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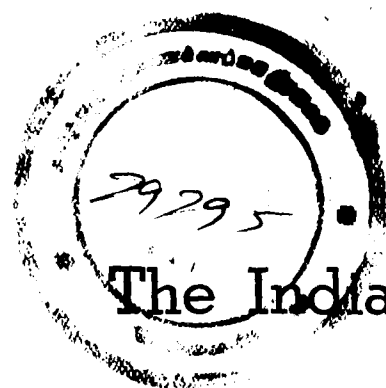
P. SRINIVASA RAO, G.M.V.C.

Veterinary Surgeon, Madras

Office: 26, WALLAJAH ROAD, MOUNT ROAD, MADRAS (S. INDIA).

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EDITOR:

P. SRINIVASA RAO, G.M.V.C.,

*Veterinary Surgeon, and Proprietor, Dr. Pangal's Veterinary Institute
26, Wallajah Road, Mount Road, Madras, S. India*

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THE Indian Veterinary Journal

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SULFARSENOL

FOR

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FOR

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Vol. IX No. 4, April 1933.

FOR

Pneumonia and Angina after Distemper in Dogs

See The Indian Veterinary Journal

Vol. X No. 1, July 1933.

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THE **Indian Veterinary Journal**

Vol. XVII

JULY 1940

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General Articles 484

TESTS FOR DETECTING POOR QUALITY MILK & GRADING

BY

J. D. SAMPATH KUMARAN, B.S.A., L.V.P. (Hons).

*Member of the National Institute for Research in Dairying,
University of Reading, England,
Manager, Palace Dairy Farm, Mysore.*

"It takes a cheerful Philosophy to find Virtue in the sulphurous odour of a bad egg: but if all bad water and bad milk was blessed by a like beneficent danger signal what a host of dead and dying human beings would have been saved."

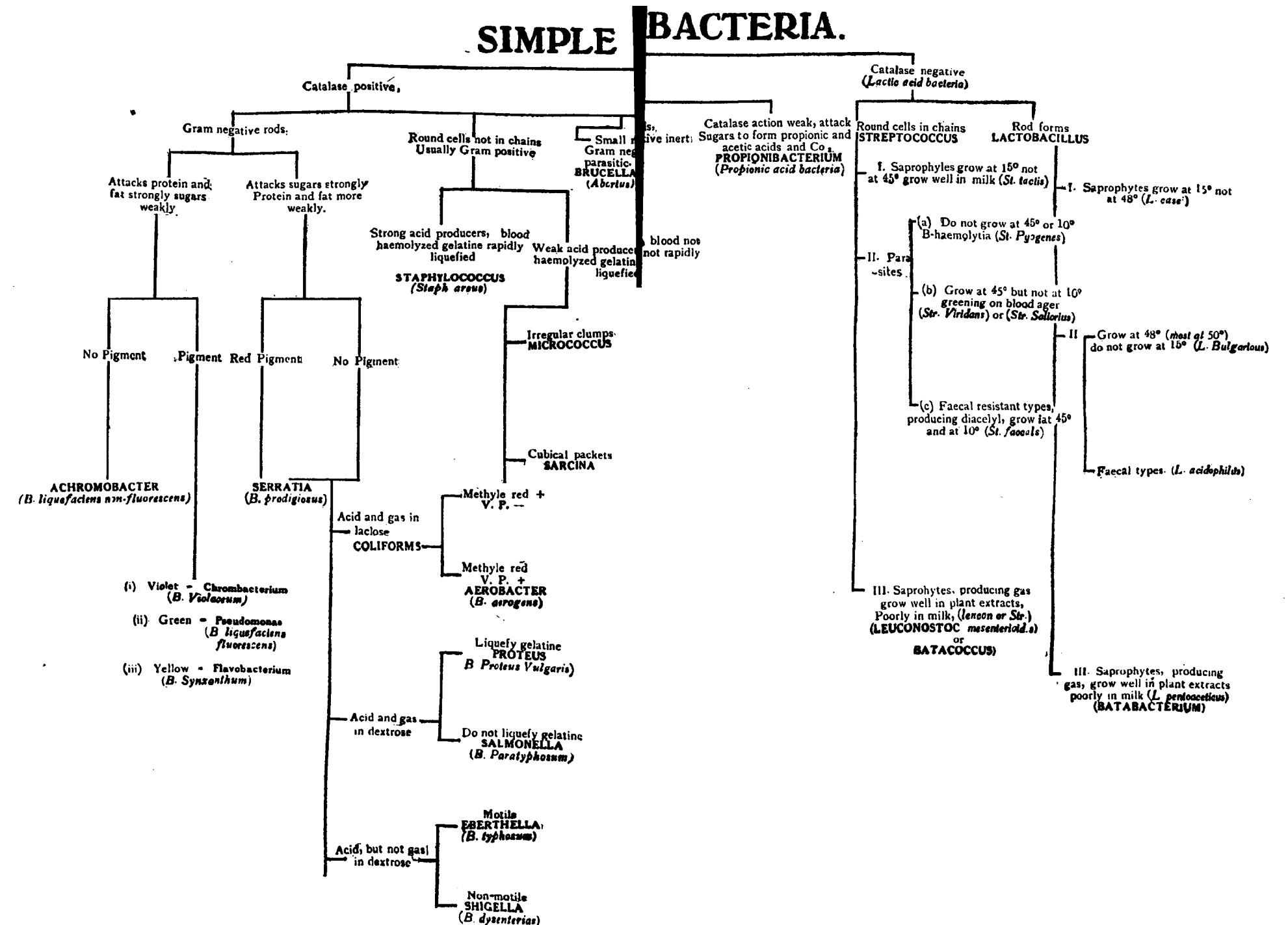
The problem of producing clean milk is demanding more and more attentions from the dairy farmer. A hygienic barn should be airy, well ventilated and free from any dampness. It is not generally realised that the cow gives off a considerable amount of water in the form of vapour through the pores of her skin and in her breath. Some authorities put this at 1-2/5th gallons per 24 hours. It is, therefore, of the utmost importance that this water vapour is got rid of, otherwise the cow breathes damp air, which is one of the causes of tubercular troubles. The size of the stall should be suitable to the number of animals and the cubic air-capacity of the building is of importance in conjunction with efficient ventilation. 800 cubic feet per cow is the usual minimum figure at which to aim.

It should be remembered that clean milk production requires dust-free air at milking time. Therefore throwing down of hay, cleaning out of the stalls, or the cleaning of cows stir up dust and odours, some of which may contaminate the milk. If stalls cannot be cleaned out at least one-half hour before milking it is better to delay this operation till after milking has taken place. However, manure should be scraped carefully and the bedding arranged without causing any more dust than possible. The cleanliness of the cows' bodies is one of the chief factors relating to the contamination of milk. If cows are allowed to become filthy through standing or lying in the gutter defective milk is likely to result. In addition to keeping cows clean to avoid contamination, the thorough grooming of the cows daily is necessary. It is a safe plan to wash the udder and flanks with a weak lotion of potassium permanganate which is a very cheap drug available in all stores.

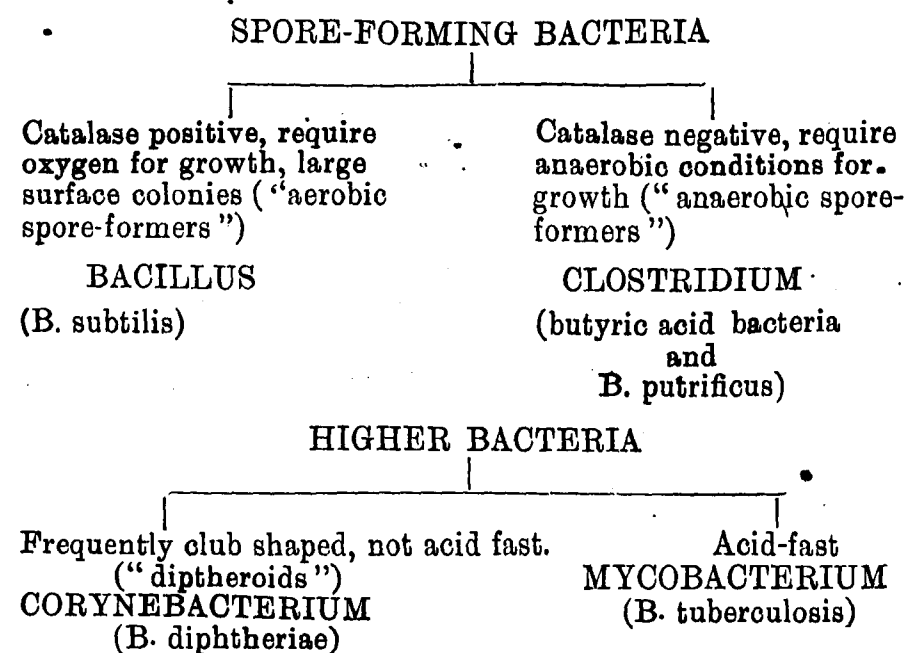
The observation of these points relating to sanitation of cows, together with the use of thoroughly clean and sterilised vessels, will naturally result in higher quality milk.

Unfortunately in our country such sanitary conditions are rather the exception than the rule. The great majority of milk dealers and producers are illiterate and unclean with poverty all round them. Apart from producing milk in an unhygienic way, the foul practice of adulteration with all kinds of water increases the contamination of milk.

Milk contains bacteria. These are derived from several sources of contamination, and under normal conditions non-pathogenic. Some of them do not bring about any perceptible changes in the milk, whilst others produce marked changes; and it is due to the latter that milk is regarded as an extremely perishable and unstable fluid. These organisms split up milk into certain products which may be injurious to health especially in case of children and invalid adults. While the common milk bacteria are in themselves harmless, and while their growth in milk, to a certain limited extent, is not attended with any appreciable injurious effects, their presence in large numbers may result in some harm.



Bacteria in milk are of numerous species. Dr. Davis ⁽¹⁾ has given the following simple classification which includes all the organisms of importance in dairying. He has differentiated them upon a broad basis and from the point of view of quite simple tests.



TESTS

Bacteriological tests require special apparatus and skilled labour. To estimate the number of bacteria in milk the "Plate count" is the method largely employed. B. W. Hammond⁽²⁾ contends that the plate count has the following disadvantages. (a) The presence of pathogenic organism is not detected, since they require special media for growth; (b) counts are not accurate, for clumps grow as one colony or individuals may develop into one colony, while certain individuals do not grow at all in the medium used; (c) specific information regarding species is not furnished; and (d) the time required before results are available is too long.

J. Broadhurst and C. Paley⁽³⁾ state that a single dip stain is employed by them for making direct microscopical counts of

milk, according to the method developed by Breed (Bakt. 11 Apt. 30: pp. 337-340, 1911) and modified by Lazarus (Quarterly Control of Market Milk, 1935) and Bryan et al (J. Milk Tech. 1. (5) 26-34, 1938. It combines fat extracting, fixing and staining. The stain contains ethyl alcohol, a very small quantity of concentrated sulphuric acid, tetachlorethane, methylene blue dye and an alcoholic solution of basic red fuchsin.

This stain has the advantage that the background permits easy differentiation between the bacteria and other cell and foreign bodies. Eyestrain is avoided because organisms are not hidden by darkly stained serum solids. The latter are coloured very faint pink, while the organisms and other cells are blue. No decolouring of a heavily stained smear is necessary.

The above method due to its simplicity of operation is becoming very popular in the United States of America, and it gives far more information than the plate count.

Various tests are employed to detect the presence of Tubercle bacilli in milk by microscopic examination but the process is slow and rather uncertain. Negative microscopic results, however, do not necessarily indicate the absence of tuberculous infection in the milk.

Chemical Tests

The best-known tests in this group are the Methylene blue and Resazurin tests. Both depend on the reduction of a dyestuff to a colourless form by the chemical activities of the bacteria in the milk.

Methylene Blue Test

(as laid down in Memo. 139 Foods H. M. Stationery Office.)

Apparatus required.

(1) One water bath held at 37-38 degrees centigrade by a thermostatic control and containing perforated plate to hold test tubes.

(2) Test-tubes 6× 5/8 in. etched at 10 ml.

(3) Rubber bungs to fit these test-tubes.

(4) Methylene blue tablets (British Drug House).

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(5) Two 500 ml. graduated cylinders.

(6) Two 1000 ml. conical flasks.

Preparation of Methylene blue solution:

Dissolve one tablet in 200 ml. of cold sterile glass distilled water in a litre flask. Add a further 600 ml. and store in a cool dark place. It would be always advisable to prepare this solution fresh once a week.

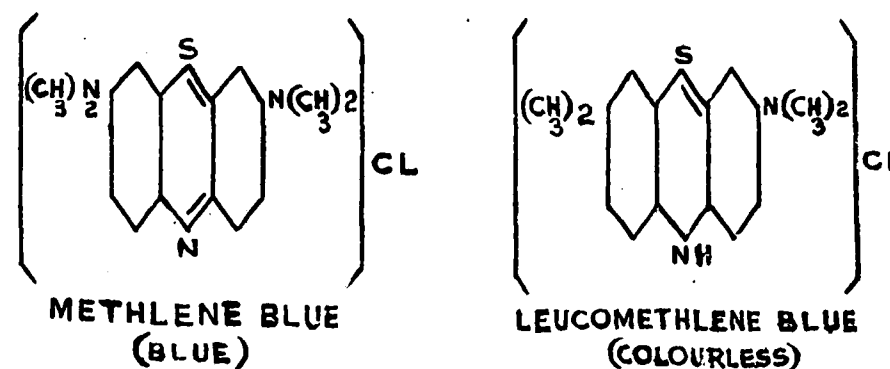
Treatment of Tubes and Bungs

Tubes and bungs should be thoroughly cleaned and the tubes placed upside down in a wire basket, the bungs in a metal container with a little water and both sterilized in the steam chest or autoclave. They should be left in the chest until used.

Technique

Transfer the milk to be tested with a sterile pipette to the test tube, filling up to the mark. Add 1 ml. of the methylene blue solution, insert the bung (holding it at the upper edges) and mix by inversion. Place (bung upwards) in one of the holes of the test tube rack in the water bath at 37 degrees centigrade. Examine every half-hour, inverting and reverting unless reduction has begun.

