state that it is receiving attention.

I have the honour to be,

Sir,

Your most obedient servant,

(Sd.)

BOMBAY, }
3-10-'39 }

For Under Secretary to the Government of
Bombay, *Revenue Department.*

To

THE EDITOR,
Indian Veterinary Journal.

Sir,

I shall be highly obliged if you will give publicity to the following resolution in your esteemed *Journal* :—

Resolved that a Memorial Fund be started in memory of late Khan Sahib Ahmed Ismail Shaikh, retired 2nd Professor, Bombay Veterinary College".

The above resolution was passed unanimously at a condolance meeting held by Veterinary friends, Staff and Students of the Bombay Veterinary College. Rs. 250/- were contributed on the spot.

Contributions will be gratefully accepted by the undersigned.

Thanking you in anticipation.

(Sd.) P. G. DATE,

Joint Honorary Secretary, B.V.M.A.,

BOMBAY, }
28-10-'39 }

BOMBAY.

Extract

THE POST-NATAL DEVELOPMENT OF THE KANGAROO

BY

GUY DOLLMAN, B.A., F.L.S., F.R.S.A.

(Paper presented to the Linnean Society, London, on
November 10th, 1938.)

The Natural History Museum has recently received from Mrs. M. V. Walker, as a donation, a set of wonderful photographs depicting the early life history of the Kangaroo (*Macropus*) taken by her husband, the late Dr. W. G. Walker. Dr. Walker, it will be remembered, was killed in an aeroplane accident in this country last August. He was keenly interested in flying as a help to medical science in Australia and was himself a pilot of some experience.

This series of photographs was taken some years ago and is undoubtedly one of the finest records of the post-natal development of an animal ever obtained, showing as it does nearly all the phases from the newly-born young to mature specimens. It is obvious, as I think you will agree after seeing the photographs, that such results could only have been obtained from the examination of many hundreds of kangaroos and young kangaroos and these photographs will remain for all time a record of the painstaking researches carried out by Dr. Walker.

When first born the young kangaroo is very minute and immature, being little over an inch in length and looking more like a fragment of raw flesh than a young animal. This embryonic appearance of the newly-born young is commonly met with in marsupials, since instead of being born in a more or less advanced state as is the case in the Placentals or Eutheria, they are brought forth at a very early stage; in a great number of species there is no placental connection between the developing embryo and the maternal uterine tissues. In those marsupials where no placental link is developed, the necessary nutriment for the growth of the developing embryo is largely derived from the embryonic envelopes which surround the vesicle, the latter never being attached to the uterine walls. This arrangement appears to be quite sufficient for the very short period of foetal life which these marsupials have to undergo.

There is one curious point about some of the smaller and more prolific marsupials which is not found in the kangaroos and that is the over-production of young. Sometimes nearly twice as many young are produced as there are teats in the mother's pouch to accommodate them, resulting, of course, in a high rate of mortality among the newly-born foetuses. There is a scramble for the teats and the unlucky ones are doomed to extinction.



Courtesy of Veterinary Excerpts



Courtesy of Veterinary Excerpt



Courtesy of Veterinary Excerpts



Courtesy of Veterinary Excerpts

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This has been noticed in the American Opossum where as many as 23 foetuses have been recorded for 13 nipples. It is rare, however, to find all 13 teats occupied though whether this is due to the size of the litter or early post-natal mortality is not yet clear. Still more marked is the number of eggs and embryos which perish *in utero*, though a number of the eggs will probably be found to be unfertilised. The term "egg" for the early stages of development of the young marsupial, is not a misnomer since the fertilised ovum surrounds itself with a "shell-like" membrane which is rather similar to that found in the "egg-laying" Prototheria and persists in these types long after birth or the laying of the eggs. The marsupials are the highest of the Mammalia in which such a structure occurs.