Reduction



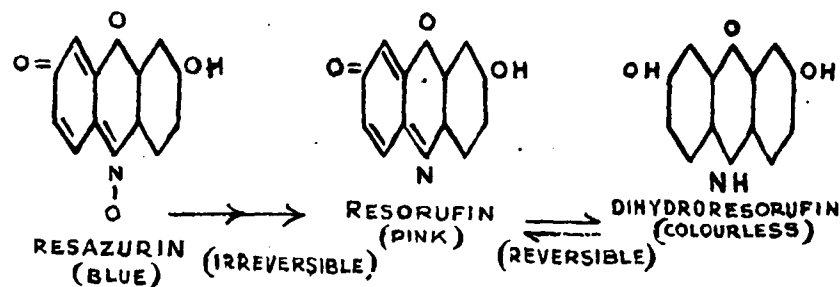
A fair correlation exists between the bacterial contents of milk and the methylene blue reduction time. Satisfactory milk will require at least three hours in summer and five hours in winter for reduction.

Grades	Grading		Bacterial Count per C.C.
	Summer	Winter	
Good	Over 3 hours	Over 5 hours	less than 500,000
Moderate	2-3 hours	3-5 hours	500,000 to 4,000,000
Poor	½-2 hours	1-3 hours	4,000,000 to 20,000,000
Bad	less than 30 mins.	less than 1 hour	20,000,000 and more.

Methylene blue reduction test for the assessment of the bacteriological quality of the milk has been recognized and used for more than thirty years. If only bacterial count is of significance, methylene blue should be used.

The Resazurin Test

Pesch and Summert⁴ in 1929, were the first to carry out systematic tests with this dye as a possible alternative to methylene blue. Ever since then various workers have experimented upon this dye. Resazurin is a dyestuff prepared by the action of nitric acid containing nitrous acid on resorcinol. The structural formula and its reduction product is as follows:



Davis⁵ describes the following method for testing. Preparation of Solution:—

Dissolve 0.1g. of Resazurin in 200ml. of glass-distilled water (0.05%). Keep this as a stock solution. (Make a 1 in 10 dilution as required (e.g., 5 ml. to 50 ml.) and add 1 ml. of this diluted solution to 10 ml. of milk. Keep the stock solution in a refrigerator.

Tests for Detecting Poor Quality Milk & Grading 7

Method

Fill a graduated test-tube (same as for methylene blue test) upto the mark with the sample, using aseptic precautions. Both the mouth of the sample bottle and that of the test-tube should be flamed. Then add 1ml. of the diluted (0.005%) resazurin solution to the 10ml. milk and insert the sterile bung. Invert and revert twice, and finally place the tubes in the bath at 37 degrees centigrade. Avoid direct sunlight at any time. The tubes in the bath should, of course, be shielded from light.

Recording Results

The following colours may be taken as a working basis after one hour.

Scale No.	Colour	Quality.
1	Blue	Excellent
2	Slightly mauve	Very good
3	Mauve	Good
4	Pink mauve	Fair
5	Mauve pink	Poor
6	Pink	Bad
7	Colourless	Bad

This assessment includes both bacterial quality and freedom from abnormality in a pathological sense. At least three tests should be made before a sample is declared fit or unfit. Immediately after one-hour recordings a smear should be made of the faulty milk and stained with polychrome or Loeffler's methylene blue. Large numbers of bacteria indicate careless production; the presence of any leucocytes, especially if accompanied by long chain streptococci indicate mastitis.

Davis⁽⁶⁾ gives the following method which permits the detection of bad milk in five minutes. The difference in the technique being that the water bath is kept at 45 degrees centigrade instead of 37 degrees centigrade, and adding only 0.5ml. of the 0.005% solution instead of 1ml. If the dye has turned lilac, mauve, pink or colourless, in five minutes, the milk may be condemned. If the dye is instantly reduced to the pink or colourless form, it indicates the probability of severe infection

with mastitis. A pale colour (lessening of the intensity of the original blue) apparently correlated with high fat content is not an indication of poor quality.)

This rapid test is very valuable in "weeding out" undesirable milk.

Dairy Laws

The following are the important requirements for the different grades of milk in Great Britain.

Certified Milk

Must not contain more than 30,000 bacteria per cubic centimetre, and *Bacillus coli* (evidence of contamination by dung) must be absent in 1/10th C.C. The cows must pass the tuberculin test before entering herd and thereafter every six months. A Veterinary examination is necessary every three months. The milk must be bottled on the farm, and the bottles must be sealed with a cap and outer cover, with the day of production marked on it. The words "Certified Milk" and name of the producer must be printed on cap.

Grade "A" Tuberculin Tested Milk

Must not contain more than 200,000 bacteria per C. C. and *Bacillus coli* must be absent in 1/100th C. C.

The cows must pass the tuberculin test before entering the herd and thereafter every six months. A veterinary examination is necessary every three months. The milk may be bottled on the farm, or away but the bottles must be sealed with a cap and outer cap, with the day of production marked on it. The words "Grade A" "(Tuberculin Tested) Milk" must be printed on cap, with the name and address of distributor.

Grade "A" Milk:

The conditions as per Grade "A" Tuberculin tested milk apply, except that the cows do not have to pass the tuberculin test and the description on the cap is altered to "Grade A milk."

The authority for granting licenses is the Minister of Health.

The following regulations are in force in the United States of America. Between certain states and cities there will be slight

difference with regard to the requirements for cooling. The temperatures may differ slightly.

Certified Milk

"Certified milk shall be cooled at 45 degrees F. immediately after being drawn from the cow and so maintained until delivered to the consumer, when it shall contain not more than 10,000 bacteria per C. C.

Guaranteed Milk

"Guaranteed raw milk shall be cooled at 50 degrees F. immediately after it is drawn from the cow and so maintained until delivered to the consumer. It shall contain not more than 15,000 bacteria per C. C.

"Guaranteed pasteurized milk shall be cooled at 50 degrees F. immediately after being drawn from the cow and so maintained until delivered to the consumer. It shall not contain more than 15,000 bacteria per C.C. before pasteurization and 3,000 after pasteurization.

Grade "A" Raw Milk

"Grade "A" raw milk, when distributed twice a day by the producer, must be cooled to a temperature of 60 degrees F. or below, immediately after being drawn from the cow, and so maintained until delivered to the consumer." All Grade "A" raw milk shall not contain more than 50,000 bacteria per C.C. when distributed to the consumer.

Grade "A" Pasteurized Milk

"Grade "A" pasteurized milk shall be cooled to as low a temperature as practical immediately after being drawn from the cow and so maintained until delivered to the plant. After pasteurization, milk must be cooled to a temperature of 50 degrees F. or below and so maintained until delivered to the consumer. It shall not contain more than 150,000 bacteria per C.C. before pasteurization and 15,000 after pasteurization.

Conclusions

The use of milk of cows and other mammals in the human diet is as old as the history of mankind, and its value has

always been highly esteemed. Fine Physique good health and vitality are usually seen in races where milk has an important place in diet. Of recent years milk injections are given for Post purpural fever, asthma, skin diseases, gonorrhea etc. Whatever be the object of its use, milk must be used in a clean state. Grading of milk and a systematic testing would go a long way in controlling a pure supply for the human use.

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YOKES, YOKING AND YOKEGALLS *

BY

K. R. ALUR., G.B.V.C.,
Lecturer, Bombay Veterinary College, Bombay.

Introduction.

Yoking of cattle is no invention of modern times ; nor is that of horses. From time immemorial the custom has been in vogue and can be traced to the days of ancient times. I do not propose to descend to discuss the economic or the utilitarian aspect of the legends ; but however it stands unquestioned that animals were made use of and were regularly either harnessed as in the case of Chariots or saddled for riding purposes.

Necessity of Yoking

Yoking is an evil of domestication and it is incumbent on the civilised world to moderate the evils. What-ever may be the method of yoking it is bound to inflict a certain amount of pain and cause exertion on the part of the animal. In a society of co-operative beings we have to live and let live. For the comforts and attention paid to the domesticated animals they must reciprocate for the services done to them. Each kind of animal has a special duty to perform and bullocks share the function of conveying. It is for this, the necessity of yoking arises.

A Yoke and its Points

A yoke is a horizontal bar of any material usually of wood and is used for the purpose of dragging a conveyance. It has an attendant member namely the "Central Post" and "Resting Peek." It has two or four "Control Pegs" to keep the neck within the seat of yoke and two neck straps to prevent the yoke

* Paper read at the Provincial Veterinary conference of the Bombay Veterinary Medical Association, December 1939.



Fig. 1. Yoke receded backward during uphill



Fig. 2. Yoking of unequal Pair.

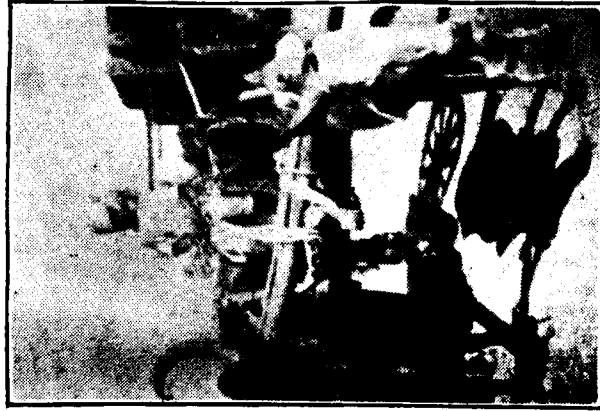


Fig. 3. Bad conformation of horns.



Fig. 1. Bad conformation of horns



Fig. 2. A cart with an iron resting stand.



Fig. 3 A typical Yokegall.

flying off. A good yoke is made up of seasoned wood and is usually light. It is of vital importance that the material of the yoke should be a non-conductor of heat and cold. There is constant friction between the yoke and the neck and heat is thus produced. It is for this, the wood is mostly preferred being a bad conductor of heat and cold. Strong wood is selected and is specially well smoothed at the seat of yoke. It is fashioned square at the centre to get a good rest on the Central post and is tied to the same by ropes. At times there is a nail peg which is loose to allow free movements. A seasoned yoke is highly valued by the cultivators. It is rounded off, at the ends and tapers laterally. There are different types of yokes, and the same will be dealt with later. (Plate No. 1, Fig. 1 and 2.)

Yoking

Yoking is an art and by keen observation and constant practice one can easily detect what is wrong with yoking. All the things must be seen through before any defect is detected. The ventral surface of the yoke must rightly confirm with the form of the neck. If it is too thin it gets buried in the neck. It does not move on the neck freely and causes a sore centrally as the pressure is not shifted to and fro. The area of pressure changes according to the level of the ground covered by the animal. In action it shifts anteriorly towards the horns when the animal is carrying the conveyance down the hill. (Plate No. 1, Fig. 3). It recedes back to the withers at the base when the animal is carrying the same up the hill. (Plate No. 2, Fig. 1). In plain ground it rests centrally. If the pressure is not shifting galls would be more frequent. So a good yoke must be of sufficient thickness. It should be slightly arched to fit the neck or else it will cause galls by the edges over the neck which is naturally slightly concave.

The surface should be perfectly smooth and well polished to ease friction. It should be sufficiently long to accommodate the animal or else both the animals will brush at the hock.

The line of force will also be obliterated and much energy will be wasted, causing galls on the lateral side of the animal's

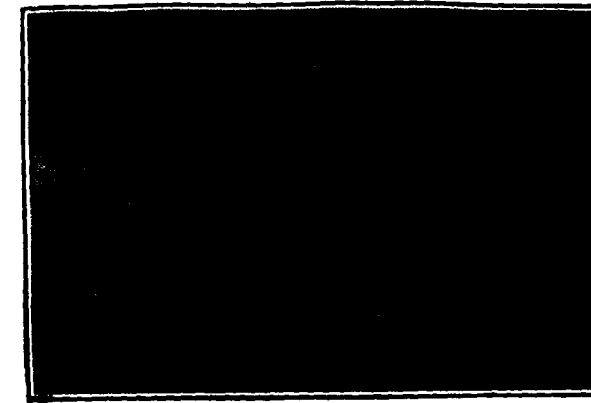


Fig. 1. Yoke



Fig. 2. Yoke



Fig. 3. Yoke shifted anteriorly during down hill.



Fig. 3. A Yoke gall before and after operation.

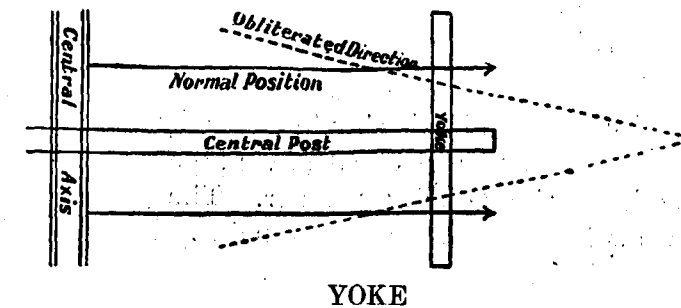


Fig. 2. A Yoke gall before and after operation.

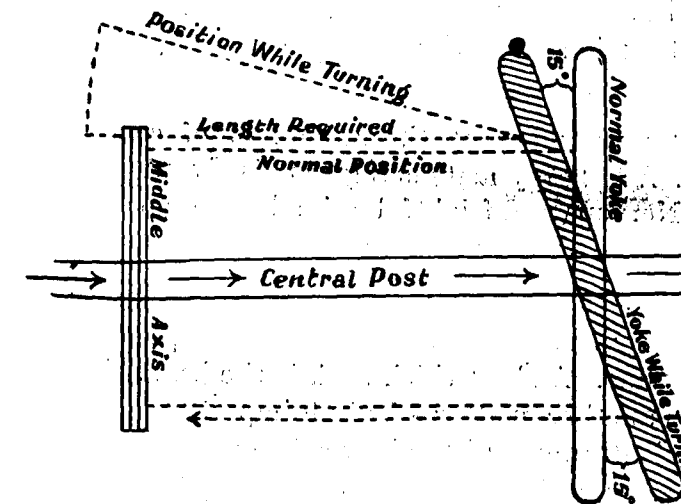


Fig. 1. A Yoke gall before operation.

neck. Each animal drags inside and centrally, so greater friction is taken by the conveyance, hence more energy is wasted.



The central post must allow a certain amount of movement with the yoke. It should be sufficiently long enough to accommodate the animal, especially during turnings. Square crosses are normal features of the roads in cities and villages and to accomplish the same a gradual incline varying from 15 to 20



Position of animals while Turning

degrees has to be provided for, so extra length is required in the central post. Many a time animals are accommodated and yoked irrespective of the length provided by the central post with hideous sequel that hocks brush against rolling wheels and

severe wounds are caused. To avoid the same drivers are often prone to kick the animals out of the wheel which obliterates the central line of action and lateral galls are caused on the neck. Careless driving during acute turnings is also the cause of this. If turnings are taken at full speed the inside animal invariably brushes at the hock or galls at the neck.

Unequal pairs of animals should never be yoked together. The taller animal has a decided advantage and thus throws greater weight on the smaller partner. The yoke is inclined and pressure is increased at the lower point. It causes lateral galls on the sufferer. (Plate 2, Fig. 2).

All tall animals are usually long. The yoke instead of being at right angles to the middle post, will be at varying angles, going forward with the longer animal. This causes greater pressure at the base of the neck of the smaller animal, where it may gall in course of time. The shorter animal will have to go at faster speed to keep up with mate and thus team action will not be maintained. It causes diversion in the line of central action and thus greater friction is taken at the wheels.

The temperament of the animal is of equal importance in yoking. A lethargy mate is a great disadvantage to the active worker. Nervous and frightful animals are no good workers, but are a source of great danger.

A good conformation for yoking is also a matter of breed. A thin neck is no good conformation, from point of yoking, so also a long one. A short thick neck is the best suited. Position of horns is another matter of vital importance. They should grow sufficiently forward to allow a free movement of the yoke, or else during action the yoke strikes against the base of the horns. In badly grown horns the yoke strikes constantly which may lead to inflammation terminating probably in cancer. (Plate No. 2 Fig. 3 & Plate No. 3, Fig. 1).

There are a few animals who always drag, either in or out. The cart takes greater friction and lesser speed. Such an action can partly be remedied by changing the sides of animals at

frequent intervals. It is usually a wise action to change the sides of animals for many reasons. The driver is always more vehement with the whip over the animal on the right side so it relieves the sufferer when sides are changed.

Seasoning the Neck for Yoking

Seasoning the neck from point of yoking is another important problem. By nature, the skin of the neck is as tender as it is on all other parts and unless seasoning is done galling is bound to occur. As soon as animals are put to work they start galling. In course of first few days the spirit of the animal is still unbroken and thus he resents yoking; subsequently in the zeal of subduing the animal for work, lesser attention is paid to the neck. Animal resists violently and jumps about with the yoke unmindful of galling. In this stage usually generalised inflammation of the neck is seen with local swelling. If the condition is properly treated it subsides. But it is the confirmed belief of many Agriculturists that galled animal must be yoked if they wish to avoid abscess formation. So inflammation is kept up and due to the tenderness of the skin a yoke gall gets established. By prudent and judicious yoking it is possible to avoid such accidents.

Neck in young bulls is covered with hairs so when yoking starts they get brushed off, and some are actually peeled away, leaving behind the so-called "Hair blisters." It is not possible to season the neck without setting up a certain amount of inflammation but we should see that it should not exceed so as to peel the skin away. It is of utmost importance to see that skin is left intact. The inflammatory fluid is absorbed in the system and thickening of the neck results due to fibrosis.

During the act of training, villagers apply oil and Geru (Marking nut) to thicken the skin. It serves as an antiseptic and emollient. It is equally efficient to apply vaseline containing salicylic and carbolic acid in the form of an ointment. If generalised vesication takes place the part should be applied with tincture of iodine in rectified spirit 5 to 6 times a day and

next day an emollient dressing should be applied. Stages of inflammation should be treated accordingly and during the period of rest mild blister should be given all over the neck (seat of yoke) as it does immense good. In seasoning neck for yoking it is unwise to start yoking an animal to cart or conveyance all of a sudden. The animal must be first made to keep pace with another senior partner and then a spare yoke should be put on the neck without any load. He should be driven on soft grounds and must be made intelligent to signs and calls of yoking. He should then be yoked to an empty conveyance and driven. Hasty yoking is a hazardous step and early galling will condemn the animal for all future work. In the early stages, animals must not be yoked for long distances or for heavy work. Immediately on unloading the neck should be massaged and if found damaged cold water irrigation must be resorted to.

Neck as the Seat of Yoke

Anatomically the neck of cattle may be considered as the best seat of yoke. Though nature has not intended it to be so for the purpose, still it provides for all that is required. Superiorly it has a concave surface which laterally tapers. It facilitates the stay of the yoke. There are no bones to directly brush against the spines being deeply buried in the muscles. Posteriorly it has a thick deep wither which acts as a buffer while dragging the load forward. Anteriorly there is the occipital crest with the lateral base of horns which prevents the yoke going over during incline. There is the most powerful ligament in the entire system known as the Ligamentum Nuchae which has an attachment to all supra spinal processes. Neck is covered by most powerful muscles and forms a thick bed. Trachea and Oesophagus being the most delicate organs are situated inferiorly and buried deep in the muscles. Superiorly there are no main arteries or veins, nor there are any nerves to come in direct contact with. The articulating vertebral column is the most efficient mechanism for breaking pressure. Each step involves a certain amount of movement in the vertebral

column which breaks and transfers weight. No other type of harnessing is possible in case of cattle as dewlap interferes with every other type of harnessing.

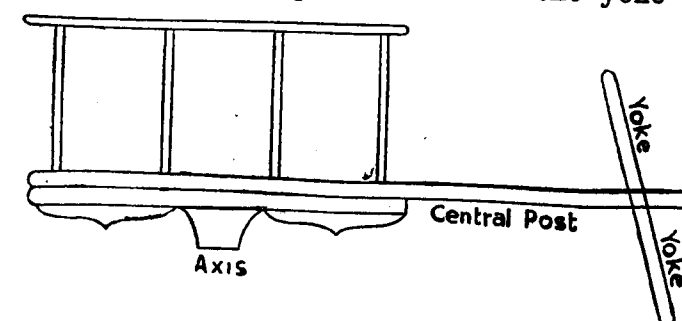
How to Load Carts

Loading of carts is an important problem connected with yoking. It requires judicial judgement to load and balance a cart. It is not all, the weight that counts, in loading. I do not propose to discuss the general loading of carts but will refer to the problem from point of yoking with reference to galling.

The cart should be centrally balanced, leaving the weight of the central post and the yoke. Both these, should be extra weights on the yoking side. This will assist the yoke to remain on the animal's neck. If this is not provided for, the yoke will fly off, and the animal will have no sufficient hold to pull the same. Fulcrum is the central axis, over the wheels.

Balancing of the Cart

The central post and the yoke carry the greater weight but it should be sufficient enough to stand against the forward pull. The animal drags in the horizontal plane, and on a level surface the yoke first recedes back to the base of the neck. Here it meets resistance as hump will not allow the yoke to recede



back. This is facilitated by the neck strap which will prevent the yoke flying over the withers and mounting it. Under this resistance, the animal immediately puts the head down to avoid pressure on the throat, and drags in a downward plane and thus the cart starts.

During the act of loading it is of great importance to see that heavy weights and cornful bags are not thrown at the back of the cart as they cause the yoke to fly up and cause great pressure at the throat. So the cart should either be loaded unyoked or else there should be a resting post fixed to the back of the cart. (Vide Plate No. 3., Fig. 2). Some use a rack to support the weight. It is quite common to see heavy bags thrown at the back of the cart which causes heavy pain and pressure in the region of the throat and at times animals are throttled.

The problem of yokegalls is too vast a subject to be detailed in this article. Galling is attendant to yoking and it cannot be remedied unless the latter stops. So to minimise the evil, precautions have to be taken and early remedial measures have to be resorted to. As sequel and accompaniment to yoking various pathological conditions are presented which are either due to disease or due to over work. Of all, a stable condition known as yokegall, has to be separately defined. From inflammation to abscess formation and fibrosis of the neck varying conditions are seen. All these, no doubt, are due to yoking; but from amongst these a special condition has to be separately defined and studied, and that is yokegall.

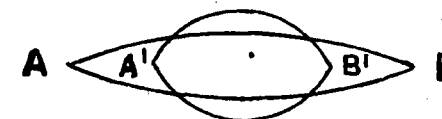
A yokegall is a non-healing, non-discharging, circumscribed sore, usually rounded in appearance. It is a raw patch of wound and is bereft of skin. In short it can be described as a brushing wound. In earlier stages it is accompanied by inflammation and infiltration but in chronic stage it entirely subsides after the formation of a false membrane. It is very slow in granulation and if the animal is unyoked a fibrosed mass is seen to protrude. To counteract this evil all cultivators make it a point to see that galled animals are regularly yoked which suppresses such granulations. The name yokegall is loosely applied to various conditions but in the strict sense of the term it has a clear definition. (Plate No. 3., Fig. 3.)

Various dressings have been tried and every one has a favourite of his own. Such dressings are usually finished off by desiccants. By dehydration of superficial cells a thin cicatrized

layer is formed which gives an impression of false cure. It is all right during the period of rest. Immediately the animal is put to work the membrane peels off, exposing the raw wound. So patient dressing for long periods is foiled to the disappointment of all. The credit of the surgeon comes to stake and the owner returns to the dispensary with a disappointing note.

Operation

In such cases surgical interference is the only remedy. Medicinal dressing has been found to be of no avail. In case of galls where the margin of the skin can be proximated it is wise to take a central incision. The incision should be in the vertical direction. It can also be taken in the horizontal plane along the course of the neck. Advantages are claimed on either side. However, in my experience in the Bombay Veterinary College I have found greater advantage in taking the vertical incision. It is easy to incise and gives a better grip. The flaps to be dissected can be rendered apart with equal pressure and they present equal sides for dissection. In the horizontal plane of incision it is difficult to lift up the upper lip; while greater portion of the lower protrudes out being easily gripped. Drainage is very efficient in the vertical incision and accumulated fluid is squeezed out by the movements of the neck and counter opening is rarely required. In case of horizontal incision it always tends to accumulate fluid in the lower pouch which usually burrows down into the lower pocket. After dressing neck is bound to move up and down so the lips of the wound are always made to open in the horizontal incision as the neck folds in the vertical plane.



A B is the length of the wound and contraction of the neck is bound to cause the gaping of the wound to A' B'.

When wounds are sutured the gravity is bound to exert force on the lower lip and it tries to descend down while the

upper one remains hanging not in proximation with the lower one. This is not so in case of vertical incision.

The wound should not be more than half an inch deep. It should then be hooked from the flap and the portion should be dissected off to taper towards the margin. Similarly the other side should be dissected. This will result in the formation of a pouch. The margin should be brought together by a suture or two. The ragged ends should be clipped off and rendered raw or else close proximation is not possible. Silver or wire covered with silk is the best form of material. A few days dressing heals the wound and in case of gaping wounds where it is not possible to proximate the wound for the first time the original sutures should be removed and fresh sutures should be taken. Cases have been tried with success in the Veterinary College Hospital. The principle of healing yokegalls is to proximate the skin margin, whatever may be the form of operation.

Sequel of improper yoking

Due to improper yoking inflammation is the first thing to be seen in varying degrees. Usually it resolves itself if rested and treated. In unfavourable cases it leads to abscess formation. In some cases inflammatory fluid gets localised and forms a pouch. Many a times the ripened abscess is brushed off due to yoking so a half evacuated cavity is left behind with a scab on the top. Pus is usually found under such scabs. Small abscesses are many times absorbed completely; but some of them form themselves into thickwalled abscesses with thick cheesy pus in the centre, in an encapsulated stage. It is not uncommon to find abscesses from where all the pus is absorbed leaving behind a mass of fibrous tissue which is nothing but the capsule of the abscess, presenting an appearance of false tumour. The so-called tumours of the neck are not the real neoplasms; but they are vaguely described so, due to their resemblance. In reality it is fibrosis of the muscular structure giving an external appearance of tumour. In some chronic cases the muscular fibres are converted into loose fibrous tissue. It remains a loose tissue and it cannot be made to absorb.

In cases of generalised inflammation and subsequent yoking small abscesses of various sizes are seen all over the neck. When neck is uncared for, scales rise up due to destruction of cells and give an appearance of dermatitis. This condition is scurvy neck. In cases of persistent yoking dermatitis does set in when neck as a whole is inflamed. In very severe cases the entire neck becomes stiff and swollen with marked pain and heat in the local region. In unfavourable cases it progresses further and deep seated abscesses are formed in the longitudinal muscles of the neck.

True yokegalls are found in animals which are overworked, or badly yoked. It is a most common condition in animals which are used for dragging water or ploughing iron ploughs. It is a chronic stage of brushing being a malignant wound and repugnant sight.

Attention to Neck after Yoking

It is indeed indisputable that neck requires most careful attention in yoking animals, than any other organ. Proper yoking must be accompanied by regular attention to the neck. It should be a routine to examine the neck before and after yoking. Immediately on relieving the neck from yoking it should be slightly massaged and emollient dressings containing either carbolic or salicylic acid be applied. Neck should be occasionally washed and spirit be rubbed. After strenuous and long period of yoking rest should be given and animals should be changed.

Forms of Yoking

There are various forms of yoking to suit different conditions. The animal energy is made use of for varying purposes and method of yoking differs with each. It is not possible to enumerate the various forms and discuss the merits of each one as modifications are too varied. Many of the existing forms are too crude and time serving. It is mostly due to poverty that very little attention is paid to efficiency. Material used for all purposes is mostly wood and it is fashioned in such

a way that very little attention is paid to avoid friction and clumsiness in form. By the use of ball bearing and iron pivots much of the friction can be eased.

Animals can be yoked single or double according to the nature of conveyance and method of work. They are also yoked for ploughing, sowing, weeding, watering, crushing grains, extraction of oil, crushing sugarcane etc.

Whatever may be the form of yoking the object is to avoid direct pressure on the neck. It should not involve muscular action of only one organ. The contrivance of yoking should not directly brush on any part and cause galls or sores. The animal yoked should be free to make movements and take turns without directly taking load and pressure on its own person. When yoked in pair there should be sufficient space for each and the position of one should not interfere with the another. There should be enough of hold to drag the conveyance forward. Under no circumstances the conveyance should be allowed to run over the animal; and the accompaniments of yoking should be sound enough to hold the same.