Until the year 1913 it was very generally believed that the young of the kangaroo and other marsupials were placed in the pouch by the mother as soon as they were born. For instance we read in "Mammals Living and Extinct" that classic work by Flower and Lydekker, the following passage relative to this question: "In this pouch the young are placed as soon as they are born; there their growth and development proceeds and to it they resort temporarily for the purpose of shelter, concealment or transport". In the "Western Mail" of Perth, Western Australia, January 3rd, 1913, there was published an article by Mr. A. Goerling on some observations made in the year 1906 on the birth of a young red kangaroo (*Macropus rufus*). In this article Mr. Goerling tells how he observed the newly-born kangaroo make its way up to the entrance of its mother's pouch and pass into the pouch and travel onwards towards the nipples. He states that the new-born kangaroo had to look after its own safety and reach the pouch without any assistance on the mother's part; during the whole time occupied by this journey, about thirty minutes, the parent paid no attention whatever to her offspring, leaving it entirely to its own exertions and offering no assistance of any kind.

The young of these marsupials have the forelegs and head much more massively developed than the hind-quarters, the hinder parts being weak and rather grub-like. The young one progresses through the hair of the pouch by means of alternate movements of its arms, the action resembling that of the over-arm stroke in swimming, the head moving from side to side during the animal's progress. Arrived at the nipples it quickly fastens itself on to one, the nipple filling the cavity of the young one's mouth in such a manner that it can rarely be detached without rupture. The suggestion that has been put forward that the mother kangaroo actually pumps milk into her young by muscular exertion does not appear to be substantiated by fact. The young of kangaroos and opossums have been observed to suck at the teats in a perfectly normal manner.

In the case of the kangaroo the young remains thus attached for about 4 months; in this time it has grown to look like a kangaroo and assumed a coat of hair. After this it begins to take notice of life outside the pouch and will occasionally take a bite at such fodder as it can reach by stretching out its head. At a later date it emerges and commences its life as a separate individual but is for a long time dependent upon its mother's pouch for cover when danger threatens.

A very similar state of affairs has been noticed in the development and birth of the American Opossum (*Didelphys virginiana*) and has been dealt

with at some length by Carl Hartman in the Anatomical Record, October, 1920, and in the Smithsonian Report for 1921. In this latter publication the author states that young reach the pouch without the aid of the mother and that the embryonic life *in utero* of the foetuses is only eleven days but nevertheless at birth they have sufficient neuro-muscular co-ordination and sensory response to clamber up from the vaginal orifice into the pouch, find the teat in a maze of hair, and attach themselves for two months' sojourn in this haven of food and shelter. Among Dr. Walker's photographs is one showing a series of 4 young opossums from birth up to about six weeks old; these are, of course, the young of the Australian opossum (*Trichosurus vulpecula*) but they very closely resemble the kangaroo series taken by Dr. Walker and the photographs given by Mr. Carl Hartman on "The Breeding Habits, Development and Birth of the Opossum" (Smithsonian Report, 1921).

In other groups of marsupials the pouch opens backwards, as is seen in the Native Cats (*Dasyurus*), Bandicoots (*Perameles*, *Isodon*, etc.) and the Pouched Mice (*Sminthopsis*); in such cases the journey of the young to the pouch must be shorter and less complicated one than in the kangaroos and opossums where the pouch opens forward and the young have first to travel over the outside wall of the pouch. Although no pouch is found in the Platypus, among the Prototheria, a temporary marsupial structure is developed during the breeding season in the Echidnas, in which the egg is deposited and there hatched. In this pouch the young one is carried about, after which it is placed in some safe retreat by the mother and after a period is doubtless spiny enough to look after itself.

The most astounding thing about the young of the marsupials is their small size which in the case of an animal such as a kangaroo is the most striking feature in the whole history of the animal development; the small grub-like embryonic creature which laboriously finds its way to its mother's pouch bears little or no resemblance to the powerful and massive animal into which it grows.

The first of Dr. Walker's photographs shows the pouch of a female kangaroo with a newly-born young one hanging on to one of the teats. Its journey up to the pouch has only just been completed and it is seen with its mouth firmly attached to the nipple. The second picture gives a closer view of the same individual. In the third photograph we have a series of eight young kangaroos ranging from the newly-born one to one about six weeks old. The newly-born kangaroo is scarcely more than an inch in length. The first six young ones of this series all show the disproportionately large head and fore limbs and weak hind-quarters. The last two of the series show the hind-limbs, feet and tail growing more quickly than the fore part of the body. The weak development of the hind quarters in these young marsupials is a feature which appears to be maintained throughout the group and is well seen in this photograph, the fourth of the series, of a three-day old kangaroo which shows the high state of development of the fore-paws. In the fifth picture we see the animal at about the seventh day with the nipple still in its mouth and the hind-paws and tail beginning to develop. At ten days old, seen in the sixth photograph, the developing pouch is fairly obvious; the head and fore-paws are still disproportionately large. In photograph No. 7 we have a fourteen day old baby kangaroo which measures an inch and a half long, the hind-feet and tail have here grown to balance the fore part of the body. "In the next photograph (unnumbered) we have a series of four baby opossums