To fulfill the healthy conditions of yoking a four wheeled conveyance is the one of the right type. In state of rest it balances itself and throws no pressure on the animal yoked. In motion, the arm of the shaft or the yoke does not rise up and down to cause either pressure on the neck or at the throat. It is a disconnected shaft free to take lateral turns and upward movements. The animal only balances itself like a skater on the ice aiding forward movement, and controlling the conveyance in case of posterior pressure. In short the centre of gravity which would normally fall within the width of the central axis of a two wheeled conveyance, would now fall within the space provided by the four wheels. In the former case it shifts so frequently and falls outside so that the animal yoked will get a jerk every time it does so. Besides it has the advantage of not throwing any weight directly on the animal when the cart is being loaded. It is an unique advantage, as all two wheeled conveyances suffer from it without exception.

If loaded unyoked the cart becomes slanting and hence proper distribution of weight cannot be done. Above all humanity and kindness towards animals is the key-note of yoking. We should measure their suffering from our own and try to minimise the suffering of the dumb animals if it could be avoided. The manual power stored in the vast number of animals of various species should be utilised towards the struggle of existence of mankind as goodness and kindness are reciprocal; but it should not be an act of cruelty in satisfying the human lust for brutal power to be utilised for the betterment of human race.

Acknowledgement

I beg to knowledge the great help and encouragement given to me by M. Mohy Deen, Esq., M.R.C.V.S., J.P., Principal, Bombay Veterinary College during the completion of the article and after.

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HAEMATOLOGICAL STUDIES IN THE INDIAN DAIRY ANIMALS

Structural Changes with Mineral Feeding

BY

N. S. SANKARANARAYAN, G.M.V.C

(Received for publication on 16-2-1939)

Phosphorous and Calcium deficiencies have been associated with disease of bones. The want of substances essential for the normal building of tissues of animal body suggests the need for examining the effects of their deficiencies on blood itself. Orr (1931) says that deficiencies in diet that cause rickets cause also changes in blood, as a matter of fact the primary change is in the circulating fluid. Various investigations have been carried out in the form of chemical analysis of blood of high and low phosphate content, but regarding the structural characters of blood as influenced by the concentration of blood phosphates nothing has been mentioned so far.

The present paper is confined only to the results obtained by the administration of inorganic phosphates of different quality and quantity to animals. The morbid findings in the structural characters of blood before phosphate feeding and effects produced after, which are recorded, is hoped to be of much use to have a clear comprehension of the diseases resulting from mineral deficiency.

During the course of a mineral feeding experiment in the Animal Nutrition section, at Bangalore the opportunity was availed of and regular haematological studies were made on the animals under experiment. Two animals 1 and 2 were placed under the experiment. They got maintenance ration consisting of ground nut cake and Bellary hay (supplied by the Government Military Grass Farm, Bangalore) with one kilogram of fresh g. grass throughout the experiment. Three organic phosphates were fed along with the soaked cake as stated in Table 1.

TABLE I

Showing the quantities and periods when different phosphates were fed.

Phosphates fed.	Periods	Quantity fed.
Calcium phosphate.	4 weeks	30 grams.
"	4 "	60 "
No phosphate.	8 "	.....
Sodium phosphate.	4 "	30 grams.
"	4 "	60 "
No phosphates.	4 "	.....
Ammonium phosphate.	4 "	30 grams.
"	4 "	60 "
No phosphates.	.....	.....

During the experiment the animals were under complete rest, but they were weighed daily and the live weights recorded and the averages are given in Table II.

TABLE II

Showing Live weights of animals during the experiment in pounds.

Periods	Animals 1 2	Phosphates fed.	Quality
W : 18-8-34	925 738	No phosphate	.....
" 15-9-34	942 771	Calcium phosphate	30 grams.
" 13-10-34	951 774	"	60 "
" 17-11-34	975 804	No phosphate	.....
" 19-1-35	977 814	Sodium phosphate	30 grams.
" 16-2-35	976 824	"	60 "
" 16-3-35	974 831	No phosphate	.....
" 27-4-35	980 839	Ammonium phosphate	30 grams.
" 25-5-35	986 850	"	60 "
" 22-6-35	993 860	No phosphate	.....

The blood of these animals was studied before any phosphate was fed and at each successive change, in quality and quantity of phosphate. The period in which samples were examined, was always the last week of the period, in which one

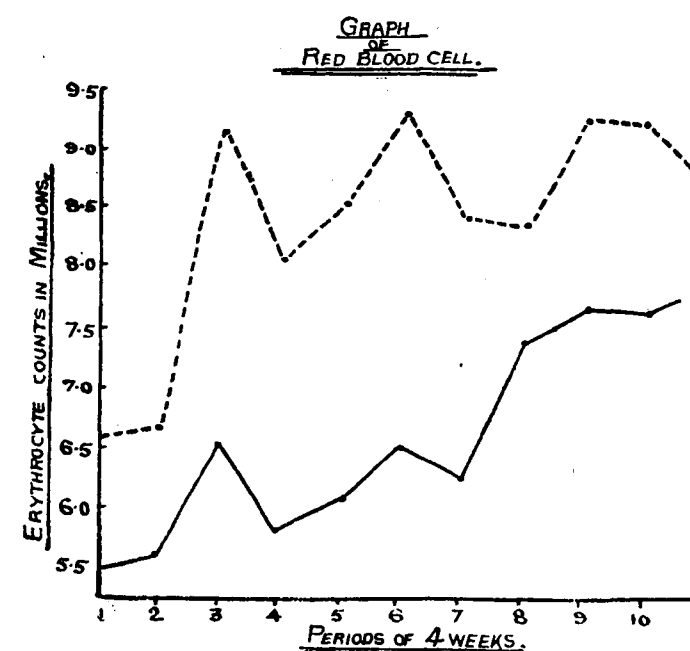
particular quality or quantity of phosphate was fed. Studies included, chiefly numerical countings of red blood cells and some of its morphological characters. The technique followed has already been described in a previous paper by the author (Sankaranarayanan 1937). Three of four samples of blood from each animal, were examined and the averages are given in table III.

TABLE III
Erythrocytes counts in millions in animals during phosphate feeding

Period	Animals 1 2	Phosphates fed.	Quantity
4 Weeks	6.528 5.500	Initial	.....
4 "	6.640 5.576	Calcium phosphate	30 grams.
4 "	9.168 6.520	"	60 "
4 "	8.028 5.824	No phosphate	.....
4 "	8.592 6.095	Sodium phosphate	30 grams.
4 "	9.320 6.512	"	60 "
4 "	8.456 6.270	No phosphate	.....
4 "	8.416 7.440	Ammonium phos- phate	30 grams.
4 "	9.336 7.720	"	60 "
4 "	9.304 7.700	No phosphate	.....
After 11 months	8.800 7.920	.....	.....

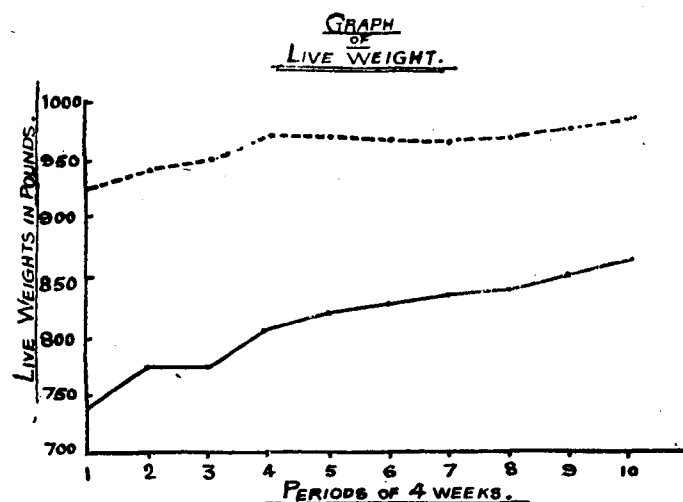
From a study of Table III it may be observed that the animals in the beginning gave low R.B.C. counts, when the healthy Indian cattle usually contain about 8 million red cells (Sankaranarayanan loc cit). Presence of Polychromasia and cells with nuclear remnants which were observed in stained blood smears indicate anæmia in both the animals. But it is highly interesting to note that both the animals showed remarkable improvement by giving higher red cell counts after phosphate intake. At each feeding the red cell contents rose higher and higher, followed by a fall, when each phosphate was stopped. It is noteworthy again, such falls in the red cells have never been to the Pre-phosphate-feeding level. Finally, the counts reached a maximum with the ammonium phosphate.

The following graph illustrates the rise and fall in the R.B.C. content of blood.



It is remarkable, that the rise and fall in the red cell content of blood in both the animals are almost identical. At each feeding, blood smears taken and stained with Giemsa's revealed Megaloblasts, Microblasts and Erythroblasts in the field, which are signs of blood regeneration (R. Sabin 1922). The improvement in blood, effected by phosphate intake is followed by a simultaneous improvement in condition of the animals and increase of live-weights in them. Table II gives the live weights in succession before and during phosphate feeding. It is seen that both the animals have increased considerably, the animal 2 increasing by 100 lbs. within a period of 40 weeks. The following graph also illustrates the regular improvement in condition and the curves for both the animals are again identical.

Before proceeding to the discussion of the results, mention should be made as to the cause of anaemia in the animals, before phosphate feeding experiments. Both the animals were in the Nutrition section under series of feeding experiments. One of them, i.e. No. 1. was older than the No. 2. (say about 10 years old) and the other younger by about 7 years. Both were



maintaining their live weights and no apparent sign of ill-health was noticed in them. Animal No. 2. was placed under a work experiment about three months before this phosphate feeding experiment, during which, it was getting full work ration according to the schedule of rations in the farm. After a course of one month, the animal 2. was found to lose condition and the live weight had come down from 760 lbs. to 730 lbs. in spite of the animal taking its rations full. An examination of the blood was made and the red cell count was found to be only 5.5 millions with fragmentations in the field. Stained blood smears from the animal showed anaemic changes, few basophiles, but no Protozoa. A sample of faeces was examined for helminths. Although few nematode ova were observed, they should not be considered sufficient to produce this sudden change in the blood. Mention should also be made, that the blood was not examined before the work experiment, but no

symptom suggestive of any disease was noticed. So assuming, that the animal was healthy before, it might have become anaemic only during the work experiment.

Peyton Rous (1923) finds that exercise from sedentary habits induces destruction of red cells and presence of Schistocytes of Ehrlich are signs of serum changes. De Langen (1930) is of opinion, that the anaemia which cannot be explained by blood loss appears to be due to bone marrow injury. This injury which he speaks, may be the effect due to loss of certain of its constituents, since he made good this injury by the addition of Lecithin to grass fed to animals (Rabbits), thereby causing regeneration of blood. So in the absence of helminthiasis, Protozoan disease or blood loss, probably the sudden metabolic activity brought upon to bear on the animal without perhaps, sufficient intake of materials may be the cause of this deficiency anaemia. What exactly the loss during sudden work could not be definitely made out. As regards the animal 1 the anaemia may be due to age as other signs of ill health were not noticed.

From these two issues have risen for discussion (1) how, sudden working produced blood degeneration and (2) whether inorganic phosphate intake induces blood regeneration. Palmer and his co-workers (1930) found, that there is marked increase of inorganic phosphate in blood, followed by a still more marked decrease to a point below 'Before exercise level' which is more persistent. Victor C. Meyer (1924) reports that 80% of the total phosphorus of blood is in the corpuscles and owing to the fact, that the phosphorus compounds in blood are relatively unstable, it is easily made available to serve as buffers in case of need. It is probable therefore with the use of the easily available phosphates of the red cells, through a sudden metabolic activity during work, and in the absence of phosphate intake, blood degeneration might have followed with destruction of Erythrocytes, loss of body weight and condition, as observed in bullock 2. This explanation is further supported by the findings of Holpern (1936), Genevieve Stearns and Edna

Warwig (1933), Byrom and Key (1928) regarding the relationship between blood phosphorus and blood corpuscles.

As regards the second point the explanation for the first by analogy holds good for the second also. Maximow (Sabin 1922) produced regeneration of blood by stimulation of bone marrow. It is possible to assume that such stimulation could be brought about, by the supply of materials to make up the deficiency in the bone marrow. Lecithin again, used by DeLangen (loc. cit) for rapid blood regeneration is only a compound of phosphorus. So in this case the phosphates fed to the animals either might have stimulated the bone marrow or supplied sufficient materials, for the manufacture of corpuscles or somehow utilized for regeneration of blood.

Extensive work has been done on treatment of anaemia, and iron and liver preparations are generally adopted, but workers like Muller (1933) Wichels and Hofer (1933), Syderhelm (1932) are at variance as to the exact nature of element concerned, in the cause and cure of anaemia. One thing is clear however, that other agencies in addition to lack of iron, helminths and protozoa may also contribute to the genesis of anaemia and nothing definite could be arrived at, as to the exact nature of element concerned, in the regeneration of blood, but from the findings of workers already referred to, and from the results of these two experiments, it may be assumed, that phosphates also contribute a great deal to bring about regeneration of blood in anaemic animals.

Before concluding, mention should be made about the effects produced by ammonium phosphate. Referring back to table 111 and to the pertaining graph, it may be seen that the R.B.C. count reached its maximum when ammonium phosphate was fed. During that time the presence of Erlich's Schistocytes in large numbers were observed, which only showed that destruction of red cells was going on owing to serum changes. Bodansky and Chandler (1932) report of the susceptibility of animals to the effects of ammonium chloride acidosis. Whether

ammonium phosphate also produces the same effect is not definitely known. So leaving aside that question at present, one conclusion which could be drawn from this experiment is, that calcium and sodium phosphates also, when fed, bring about regeneration of blood.

Acknowledgement.

The author feels indebted to Dr. F. J. Warth, the late Physiological Chemist, Bangalore under whose instructions and guidance this work was carried out and with his permission and encouragement, this is being published now.

Summary.

1. Haematological studies were made on two animals under phosphate feeding experiments. Both the animals were found anaemic in the beginning—one due to age and the other due to sudden exercise from sedentary habits.

2. It was found that calcium and sodium phosphate feeding induced blood regeneration in both the animals by raising the red cell content of blood.

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Editorial

MANUFACTURE OF DRUGS IN INDIA

We are glad that the Board of Scientific and Industrial Research which was formed soon after the outbreak of War has recommended to Government the setting up of a number of Committees to consider and work up the various schemes of Research in detail. A Drugs Committee is one such section that is to be set up and it is to consider the question of manufacture of important drugs in India. We hope that the Government would lose no time in accepting these recommendations and in setting up those Committees without any delay. The grants to these schemes of Research are generally to be distributed through institutions like Universities and this should be a sufficient guarantee that the money will be spent usefully and well.

The question of the utilisation of Drugs available in this country, and the manufacture of the various pharmaceutical preparations from these drugs for the treatment of patients, both human and veterinary, has of late, become a great problem; and Brevet. Col. R. N. Chopra has done well in drawing attention to this in his address at the All-India Conference of Chemical and Pharmaceutical Manufacturers in November 1939. With the introduction of the Western system of medicine in this country and its gradual expansion into the countryside, the demand for the supply of drugs has become greater and greater. But unfortunately, this demand for more and more

drugs, has not been simultaneously accompanied by the manufacture of these drugs in this country. A good percentage of these drugs is being got from abroad and India has become an importing country in regard to her supply of drugs. The few firms which manufacture drugs and pharmaceutical preparations in this country have to depend for their basic chemicals on foreign imports. For example, to quote Brevet. Col. R. N. Chopra, the important drugs used in medical practice are: Boric acid, Hypophosphorous acid, Salts of Ammonium (Chloride, Carbonate), Potassium (Iodide, Bromide, Chlorate, Permanganate), Sodium (Bromide, Bicarbonate, Iodide, Phosphate, Salicylate) and Magnesium (Carbonate, Oxide, Sulphate), for almost all of these, India depends on foreign supplies at the present time." Even Glucose which is in everyday use in medical and Veterinary practice, is not being manufactured in India. According to the figures for 1936-1937, the value of drugs imported into this country was Rs. 2,59,34,000. This colossal figure should be an eye opener to one and all including the medical and veterinary practitioners in this country. This dependency of the country on the importation of drugs has been very acutely brought home to us by the present War. This War, which, from all accounts, is greater than the previous Great War, has very deeply affected the drug market in this country. A great many drugs of proven efficiency against certain diseases have either become scarce or obtainable only at very high prices. Certain drugs of "enemy origin" are not at all available. Added to these, the great demands for drugs has stimulated the cupidity of unscrupulous dealers and manufacturers to flood the market with drugs of doubtful quality. There appears to be a number of firms in this country which import in bulk drugs of poor quality and retail them to the undiscerning public at very cheap rates; while there are others which seem to make a fine art of adulteration of drugs and pile up profits from their sales. To quote an example, a recent analysis of the various brands of Adrenaline in Indian market revealed the astounding fact that only a very low percentage came up to the requisite standard. Such adulterations

and sales of inferior products have been possible in this country because there are no legislations to control these transactions. This has indeed been a great handicap to the really honest manufacturers and dealers in drugs. According to Brevet. Col. R. N. Chopra, the main reason for such a deplorable state of affairs in the drug market of this country for cheap medicines and the only remedy for this state of affairs lies in the organisation of the Drug Industry in our country. It is only then, goes on the Brevet. Col., that we shall be able to satisfy the conditions which might be prescribed by properly considered drug-control legislation and to put on the market standard goods which the people need and which will suit their purchasing capacity. These are wise suggestions based on a correct appreciation of the conditions prevailing in this country and we dare say they will be taken up by the combined co-operative efforts of the State and the Public and that the Drug Industry in this country placed ere long on scientific and sound lines.

While on this subject, we are reminded of a Scheme which was formulated sometime back by the Indian Council of Agricultural Research for the study of poisonous plants of India. We were even given to understand then that a grant had actually been made for working out the scheme in the Madras Medical College under the joint supervision of the Director of Veterinary Services and the Surgeon General with the Government of Madras. But we are pained to note that the scheme has not yet started working, although, we understand, it is some months since it was formulated. We are not aware of the reasons for the delay. We therefore appeal to the authorities concerned not to delay the scheme too long and allow it to lapse for want of any enthusiasm and interest to boldly undertake it.

THE VETERINARY DEPARTMENT OF COCHIN STATE

We are glad to note the steady progress of the Veterinary Department in Cochin State, situated on the South-western border of the Madras Presidency. Its area is about 1500 square miles and its animal population according to the last census is about a little over two lakhs. The department was first formed in the year 1908, linked with the Medical Department with a single Veterinary Hospital in Trichur Taluk. The number of hospitals were again increased by two, the Taluks of Talapilly and Chittoor being fortunate enough to get one more hospital. Not long after, the activities of the Department were further increased by the opening of two additional hospitals in Cochin Kanayanoor Taluk. Two touring Veterinary Inspectors were also appointed to control the epidemics and do propaganda work among the ryots.

As a result of the educative propaganda done by the touring Veterinary Inspectors, the ryots began to realise the benefits of the Veterinary aid and resort in greater numbers to the Veterinary institutions.

With the advent of the Ministry of Rural Development this Department came under the Hon'ble Minister Dr. A. R. Menon. The Minister himself is a well accomplished medical man and the Veterinary Department is making rapid progress under him. He organised the Department and opened eight more institutions in different parts of the State thereby increasing the total number of the institutions in the state to seventeen. With this development, a Special Officer to look after this Department exclusively was found to be highly essential and Dr. K. Ninan Eapen, G.B.V.C., P.G., was appointed to that post.

We congratulate Dr. Eapen on his appointment and hope to record in the near future the rapid progress of the Department especially on its Animal Husbandry section.

B. B. JOSHI, G.B.V.C.

An Appreciation by Dr. W. Burns

For the last twenty-six years Mr. B. B. Joshi, who has just retired, has been in charge of the Veterinary Hospital (now called the Nusserwanji Sorabji Veterinary Hospital) attached to the college of Agriculture, Poona. For twenty of these years he has also been the Superintendent of the Hostel of that College and the many students who have passed through the College during that period will remember him with gratitude. The management of a hostel is by no means an easy task with a hundred and fifty to two hundred vigorous young men to look after. The fact that Mr. Joshi has carried it on so long is in itself a testimony to his abilities in that direction.

Mr. Joshi was born in 1886 and his education up to Matriculation took place in a school at Mahad in the Kolaba district of the Bombay Presidency about six miles from his native village. It is not only in America that students work their way through college; from his 13th year, Mr. Joshi worked as a teacher or otherwise, even in his vacations, and also obtained scholarships and so completed his course in the Bombay Veterinary College and graduated in 1908. He was appointed to the Civil Veterinary Department in 1909 and in 1913 was deputed to the College of Agriculture, Poona, as Lecturer in Veterinary Science, a post that he has held since. The development of the Veterinary Hospital he made his life's work and it was largely due to him that the magnificent donation of Rs. 30,000 from a Parsi family was given which was used for the reconstruction of the Hospital and which is the cause of its present name. Mr. Joshi had several special lines of work in which he was interested, one of them being cattle disease. To the general public of Poona and even in wider fields he was, however, perhaps best known for his great success in the treatment of the diseases of dogs. In dealing with these animals, he had not only the gift of diagnosis and a sure and efficient touch in operations but he also had that peculiar sympathy to which canine patients show so quick a response.

Students liked his classes and there was no absenteeism where his work was concerned. He was for a time an officer in the First Bombay Battalion, University Training Corps where his natural gift of discipline made him a very useful officer. The good wishes of his colleagues and of the many students whom he has helped, guided or corrected will go with him into his retirement.

[We wish Dr. Joshi a long, prosperous and useful retired life.

Ed. I. V. J.]

Clinical Articles

THE SO-CALLED 'LAHORE CANINE FEVER' AND ITS TREATMENT.

BY

CHET RAM, L. V. P.,

*Clinical Assistant, Incharge Canine Ward,
Punjab Veterinary College, Lahore.*

This very fatal disease of dogs designated as 'Lahore Canine Fever' is fairly common not only in Lahore but also in other parts of the Province. In Delhi also the incidence of this disease is not rare. From the various reports published from time to time it appears that other parts of India are not free from this disease. The mortality rate is high in highly bred and pedigree dogs which are very susceptible, although the mixed and indigenous breeds are not refractory.

Etiology

Until recently the disease was supposed locally to be a fever of unknown etiology when Mr. Shirlaw (1938) proved its identity with *P. Gibsoni* infection. According to him some other dog scourges such as 'Canine Typhus Fever' and 'Canine Enteric Fever', which are reported to occur in dogs in India, are in reality the various forms of 'Lahore Canine Fever' in this country and that they have been so named due to the fact that there is some analogy between the symptoms of these diseases and that it is not always possible to find causal organism, *P. Gibsoni*, in the blood of such dogs.

This organism is rarely found in the blood and out of the four cases treated at the dog hospital of this College recently for this disease with practically identical symptoms *P. Gibsoni*, was seen in the blood in one case only.

The so-called 'Lahore Canine fever' and its Treatment 39

Symptoms

Period of Incubation varies. Sen (1933) has shown in experimental cases that the period of incubation of *P. Gibsoni* infection was 28 to 30 days.

The symptoms of this disease are more or less characteristic. The first symptom noticed by the owner is great dullness and listlessness and a general complaint of eating very little or refusing the nourishment altogether. On taking the temperature it is found to be 103°F–105°F or even higher in some cases. In the early stages vomiting is not uncommon. The discharge from the nose and matting of the eyes is also seen. I have seen nasal haemorrhage in two cases only which were fairly advanced. The bowels are irregular; sometimes constipated, at other times diarrhoea with faeces of an offensive odour are seen. Bloody stools were also seen in a few cases but the blood soon disappeared from the faeces by treatment, only to reappear after some time.

The temperature oscillates between 102°F and 105°F during the major part of the course of this disease, sometimes going up even above 106°F. Another symptom which I have noticed in some cases especially those taking an unfavourable turn is the appearance of ulcers in the mouth emitting a very foul odour. These ulcers did not tend to heal except in one case which eventually recovered after a protracted illness. Progressive anaemia, which starts early in the disease and lasts for some time even after the animal is cured, is a characteristic symptom.

The prognosis is unfavourable and relapses are not uncommon. In one case the relapse occurred after about a week and in another case the dog remained quite normal for over two weeks before he had the rise of temperature. Both these cases succumbed in spite of treatment and good nursing. In still another case the relapse occurred after ten days and the animal died on the ninth day in apparently good condition, the temperature suddenly falling to subnormal a few hours before death.

Treatment

Treatment of this form of piroplasmosis, unlike *B. Canis* infection, is not specific although a fairly large percentage of cases have been treated successfully. Good nursing and proper feeding is as essential in this disease as in any other, and by this alone the life of the animal can be prolonged to weeks. Milk, white of egg, meat extract, beef tea may be given at regular intervals. Raw, minced or scraped meat in small quantities sometimes suits the patient well and is liked by some dogs when they refuse all other nourishment. As far as possible forced feeding should be avoided.

I have tried various medicines with very variable results. S.U.P. 36, Nuclein Solution and Sulphonamide P. were given extensive trial but the first two proved quite useless. Sulphonamide P., although very useful to

bring down the temperature, was absolutely ineffective to root out the disease and relapses occurred in almost all cases after a few days to two weeks. Sulfarsenol when given early gave good results but in advanced cases with little tolerance, it had a very adverse effect. Tryparsamide is very effective and is well tolerated by the animal when given in adjusted doses. In both these cases four or five injections at intervals of four to six days according to the condition of the patient are necessary. Doses should be regulated according to the age, size, breed and condition of the animal. Acaprin (Bayer) was given in a few cases and the results obtained were unsatisfactory.

One dog that was treated with Sulfarsenol for this disease showed a rise of temperature after about two weeks and on blood examination proved positive for *B. canis* although on previous occasions the blood examinations were invariably negative for this organism. Whether this infection was running concurrently or was contracted later it is difficult to say. This case was again treated successfully with Tryparsamide.

Results of treatment of some cases treated

Breed	Treated with	Result
Airedale Bitch	3 injections of Sulfarsenol at 5 days' interval along with hæmatinics	Cured. Blood + for <i>P. Gibsoni</i> on the 1st day.
Scotch Terrier	2 injections of Sulfarsenol 5 injections Tryparsamide at 5 days' interval with hæmatinics	Still anaemic. Cured. Anaemia disappeared gradually.
Fox Terrier	4 injections of Sulfarsenol at intervals of 5 to 7 days along with hæmatinics	Improved gradually & took 1½ months for complete recovery.

If the case is taken in hand early and treated with any of these preparations combined with good nourishing diet and the use of hæmatinics encouraging results are obtained. As hæmatinics I have used syrup of hæmoglobin and ferri carbonas Saccharatus, both of which have proved beneficial. The latter being cheaper is better.

Blood in the faeces disappears with the general improvement of the case but if necessary the use of bismuth salts with Salol helps to improve the condition. Out of the two cases of nasal hæmorrhage, in one case the bleeding stopped by the use of normal horse serum followed by calcii lactas by mouth, whereas in the other case, in which bleeding was profuse I had to resort to injection with Neohaemoplastin.

Anaemia persists for sometime after the patient is apparently cured, for which good nourishing diet and the use of hæmatinics should be continued.

An Unusual Outbreak of Edematous from of H. S. in Cattle 41

Elixir Glycerophosphate as a general tonic was also given a trial in a few cases and helped to improve the appetite and general condition of the animals.

Acknowledgment

My grateful thanks are due to Mr. J. S. Garewal, M.R.C.V.S., I.V.S., Principal and Professor of Medicine, Punjab Veterinary College, Lahore, for the kind inspiration and useful suggestions given during the treatment of these cases. I am also thankful to Mr. J. F. Shirlaw, M.R.C.V.S., Pathologist, Imperial Veterinary Research Institute, Muktesar for his occasional notes giving useful information regarding the treatment of this disease.

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AN UNUSUAL OUTBREAK OF ŒDEMATOUS FORM OF HÆMORRHAGIC SEPTICÆMIA IN CATTLE AND BUFFALOES.

BY

H. V. KULKARNI, G.B.V.C., P.G.

Disease Investigation Officer, Baroda.