(*Trichosurus vulpecula*) ranging from birth up to probably about six weeks. Here again we see the weakly developed hind-quarters in the initial stages and it is not until the body has grown very considerably that the hind limbs and tail begin to show their real proportions. Photograph No. 8 shows a young kangaroo feeding while still sitting in its mother's pouch. No. 9 shows a half-grown young one, or "Joey" as it is called locally, being carried in the pouch with its hind feet sticking out just above its head. No. 10 illustrates the method of emergence of the young from the pouch. No. 11 is taken a few minutes later and shows the same mother and young, the latter now on terra firma and leading an independent existence. In picture 12 we see the "joey" returning to the pouch, going in head first, which is the normal method of entrance. No. 13 shows a young kangaroo out for the first time for exercise and it will be noted what a leggy animal it appears to be at this stage. The same condition is to be seen in the next picture, No. 14, where the youngster is learning to balance itself. Numbers 15 and 16 show half-grown and fully-grown specimens.

These photographs undoubtedly constitute a most valuable record of this post-natal development of the kangaroo and the Natural History Museum is greatly indebted to Mrs. Walker for her gift. *Veterinary Excerpts*, Vol 3 No. 3.

Reviews

Annual Report of the Veterinary Department Barwani State, C. I. for 1935-36.

There was only one Veterinary hospital and one touring Dispensary as in the previous year.

The Staff consisted of a Veterinary Assistant Surgeon, a compounder and a peon. The State Surgeon was the controlling Authority. In the absence of Permanent V. A. S. on leave or otherwise the Sub-Assistant Surgeon was in charge of the hospital as Officiating V. A. S.

3023 cases were treated including 44 Inpatients in the hospital and as well as on tour as against 3732 in the previous year. For want of facilities to keep Inpatients in the small shed, more patients could not be admitted. 26 Castrations and 102 Surgical Operations were done as against 10 and 33 respectively in the previous year.

Reports received from the interior of the State were 35 (Rinderpest 12, Foot and Mouth 20, Anthrax 1, Distemper 1 and Hemorrhagic Septicaemia 1).

Lectures by the V. A. S. on tour were demonstrated to the Rayat on Rinderpest and Foot and Mouth disease.

The Veterinary Section continued to be a branch of the State Medical Department.

The Staff and Building require to be strengthened and extended to attend to the developments of the Live-stock Industry in its several aspects in the State.

K. C. A.

**Annual Report of the Veterinary Department Barwani State C. I.
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11773 cases were treated including 57 In-patients in the hospital and as well as on tour as against 3023 in the previous year. For want of facilities to keep In-patients in the small shed, more patients could not be admitted 505 Castrations and 172 Surgical Operations were performed as against 26 and 102 respectively in the previous year.

Reports received from the interior of the State were 74 (Rinderpest 16, Foot and Mouth 50, Anthrax 4 and New Diseases 4).

4824 animals were inoculated against Rinderpest and Anthrax during the year.

Lectures by the V. A. S. on tour were demonstrated to the Rayat on Rinderpest, and Foot and Mouth Disease.

The Veterinary Section continued to be a branch of the State Medical Department.

The Staff and Building require to be strengthened and extended to attend to the developments of the Live-stock Industry in its several aspects in the State.

K. C. A.

**Annual Report of the Civil Veterinary Department, Bihar,
for 1936-37.**

What was "Bihar and Orissa" in the previous reports has been changed in this into Bihar, as Orissa was made into a separate and independent province from the 1st April 1936. This report under review therefore relates to Bihar only. The area of the new province is 69377 sq. miles with a livestock (cattle) population of 23,237,467 according to census of 1930.