An outbreak of obscure disease of cattle and buffaloes resembling anthrax in symptoms was attended by me in the month of April 1940. There were eight attacks and 5 deaths reported when I visited the place. Out of 8 attacks there were three buffaloes and five bullocks, all in best of condition. The remaining two bullocks and a buffalo were isolated and kept under observation.

Clinical observation:—The disease was characterised in the case of bullocks by abnormal fever, great thirst, complete inappetite, normal urine, dark colored faeces sometimes watery and semi-liquid mixed with blood, muscular tremors conjunctivitis, inability to stand on hind legs, accelerated and stertorous respiration, appearance of painful œdematous swellings of the subcutaneous tissues, especially in the region of the groin, belly and round about the generative organs, sometimes appearing and disappearing quickly on any part of the body and symptoms of enteritis.

In case of she-buffaloes in addition to the above mentioned symptoms the tongue was swollen and protruding, and there was stoppage of milk secretion.

Diagnosis before death:—Blood smears and smears of the exudates from the œdematous swellings proved to be negative for the presence of any micro-organisms and hence definite diagnosis could not be given.

P. M. Findings:—P. M. performed on the body of one of the bullocks that died of the disease showed yellow serous fluid in the oedematous swellings with few hæmorrhagic patches, about a gallon of reddish fluid in the abdominal cavity, intestines inflamed and studded with punctiform hæmorrhages, the contents being thin, dark, reddish in colour, liver soft and friable, gall bladder full containing about a pint of dark green coloured bile, lungs oedematous and congested, spleen and other organs being normal.

Diagnosis after death:—Blood smears from various organs and smears of the exudates from various affected parts proved to be positive for the presence of bipolar organisms. It was reported that the other bullocks also succumbed to the disease on the next day after I left the place.

Duration of the disease was noted to be from 8 to 15 days and mortality recorded was from 80 to 90 %

Blood-smears and smears of exudates forwarded to the Director, Imperial Vety. Research Institute, Muktesar, have been confirmed for the presence of bipolar organisms.

Necessary steps were taken to control the outbreak.

I am indebted to Mr. Y. N. Marathe, Dy. Director of Veterinary and Animal Husbandry Services, Baroda State, Baroda, for giving me an opportunity of attending to this outbreak and to the Director, Imperial Veterinary Research Institute, Muktesar for having confirmed my diagnosis.

ANAPHYLAXIS OR SERUM SHOCK AND ITS PREVENTION

By

S. JACOB, G.M.V.C.,

Veterinary Assistant Surgeon, Office of the Director of Veterinary Services, Madras.

Susceptibility:—Man, horse, and grown up cattle seem to be affected commonly, and Swine, young calves, and animals of other species are affected rarely. No cases among sheep and goats have been reported.

Causes:—Serum shock is due to hypersensibility on the part of animal organism for heterogenous or alien protein substances introduced parenterally (i.e. through avenues other than the digestive tract). This intolerance is due either to congenital tendency or due to the influence of infectious substances, or due to the presence of abnormally large amounts of antibodies, which are not adjusted to certain proteins and cause the rapid disintegration of protein substances. In other cases specific antibodies may form against certain kind of proteins when heterogenous proteins are introduced parenterally.

Anaphylaxis or Serum Shock & Its Prevention 43

Note:—While some animals are affected by large amounts of alien serum, others on receiving small quantities of serum from animals of their own species show symptoms of anaphylaxis.

Symptoms:—In domestic animals symptoms appear from a few minutes to 3 hours after the serum injection.

In horses:—Urticaria, pruritis, oedematous swellings affecting especially the head.

In cattle:—Generalised urticaria, pruritis, oedematous swellings affecting the head and the perineum, restlessness pain at the seat of injection, salivation, trembling, generalised muscular weakness, *dyspnoea*, tympany of the rumen and occasionally fever. In some cases laryngeal oedema may develop and cause asphyxia.

The symptoms are often severe and alarming but they disappear in animals in a few hours or a day and leave no trace behind. Fatal termination is rare and is usually due to asphyxiation.

Treatment:—Injections of adrenalin, atropin, and tracheotomy in cases of asphyxia are advocated.

As a prophylactic:—(1) Intravenous injection of 1 % solution of Calcium chloride in physiological salt solution may relieve anaphylaxis.

(2) Desensitisation by preliminary injection of small amounts of the same serum is advised. The following observations were made by the writer in desensitisation of animals by preliminary injections of small quantities of the same sera.

On the 15th August 1931, 41 head of cattle were inoculated against Haemorrhagic Septicaemia at Anakapalle with adequate doses of Serum. Four of the inoculated animals had anaphylactic shock, with huge oedematous swellings all over the body, and dyspnoea and foaming at the mouth. Within 4 to 6 hours the symptoms abated and there was no further trouble.

Three months later on the 21st November of the same year, the same batch of animals had to be protected against Black quarter since the disease had broken out in the locality. With a view to prevent the possibility of the occurrence of anaphylaxis among the inoculated animals, they were given first a desensitising dose of 5 c. c. of serum per head 6 hours prior to the administration of the usual dose. Seven of these animals had anaphylaxis within an hour after receiving the desensitising dose. The remaining 34 animals were injected with 10 c. c. of serum per head 6 hours after they received the desensitising dose. But 9 of these animals had an attack of anaphylaxis in about 2 hours after the inoculation. The symptoms noted were oedematous swellings all over the body, *dyspnoea* and frothing at the

mouth. In about 12 to 24 hours the symptoms subsided. The experience gained from this experiment was that the administration of a preliminary desensitising dose of the same serum is not a sure protection against anaphylaxis.

Therefore when another opportunity was afforded I followed a different method of inoculation.

In the year 1937 there was an outbreak of Anthrax in the palace stables at Bobbili. Consequently all the animals of the palace consisting of 2 elephants, 35 horses and 75 head of cattle had to be protected against Anthrax with serum. All these animals had previous injections of protective sera at some time or other. Hence they were divided into three batches. The first batch consisted of 2 horses which had received serum injections a few months previously. Each of them was first given 1 c.c. of anti-anthrax serum diluted in 9 c.c. of sterile normal saline solution and were closely observed for 15 minutes to see if they would develop an urticarious wheal. But since they did not show any, 5 c.c. of the same serum was given to each animal in an undiluted form. Three hours later the remaining dose of serum i.e., 94 c.c. per head was given to each animal by subcutaneous injection and there were no untoward symptoms.

The second batch consisted of 33 horses and 2 elephants. Each of them was given first a desensitising dose of 5 c.c. of serum. Within a couple of hours two horses had an attack of anaphylaxis, the symptoms of which lasted for about 24 hours. After the symptoms were completely abated, each of these 2 horses was given an injection of 75 c.c. of serum diluted with 25 c.c. of normal saline solution as a safeguard.

Each of the remaining 31 horses received 95 c.c. of serum 3 hours after the preliminary desensitising dose. But 7 of them had anaphylaxis within an hour.

Out of the above mentioned 9 animals which had anaphylaxis 6 animals were said to have been inoculated against anthrax about 6 years ago. It is really surprising to note that a dose of serum received so many years ago could keep the body hypersensitised to alien sera for so long a period.

The third batch consisted of 23 calves and about 25 adult cattle which were inoculated by S. S. method with anti-Rinderpest serum 9½ months ago; and 27 adult cattle which received anti-Rinderpest serum 3 years back. All the above 75 animals were first given a desensitising dose of Serum at the rate of 2.5 c.c. per each calf and 5 c.c. per each adult animal diluted with equal quantities of sterile normal saline solution, 5 hours later the remaining doses of serum at the rate of 15 c.c. per calf and 25 c.c. per adult animal was injected in an undiluted form without any untoward symptoms.

Conclusion:—The experiences detailed above show that dilution of the preliminary desensitising doses of serum with normal saline solution is capable of assisting in preventing protein reaction which is responsible for anaphylaxis or serum sickness.

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BABESIA CANIS INFECTION IN A PUP

BY

N. L. NARAYAN, *c.v.sc.*,

Veterinary Assistant Surgeon, Unjha, Baroda State.

For the first time a case of Canine Babesiasis in a pup was observed in this jurisdiction. The subject was my own black and white terrier aged about nine months.

Symptoms:—Fever up to 105°. Languor and loss of appetite. Nose hot and dry. Mucous membranes of the eyes and mouth were congested and tinged yellow. The urine was highly coloured with a greenish red tinge. There was great thirst.

Diagnosis:—She was suspected for Canine Babesiasis. Blood smears from the tip of the ear were taken and examined under microscope after staining with Leishman's. The examination revealed Babesia Canis infection.

Treatment:—She was admitted to the Dispensary on 31-3-'40 for treatment and 10 c.c. of a one per cent. solution of Trypan Blue was given intravenously into the saphenic vein. Careful nursing and nutritious diet were given. The temperature was recorded regularly. The ticks from the body were removed and destroyed. In the course of ten days she became perfectly alright. She is now playing well and feeding well.

My thanks are due to Mr. H. V. Kulkarni, *G.B.V.C.*, Disease Investigation Officer, Baroda State, Baroda, for his help given to me in the examination of blood smears.

WIRE-WORM INFESTATION ON TEGUR FARM

BY

V. N. KULKARNI, G.B.V.C.,

Deputy Director of Veterinary Services, Bombay, Poona.

Young cattle were dying on this Farm every year of gradual debility and swelling on the region of the neck.

This state of affairs continued for some years before the cause was investigated.

The Superintendent, Civil Veterinary Department, Bombay Presidency (Mr. Taylor) suspected the disease to be a parasitic affection from the description and history supplied to him by the Veterinary Inspector, Southern Division in the month of July 1920.

A cow calf that died on 3rd June 1921 with debility, inter-maxillary swelling, stertorous breathing and profuse lachrymation showed a number of filaria (*Hæmonchus*) in pharynx, larynx, trachea and bronchii.

Another bull calf that died on 13th June 1921 (ten days after the first one had died) with the same symptoms showed wire-worms in abundance in the abomasum and a few in bronchii.

A third case occurred on 17th July 1921 in which pulmonary hæmonchi were found.

Excluding these three that died in the year 1921 not less than twenty cattle died of this complaint in the previous three years.

All the calves and a few unthrifty adults were treated with copper-sulphate solution for about 3 or 4 years from the year 1921 and onwards.

The result of this treatment was satisfactory in as much as the deaths did not occur further (at least from this disease) and the Deputy Director of Agriculture said in a report of his in 1927 that "Wire-worm infection once affected the cattle very much but not now".

Sheep were introduced on this Farm in the year 1920 with the purpose of trying sheep breeding experiments.

These began to die from the year 1922-23, the toll of death reaching the highest in the year 1926-27. Altogether 76 sheep died in five years previous to 1927.

Enquiries were therefore started to investigate the cause of death in these animals. From the previous history of the Farm that cattle did die here of wire-worms it was presumed that that must be the cause of death in the sheep also.

An Interesting Case of Phymosis

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A course of treatment with a mixture of copper sulphate and mustard was started every year for five months from June onwards and has been going on since the year 1927 to date.

An ewe which died on 1.4.1930 showed wire-worms in the intestines. This case was first suspected for some nervous disease and had diarrhoea two days before death.

Unfortunately the Veterinary Assistant Surgeons had very few opportunities of conducting postmortem examinations on the carcasses owing to distance.

Treatment:—Copper-sulphate and its combination with arsenic or Nicotine or mustard. Copper-sulphate and carbon tetrachloride alternatively etc.

AN INTERESTING CASE OF PHYMOSIS

BY

V. SRINIVASAN, B.A., DIP., EON; G.M.V.C.,

Veterinary Officer, Alwar.

Long pendulous sheath is a characteristic feature of the Mewati breed as it is of many other breeds in India. This distinguishing feature in a way is a defect also. During the year 1939-40 as many as twelve cases of Phymosis or abscess in that region have been operated upon in this hospital alone. The following case deserves special notice owing to the magnitude of the tumour in that region.

A Mewati Brahmini Bull, aged 13 years, belonging to village Haldina in Alwar Nizammat.



History:—The bull had been suffering from Phymosis for six months. A big fibrous tumour with numbers of abscesses and ulcers, in the region of the preputial orifice, was dragging the whole sheath down so that it looked

as an extra leg (vide photo). The Preputial orifice was directed backwards and the bull urinated in much the same way as a camel does.

Operation — Two ounces of Chloral Hydras in a pint of water were given early in the morning of 12-1-39. The bull was cast and carefully secured. A tight tourniquet was applied above the tumour. Three inches below the tourniquet, a circular incision was made and the tumour dissected out and removed. The bleeding which was quite profuse was arrested by means of hot iron. The wound was then dressed with Tr. Ferri Perchlor and bandaged. The tumour weighed thirteen pounds.

The animal went off feed and the temperature in the evening was 104°F. A stimulant mixture consisting of Spts. Ammon. Aromaticus and Spts. Ether Nitrosi was given.

The fever continued for four days, and the animal did not take anything at all these days. To keep up the vitality of the animal I drenched the bull with one seer of milk in the morning and one seer in the evening with a pound of Gur. On the fifth day of the operation, the temperature came to normal and the animal began to feed. The wound was irrigated every day with a lotion of Permanganate of Potash and dressed with carbolised vaseline. It was discharged completely cured and fit for further service on 22-2-39.

The growth on Microscopical examination was found to be a fibroma.

The article would have been published long ago but the photographer mislaid the negative and found it only recently.

In my opinion, a long pendulous sheath has no physiological nor any aesthetic advantage to the animal.

College News

BOMBAY VETERINARY COLLEGE

The following students are declared to have passed the Final Diploma Examination for the Session 1939-40 held in March-April 1940 :—

- | | |
|---------------------|----------------------|
| 1. Devesan, C.P. | 13. Palekar, M.N. |
| 2. Handigol, D.G. | 14. Shaikh, G.C. |
| 3. Datye, B.S. | 15. Khasgiwale, J.K. |
| 4. Murkibhavi, G.R. | 16. Deshpande, S.K. |
| 5. Shiggaon, K.L. | 17. Latey, S.G. |
| 6. Kalaswad, R.K. | 18. Safaya, G.N. |
| 7. Dhulkhed, H.H. | 19. Patankar, K.P. |
| 8. Kaduskar, S.P. | 20. Khare, V.G. |
| 9. Khan, I.A. | 21. Parvatikar, S.V. |
| 10. Modak, N.R. | 22. Munshi, A.M. |
| 11. Siddiqi, M.A. | 23. Raina, J.N. |
| 12. Jog, M.M. | |

M. MOHEY DEEN, M.B.C.V.S., J.P.,
Principal.

(Note. In the last issue, result of A class was published instead of result of final Diploma Examination, by oversight and we regret the error. Ed. I.V.J.)