The departmental staff consisted of one Director, 4 Provincial Service Officers including a Disease Investigation Officer, 11 Veterinary Inspectors, 1 Laboratory Assistant Surgeon, 5 Staff Veterinary Assistant Surgeons, 10 Reserve Veterinary Assistant Surgeons, 26 Stationary and 87 Touring Veterinary Assistant Surgeons, at the beginning of the year. With 2 deaths, 3 retirements and 11 additions of the Veterinary Assistant Surgeons, there were 27 Stationary and 94 Touring Veterinary Assistant Surgeons at the end of the year. In Bihar Veterinary College there were 4 Professors, 2 Lecturers, 3 Demonstrators and Assistant Lecturers and 3 Veterinary Assistant Surgeons working at the Hospital and the Laboratory.

The number of hospitals was reduced from 33 to 29, 4 having gone to the new province.

In these 29 hospitals, 97225 (90413) in and out patients were treated, 20875 (21247) castrations were done and 12400 (147942) patients not brought

to the hospital were supplied with medicine. The increase in the in and out patients treated is really satisfactory.

The touring staff visited 46585 (46456) villages, treated 332072 (329785) cases for contagious and non-contagious diseases and castrated 90563 animals. Greater attention paid by the staff with the goat virus work was responsible for the decrease in the number of villages visited. Rural or Field Veterinary Dispensaries increased from 122 to 124 in which 12278 (126810) fresh patients including 38044 castrations were treated. There was an awakening of the local bodies to the need for the increased touring staff resulting in additions made by some of them.

The year was bad for cattle, all the principal diseases having prevailed. Rinderpest and Haemorrhagic Septicaemia were more virulent than others. There were 3289 (3264) outbreaks with 40675 (57070) attacks and 18632 (7923) deaths recorded.

90.7 (85.5) per cent. of the outbreaks were attended by the staff. 61 chowkidars were rewarded for good work while 53 were punished for negligence in this connection.

There were 6 outbreaks of Equine Surra in which 3 died and one was destroyed. The report is silent as to what happened to the remaining 3 of the affected ones. Anthrax, Strangles, Tetanus, have each claimed a few deaths in equines. Mortality is also recorded under cases not classified and 369 deaths under other causes such as old age, debility, etc. 196 equines were protected with Anthrax serum and Anthrax Spore Vaccine from Burma.

1532 (1127) outbreaks of Rinderpest have been recorded with 16849 (12092) attacks and 7918 (5639) deaths among bovines. Against this 77261 (73243) Serum-alone inoculations and 348087 (260965) goat tissue virus vaccinations were carried out. The latter method was adopted both in free and infected areas; the increase in figures in inoculations and vaccinations is very satisfactory considering the limited staff.

There were 771 (384) outbreaks of Haemorrhagic Septicaemia with 4476 (2179) attacks and 3372 (1612) deaths. 46715 (27784) animals were protected against this in 280 (124) outbreaks by Serum-alone method and 21207 animals with Haemorrhagic Septicaemia vaccine.

38 (24) outbreaks with 247 (41) attacks and 176 (29) deaths have been recorded. Protection against this was given to 5784 (24.5) animals in 21 (9) outbreaks by all the four methods of serum, vaccine, aggression and Sero-vaccine.

There were 41 (42) outbreaks of Anthrax with 301 (348) attacks and 228 (79) deaths, 5165 (5047) bovines were protected with Anti-anthrax serum in 29 (22) outbreaks.

Surra claimed 86 deaths among bovines including 14 buffaloes. 786 deaths of cattle and buffaloes have been recorded under other diseases under Parasitic Diarrhoea, Liver Fluke, Ephimeral Fever and etc.

3678 deaths of cattle and 1223 of buffaloes from varied other causes have been recorded. 245 deaths among dogs included 44 cases of rabies. Deaths among fowls from Fowl pox cholera and ranikhet diseases have been recorded.

There were 3 Serum depots including the newly opened one at Ranchi for storing up sera and vaccine received generally from Muktesar Institute.

The following outline of work done by the Veterinary Disease Investigation Officer is mentioned :—

I. *Rinderpest* :—(a) goat tissue virus inoculation with particular reference to buffaloes. Further trials continue. (b) Duration of immunity conferred by goat tissue virus and goat blood virus.

II. Bovine Surra treatment with Bayer 205 on the lines suggested by Muktesar with successful results.

III. *John's disease* :—The result of mineral feeding was encouraging.

IV. Systematic investigation among equines was made into the incidence of sterility, abortion, metritis, and retained placenta. Actinomycosis, warble fly infestation, also engaged the attention of the Veterinary Investigation Officer. Encephalomyelitis and Anthrax in equines, contagious ecthyma and tick and intestinal parasitic infestation among goats, and dogs and fowl cholera in fowls are mentioned to have also claimed the attention of the Veterinary Investigation Officer.

1895 specimens were examined and 755 of them were positive for various diseases.

29 (36) new students joined the Patna College and at the end of the year there were 73 (64) students in all the three classes. Out of this 26 (22) were from Bihar and the rest being from outside. 12 out of 19 passed in the Diploma examination and the results in all the classes were satisfactory. A Post-graduate course for 3 months was reopened. A brief mention is made of the Research work done and its programme for the succeeding year. There were only 31 stud bulls (32) all of them being the property of the Local Boards. Difficulty was experienced in securing an adequate supply of approved bulls. The strength in the herd of the Patna Cattle Breeding and Dairy Farm attached to the Veterinary College for giving instruction to the students in practical Animal Husbandry and Dairy work was 652 (613) and the total milk yield was 401702 (431008) pounds, the number of cows in milk being 99 (112). 346487 (400582) pounds of milk were sold.

33 important Horse and Cattle Fairs and Shows were held and they were all attended by the staff. Propaganda work was done with lectures (with and without lantern slides) and distribution of leaflets.

Programme of work for the succeeding year has been given to be (1) Investigation of diseases, (2) Goat virus tissue inoculation with special reference to buffaloes, (3) castration of scrub bulls and (4) Propaganda.

The following papers were contributed :— (1) The improved method of combating Anthrax in cattle by vaccine instead of serum. (2) Doyle's diseases in fowls, its diagnosis and control, (3) The effect of Trypan Blue on Goat Blood Virus and (4) Experiments in Rinderpest immunisation.

The Departmental help and co-operation towards the Bihar S. P. C. A., was continued.

The total expenditure of the Department was Rs. 703740-9-1 and the income Rs. 180559-0-8. The percentage of expenditure by Government on this Department was only 64 of the total provincial revenues. One would expect a liberal expenditure on this important work of livestock improvement and protection.

The work turned out by the very limited staff of the department is quite satisfactory especially in the matter of protective inoculations.

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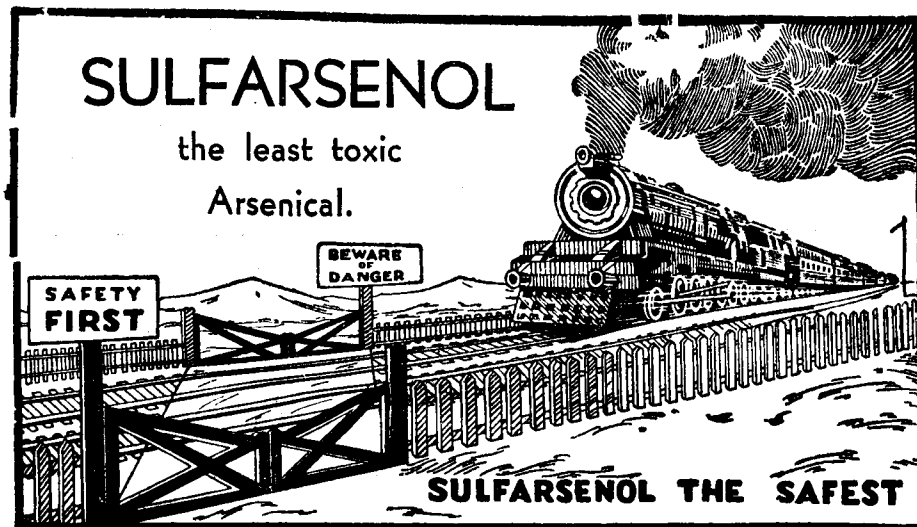
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