Extracts

HINTS ON POULTRY FARMING IN INDIA*

BY

A. E. SLATER,
Mission Poultry Farm, Etah, U. P.
Introduction.

Several requests having recently been received from Rural Development Officers and others asking for information and what we advice in regard to improvement of village poultry, this note has been prepared in the hope that it may prove useful.

The recommendations made in it are based on the methods followed at the Mission Poultry Farm, Etah, U. P., which has been running successfully since 1912, and its five branch (village) poultry farms, in the districts of Etah, Mainpuri, Fategarh and Etawah.

What is here advocated we know from experience will succeed if the work is carefully supervised, for many years the largest poultry show in India has been held annually at Etah, the exhibits of pure bred fowls all village bred, numbering from 1000-1500 and at the annual village poultry shows, we have had village exhibits of 300-800 pure bred poultry.

The methods recommended as to housing, care and management; feeding, prevention of disease etc, are those followed on the Mission Poultry Farm and its branch farms, and which in our hands have proved practicable, simple, efficient, and inexpensive.

How to Introduce Improved Poultry in Villages?

For the development of a village poultry industry throughout the country, it would be desirable to follow the method that has worked successfully in the Etah district and the adjoining districts. We would recommend the establishment at suitable centres such as district headquarters, of small but efficient demonstration poultry farms where the advantage of modern methods of housing, prevention of disease, pedigree breeding, feeding, hatching and rearing could be demonstrated.

Linked up with these demonstration centres there should be as many simple village poultry farms, in selected villages as may be deemed desirable. It would be best to have but one purebred variety kept at each village centre. Purebred eggs for hatching to be sold from these village centres at the rate of one anna per egg. To foster the industry an annual village poultry show should be held at each village centre and assistance also rendered in marketing the produce. To keep up the quality and stamina of

* "Allahabad Farmer", January 1940.

the fowls kept at the village centres, fresh stock from the central demonstration poultry farm should be provided as necessary.

Cost of Stock and Housing

The following suggestions are made as to costs, both non-recurring and recurring, for a unit fit for a village centre consisting of one all-metal tick proof house 6' x 4' x 4', yard and a pen of 10 purebred fowls. A non-recurring grant of Rs. 250/-; cost of 10 fowls Rs. 100/-; cost of runs and equipment Rs. 110/-; all-metal poultry house Rs. 40/- and a recurring grant of Rs. 250/- per annum for the maintenance of the fowls, pay of attendant and other petty expenses are required. It may or may not be thought desirable to establish small demonstration poultry farms at various district headquarters. This factor will probably be determined by the amount of money it is proposed to spend on poultry improvement, but if such a farm be contemplated it may be made up of one or more units, the cost of one unit having already been mentioned. If systematic rural improvement of poultry is sought, then in my opinion the village centres are the more important if both cannot be afforded.

Improvement of Local Breeds

Another method of village poultry improvement advocated by a good many is that of crossing and grading up the cross bred hens. To do this all desi males in the village should first be given up being exchanged for purebred. White Leghorns, Black Minorcas or Rhode Island Reds. Naturally only one of these breeds should be chosen and not all three. The crossbred females are then mated, again to a purebred cock, of the same breed used in the first cross. All crossbred males must be got rid of, for to mate the crossbred females back to a desi or cross bred cock is simply going backwards, and accomplishes nothing. If this method of crossing the cross bred hens with a purebred male is systematically carried on for about 5 years, the hens at the end of that time will be over 99 per cent. pure. This method is known as grading.

The first cross shows a great improvement. The hens are much better layers of larger eggs than the desi ones, and in case Rhode Island Red males have been used, larger also.

Local conditions must determine whether to use Leg horns, Minorcas, or Rhode Island Red cocks. If eggs are the prime requisite, Leghorn, or Minorca males may be chosen. If table fowls of large size are desired Rhode Island Red males may be used.

Which of these two methods should be chosen. The keeping of a pen of pure bred fowls in a village centre and selling pure bred eggs for hatching or the distribution of pure bred males in the villages to be used for crossing on the desi hens. The choice is again determined by local conditions.

If there are but a few families keeping fowls in that particular village and it is easy to persuade the people to get rid of all the desi males they have, so that these will not be a constant source of danger to the purebred fowls they raise then, we advocate the keeping of purebred fowls, as the villager can more readily earn more by this means. Should however the village be a large one, say with a large Mahomedan community keeping

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many fowls, then probably the crossing and grading method will give better results, as it will be difficult to persuade all the people of the village to give up all their desi cocks.

Coming now to the procedure to be followed in the village two main lines of improvement are open. Purebred poultry can be kept at the village farm, consisting as has been suggested, of a unit made up of an all metal tick proof house, a yard and ten purebred fowls, 9 females and one male. Eggs for hatching can be sold to villagers at one anna per egg and they can be encouraged to go in for purebred poultry. That purebred fowls can and do thrive in the villages has been established without any doubt. Only one breed in one village centre should be kept. Certain breeds are hardier however than others and after years of testing varieties the Mission Poultry Farm has found that White Leghorns, Black Minorcas and Rhode Island Reds all do well. Leghorn and Minorcas are "par excellence" "egg breeds" and are hardy, active and vigorous, non setters and excellent layers. Their eggs have to be hatched under desi hens for the "broody" instinct has been bred out of them. Rhode Island Reds are well known as a "general purpose breed", i. e. they are a "dual purpose" fowl, combining excellent table qualities with heavy laying. They are large hardy, hardy and vigorous, and in much demand by the public. They, however, being large fowls consume more food than do Leghorns or Minorcas.

Prevention of Disease

This is most important. It is my opinion from long experience, that the fowl tick whose bite causes "tick fever" or "Spirochaetosis" is the cause of the greatest loss, and the reason for most amateurs giving up poultry keeping. Poultry are of course subject to many diseases, and in recent years the dreaded "Ranikhet disease" or "Fowl influenza" has caused great mortality but the fowl tick is the arch enemy, because people seem to be conversant with it, or with "Tick fever". This is one case where prevention is much better than cure. Complete eradication of the tick is not difficult if the "all metal" poultry houses which I have advocated be used, and if these be thoroughly burnt out occasionally. Tick proof perches placed in any house are advocated by some, but these are not nearly as satisfactory as tick proof houses. Menials are liable to forget to fill the little oil containers on the tick proof perches with oil. The tails of some of the birds may touch the sides of the house, and ticks thus gain access to the fowls for they prey on them at night, secreting themselves during the day in deep cracks etc., and the owner is quite unaware of their existence. Some fowls refuse to use the perch. It is thus far better to instal the "all metal" house. The writer in 1912 had heavy losses from tick fever. He like most amateurs mistook this disease for fowl cholera, as the symptoms in both cases are very similar, and it was the microscopic examination of the blood which revealed the "Spirochaete." When he wrote to the Governments of the U. S. A., Australia, and S. Africa for treatment etc., of tick fever, the replies stated, that in each country the keeping of poultry by the farmers had almost to be given up because of the losses caused by tick fever, and it was only when the all metal houses were put into use, that the disease could be adequately controlled. This the writer did, and has used such houses ever since.

Many people cannot even recognise the fowl tick, but confuse it with lice, mites etc. It is a larger insect, considerably larger than a bed bug which it resembles somewhat. It feeds only at night so the adult tick is never found on the fowl, but in its larval or nymph stage it is found attached to the fowl and appears as numerous little round black spots about the size of a pin head firmly imbedded in the skin.

The symptoms of tick fever are green, yellow, and white, pasty, loose motions; great prostration; loss of the use of the legs, drowsiness, high fever. These symptoms are the ones found in fowl cholera also, which I believe to be a very rare disease. Tick fever can be cured in the very early stages by hypodermic injection of Soamin or Salvarsan, neosalvarsan, 606 aloxalate of mercury and so on. To expect the villager to do this is hopeless, but to eradicate the tick through the use of all metal poultry houses, which are thoroughly burnt out, is quite feasible and in this way this dread disease may be prevented. The writer receives more enquiries about this disease from poultry keepers than about any other and in his opinion tick fever is what causes amateur poultry keepers to get discouraged and entirely give up the keeping of poultry. Desi fowls are just as subject to this disease as crossbreds or purebreds. Ticks must be controlled.

Feeding.

The greatest mistake made in feeding, is that too much grain is usually fed, and not enough animal and vegetable food. It must be remembered that the "jungle fowl" from which all breeds and varieties of poultry have been evolved, finds very little grain in the forests. Its food consists mostly of insects and green growing shoots, the only grain usually being some weed seeds. The following method of feeding fowls has been practised on the Mission Poultry Farm, for many years and is cheap and has given satisfaction. If offal, i.e. "ratab" is not available, the animal food so necessary can be given in the form of sour milk, "dahi" or butter milk. Both are very good. If heavy egg production is looked for some form of animal food must be given to provide the protein as eggs are rich in this.

The method used on the Mission Poultry Farm, Etah.

In the morning a feed of grain composed of wheat (gehun), maize (makka), and great millet (juar), about equal proportions of each, one handful to each fowl, i.e. about 2oz. If the birds are not on free range in order to induce exercise the grains should be scattered in a litter of dried leaves, dried grass or bhoosa, etc., about 6 inches in depth to keep them scratching for it.

At noon they get all the green food they can eat which in the winter consists of such things as cabbage leaves, cauli flower leaves, chopped lucerne etc., or whatever is available from the vegetable garden. Doob grass if available is also very good. They will usually eat about 2 oz. each of green food.

In the evening I give a moist mash, all they can eat which will again be about 2 oz. for each fowl. The mash is made up as follows:—1/3rd cooked minced meat. I buy from the slaughter house what is commonly known as "ratab" (paunches, lights etc.) This is a non-stimulating white meat and

very nutritious and can easily be bought for half anna or one anna per seer. 1/3rd of the cooked vegetables using whatever is available. Pumpkins, turnips and onions etc., are all good. I use whatever is in season and easily procurable. 1/3rd of *atta* consisting of a mixture of wheat *atta*, and *bejhar ka atta*, in about equal proportions. The minced meat, cooked vegetables, and *atta* should all be thoroughly mixed and fed in a moist and crumbly condition i.e. not sloppy; a little practice will enable one to know how much water to use, and the same water in which the meat and vegetables are cooked in, is the best.

Hatching and Rearing.

The best months for hatching are from October to February. If this is done the chicks are of good size, strong and robust by the time the hot winds commence in April. They will also be found far less liable to contract chicken pox if hatched early, i.e. in the winter or early spring. The village poultry keepers invariably hatch too late thinking that the eggs will chill and not hatch well, if hatched during the winter; but this is a mistaken idea. On our farm here we commence to hatch in October and complete all our hatching by the end of February. The following hints will be found useful:—

Hints for rearing and hatching of baby chicks.

1. Set the hen at night in a well ventilated semi-dark place apart from the other fowls.
2. Do not place more than 7 eggs under a country hen.
3. Use a nest box without a bottom, make the nest on the ground; scoop out the earth to saucer shape, and line the hollow thus formed with cut straw and tobacco stems or leaves.
4. Before setting, examine the hen for insects and if found, dust with a good insect powder. A hen covered with vermine sits badly, and in due course the chicks also become infested and do not thrive, the result often being fatal.
5. Make certain that the hen comes off the nest daily to feed and that she is provided with maize, fresh water, and a dry dust bath. She may remain off the nest from 10 to 20 minutes, according to the season of the year. Cooling the eggs daily is most important.
6. Leave the hen alone at hatching time.
7. Do not feed the chicks till from 48 to 72 hours after hatching. Allow them to absorb the yolk.
8. If available give them sour skim milk or butter milk to drink from the first.
9. First feed with rolled oats or stale bread crumbs with hard boiled eggs, boiled for thirty minutes, in the proportion of six parts of the former to one part of the latter. Mix in shell and all. Feed six times daily in small amounts about one ounce per day to 12 chicks.

10. After three days begin feeding with a good chick feed. A mixture of crushed wheat, maize (makka) equal parts with a little cracked rice is good.
11. Gradually increase the amount of chick feed continuing it until the chicks are old enough to eat whole or coarsely cracked grains.
12. After ten days, feed a bulky moist mash consisting of boiled vegetables, dried off with a good poultry meal. Feed with mash twice daily and chick feed three times.
13. When one week old green food must be given. Lettuce, cabbage, lucerne, sprouted oats or barley are all good. Chop it fine. Minced meat must also be given. For best results try white ants. Nothing is better.
14. When four weeks old feed four times daily and when eight weeks three times daily. Always give chick feed or grain in litter and make them exercise. Never feed on bare floor.
15. Feed as much raw or cooked vegetable at all times as they will eat.
16. Close confinement, poor ventilation, and feeding largely on grain and not on mash will never produce husky vigorous stock.
17. Dust chicks with insect powder. Oil boxes and perches with kerosene. Avoid overcrowding.

CANNED FOODS IN RELATION TO HEALTH

BY SIR WILLIAM SAVAGE, B.SC., M.D. (LOND.)

(Abstracted from the *Lancet*, Vol. 11, 4th November, 1939, p. 991).

Nutritive Properties

Reduced to essentials, the canning process involves preliminary treatment to select the parts of the food which are suitable for canning and in some instances to blanch, soften, or otherwise prepare the food and a subsequent heat treatment in sealed containers to render the food safe for storage for long periods and subsequent use after preparation. All canned foods are therefore subjected to treatment, particularly by heat, and it is possible that this may affect the nutritive qualities of the food so treated.

On the quantitative side there is no evidence that foods so treated have their total nutritive value affected in any way. Indeed from this point of view they possess considerable advantages due, on the one hand, to the fact that to give a successful commercial product the foods must be utilised by the canner in an extreme state of freshness and, on the other hand, that the preliminary treatment is calculated to make the whole of the food canned available as food without any wastage.

Qualitatively the position is not quite so simple, for theoretically it is possible that the treatment given might affect the mineral balance and the vitamin content. The question of mineral balance really only arises as regards milk, and there is no evidence that it is affected. Henry and others,

who studied this and other questions for dried and evaporated milk, state 'no significant difference was found between the biological values of the proteins (nitrogen) of the processed milks', and 'as regards biological value and true digestibility the figures show very slight reduction but not of statistical significance'.

Our knowledge of vitamins and the conditions under which they are destroyed or reduced in foods has been greatly augmented in recent years, so it is now possible to furnish reliable data as regards their presence in canned foods.

Vitamin A :—Both this vitamin and carotene are insoluble in water and stable even at high temperatures, provided there is an absence of oxygen. Vitamin A is much more sensitive to oxidation than to the degree of heat. Experimental work confirms that canning is not destructive to this vitamin and is definitely less prejudicial than ordinary cooking.

Vitamin B-2 complex :—is very heat stable; but, since it is water soluble, loss is to be anticipated from the preliminary washing (for fruits and vegetables); but this applies even more so to ordinary cooking. The experimental work done is not very large, but as regards riboflavin, probably the least stable member of the complex, no loss has been observed in several foods, including evaporated milk.

Vitamin D :—has a high stability to heat, and experimental work confirms that no destruction takes place during canning.

Vitamin B-1 :—is comparatively less affected by oxidation and possesses considerable resistance to heat in an ordinary acid medium. On the other hand, it is water soluble. Preparation processes, whether for ordinary domestic cooking or for canning, may cause considerable loss of this vitamin. Roscoe found that about half the B-1 content of spinach went into solution in the cooking water during a period of 15 minutes' boiling, and Baker and Wright show considerable cooking loss with some foods. Apart from loss in preparation the rather scanty experimental evidence suggests that the destruction of vitamin B-1 in the canning is usually small, but that there is some. Except for milk, there do not appear to be any reliable comparative figures of the vitamin B₁ content of the same food before and after canning. For milk Henry found little or no destruction with dried milks but considerable loss with evaporated milk.

Vitamin C :—is readily affected by heat, by washing, and by storage. Numerous investigations have been made on the influence of these factors, particularly as regards ordinary cooking. The vitamin C content of fruits and vegetables shows considerable variations even with the same food. Further, the content begins to diminish from the time of picking, and here canned foods have a definite advantage as economic factors necessitate the shortest possible time between picking and canning.

Very few papers give comparative figures for the vitamin C content of the same foods raw, cooked, and canned. Valuable studies have, however, been made by Oliver; she concluded :—

'Part of the vitamin C content is extracted from plant tissue when it is heated in liquid as in cooking and canning. At the end of the normal

process in each method the ascorbic acid is frequently evenly distributed throughout solid and liquid. The percentage of ascorbic acid destroyed in both cooking and canning is comparatively small, but considerable quantities are lost to the consumer when the water used for cooking vegetables is discarded. Vegetables after storage may contain appreciably less vitamin C than the fresh material after canning.....The ascorbic acid content in canned material tends to fall on storage, but for all practical purposes the loss is not great.

The much higher content of ascorbic acid in raw fruits and vegetables is shown in the table below.

Henry and others experimenting with evaporated milk, found a loss of 30 per cent. of vitamin C. Numerous other examinations of canned fruits and vegetables, particularly tomatoes show a material retention of vitamin C adequate for them to serve as valuable sources of the vitamin. This particularly applies if the canning has been comparatively recent. Daniel and Rutherford found that, whereas fresh tomato-juice contained an average of 0.20 mg. of ascorbic acid per g., there was a loss of about 12 per cent. on canning and a further loss of 10-13 per cent. on storage for six months. This still left a considerable amount of ascorbic acid. The practical experience of the French Mission to Greenland in 1922-23 was that the fifteen men lived for thirteen months on tinned foods, almost entirely without fresh foods, and no food-poisoning or nutritional defects resulted. The tinned fruits and vegetables yielded sufficient vitamin C to prevent scurvy.

TABLE
Amounts of raw, cooked, and canned fruit and vegetable
required to give 30 mg. of ascorbic acid.

Fruit or vegetable.	Raw	Cooked	Canned
Black currants ...	$\frac{1}{2}$ - $\frac{3}{5}$ oz.	$\frac{1}{2}$ -1 oz.	$\frac{1}{2}$ -1 $\frac{1}{2}$ oz.
Gooseberry ...	2 $\frac{1}{2}$ -3 $\frac{1}{2}$ "	3 $\frac{1}{2}$ -7 "	3 $\frac{1}{2}$ -9 "
Spinach ...	1-3 $\frac{1}{2}$ "	2-8 $\frac{1}{2}$ "	4 $\frac{1}{2}$ -8 $\frac{1}{2}$ "
Broad bean ...	3 $\frac{1}{2}$ "	11 $\frac{1}{2}$ -13 $\frac{1}{2}$ "	6-8 "
Pea ...	3 $\frac{1}{2}$ -5 $\frac{1}{2}$ "	10 $\frac{1}{2}$ -16 "	3 $\frac{1}{2}$ -13 "
Carrot ...	13-106 "	11-39 "	26-34 "

The commonsense way of looking at the question is to realize that all cooking processes, whether domestic or canning, cause material loss of vitamin C and that storage causes additional loss. Modern canning methods are designed to minimise this loss, so that it is better controlled than domestic cooking, and the loss may well be less. If we require a high intake of vitamin C, we have to rely on fresh fruits and vegetables to supply, for all cooked foods are inferior sources. For a sufficiency level many canned fruits and vegetables have an adequate amount. It cannot be considered as in any way prejudicial to canned foods that being cooked foods they share the limitation of all cooked foods as inferior to raw foods as sources of vitamin C.

The nutritive side of canned foods has also been studied experimentally. Godden and Thomson fed some 1,700 rats in four successive generations over a period of eighteen months in comparable groups, one entirely on canned foods and the other on fresh foods cooked as in an ordinary household. Their finding on the rats fed on canned food was as follows:—

'Their performance in respect of breeding, growth and composition of the body as a whole as well as of the bones and teeth separately was in all respects comparable with that of similar rats fed on a diet of corresponding foods, shop purchased or locally grown and cooked under household conditions. In both cases the performance was up to the average for the rats in the stock colony on what is considered to be an optimal diet.'

Their results confirm similar feeding experiments carried out in America by Kohman *et al.* over a period of four years. They also found canned foods superior as a source for calcium.

The extremely long periods in years over which canned foods can remain in good condition is shown by the interesting examinations summarised by Drummond and others.

General Conclusions

(1) On the nutritive side, canned foods compare favourably with fresh foods, when allowance is made for the fact that the former are already prepared for use and the latter are subjected to any losses which may take place in domestic preparation and cooking. These facts apply qualitatively as well as quantitatively. So much attention in modern canning practice is paid to the preservation of the vitamins that, as regards vitamin-content, they are not, in general, inferior to the same foods after ordinary cooking. In some cases they are definitely superior. The view that canned foods are devitalized foods (whatever that may mean) is not supported by nutritional research.

(2) On the chemical side there is no evidence that tin- or lead-poisoning now ever results from the consumption of canned foods. Faulty procedures may occasionally lead to considerable quantities of tin being present, and, since we have got sufficient information to say that chronic ill effects might not possibly occur, it is sound policy to take measures to reduce the tin-content to as low a figure as possible. There is no evidence that any such chronic ill effects have ever resulted.

(3) Canned foods share with all other foods the risk of being a vehicle to cause food-poisoning. From a study of all the data it can be definitely stated that canned foods are now considerably less liable than ordinary foods to be a source of food poisoning. This is conspicuously so for the more dangerous outbreaks associated with the presence of living bacilli. Liability to cause the milder outbreaks of toxin type still exists but is being reduced, and even for this type their incidence, bulk for bulk, is less than that of other foods.

(4) As regards our food-supply generally, canned foods can be accepted as a safe and convenient source and one without any special hazards, nutritional chemical, or bacterial. Their relative cost, as compared with fresh foods, is outside the scope of this article. The chief drawback to their usage is the liability for the discarded tins to provide a serious problem in scavenging, especially in rural areas.

"Indian Medical Gazette", May 1940.

Review

Practical Veterinary Pharmacology, Materia Medica and Therapeutics.—By HOWARD, J. MILK, D.V.M., Professor of Therapeutics and Director of the Small Animal Clinic, New York State Veterinary College at Cornell University, with a chapter on Biological Therapeutics by Adolph eichhorn, Director of the Animal Disease Station of the Bureau of Animal Industry, U. S. Department of Agriculture. 4th Edition. Cloth bound. 626 pages. 33 illustrations. Bailliere, Tindall & Cox, London, W.C. 2. Price 35s. (May be ordered through the *Indian Veterinary Journal*).

We are glad to review this book which has undergone all round improvement and is more or less up-to-date. Among the very many drugs appearing for the first time in this edition, the following will be particularly useful to the present day practitioner:—Cevitamic Acid, Nicotinic Acid, Protamine, Zinc Insulin, Prontosil, Sulfanilamide, Sulfapyridine, Salyrgan, etc. Busy practitioners who want to use latest preparations are at times puzzled to use an advertised remedy for lack of knowledge on the composition, indications, and contra-indications, in the light of experience of experts.

In this book we find the want fulfilled, and almost all the patent preparations are dealt with so that one can use the remedy intelligently.

The arrangement of the subject matter in this book is not like others on the subject. One finds in other books for example a metal and its salts dealt with in a single chapter. Here the various metallic and non-metallic remedies are grouped according to the action they produce on the various tissues of the body.

Pages 112-116.—“The method of increasing the volume of blood in the arteries.” The transfusion of blood, saline infusion, saline by hypodermoclysis, Proctoclysis or Enteroclysis, Intraperitoneal infusion are all fully explained.

The following extracts are instructive:—

Page 131. “Sodium Salicylate may be administered per rectum. The rate of absorption is so rapid from this channel that there is no reason for parenteral injection, etc.

Page 143. Strychnine. “Rectal doses more closely approximate the hypodermic than the oral etc.”

Page 237-240. Chapter on Vitamines considerably improved and brought up-to-date by including Thiamin, Riboflavin, Nicotinic Acid, Vitamin K (necessary for normal clotting of blood of chickens). Its lack results in haemorrhages, alfalfa is the richest source.

Page 329. Salyrgan—Mercurin. Salyrgan is of frequent need now and its mention is very apt.

Page 351. Sex Hormones. This is a completely new addition and both male and female hormones have been explained.

Page 533. It is refreshing to read “Serum allergy — Serum allergy may appear as acute shock (rare) or as an exanthema (urticarial scarlatinal, etc.) possibly associated with fever, pain, swelling in the joints and lymphatic

glands, and some degree of albuminuria. In the latter type, the symptoms appear 6-14 days after the serum is administered and may recur 2-5 day intervals for three (rarely four) successive times. There is invariably recovery.

Page 548. Canine Distemper vaccination. “Best results are obtained when the animals are vaccinated at 3 months of age or older.”

Infectious Laryngorracheitis of fowls is an addition to the Biological Therapeutic Section.

Single injection of Umeno and Doi against rabies; anatoxin, alum toxoid treatments are all detailed in the section on Biological Therapeutics.

Page 573. The dose for tuberculin is given.

“8. The suspected cattle should be submitted to a retest after the expiration of not less than 60 days. This class of cattle and those which show possible physical evidences of tuberculosis, emaciation, old age, or which have been tested repeatedly, should receive double the dose of tuberculin indicated above.

9. Experience has shown that animals, especially those of doubtful record, receiving large doses of tuberculin may respond early to the test, and one is advised to obtain temperatures at from the 4th to the 6th hour following the use of large doses of tuberculin”.

Page 577. Tuberculin. In badly diseased herds, combined use of the three tests are used and the details mentioned.

We have great pleasure to recommend this book to Veterinary practitioners and students as it contains a mine of all round information so badly needed for one to keep himself abreast of the times and to adopt the latest lines of remedies for the several ailments in animals.

Annual Report of the C.V.D. Punjab for 1937-38.—The staff including that of the College consisted of 35 (35) Gazetted officers excluding the Director and 405 (393) subordinate officers. The one newly sanctioned additional post of a Deputy Supdt. remained unfilled. The Dept. suffered a great loss in the demise of its Director, Mr. T. F. Quirke in January 1938. In their review, the Government have paid a handsome tribute to his work as follows:—“It is largely owing to his expert guidance and enthusiasm that Department has achieved a position not excelled by that of the Veterinary Department of any other Province in India.” This veteran worker controlled the Department for about 18 years and the work achieved by him bears ample testimony to his real and enthusiastic expert guidance.

A considerable portion of the report has been devoted to the valuable breeding operations. The Hissar Cattle Farm, the biggest the kind in India experienced the second successive failure of monsoons and the fodder supply assumed a grave turn. Including horses, mules, camels, sheep and goats, there were 9882 (9324) animals on the farm. 987 animals including 507 pedigree bulls and 204 approved bulls of a total value of Rs. 244025/- (Rs. 258560/-) were issued for breeding purpose at a concessional price of Rs. 74692/ (Rs. 67800/-) mainly to the District Boards. Apart from these, 1724 (1429) animals were issued from the farm for the double purpose of breeding and draught. Though the financial stringency held in Abeyance the ambitious but excellent scheme to increase the Farm herds to enable the

issue of 1000 pedigree bulls a year, still to meet the keen demand of breeders, about 204 approved young bulls from Haryana cattle tract long served by pedigree bulls, were purchased, reared and then supplied at the age of 2½ years to the Zamindars and others interested in breeding high animals. This is indeed a doubly welcome move since it puts some substantial money into the pocket of the local breeders. The experience there however is that pedigree bulls are by far superior to 'approved bull.' The milk records on the Farm Dairy showed satisfactory progress. Much valuable work in sheep goat breeding was started from finance from provincial and I.C.A.R. funds. Animal breeding activities on the Grantee Cattle Farms (5) in the cattle breeding special tracts and many other schemes have yielded successful results. "In spite of the progress made, a great deal still remains to be done. The total cow population of the province 2653056, requires over 26000 stud bulls but at present only 11302 approved bulls are registered with the Dept. "This statement in the review of the Government, encourages one to look forward eagerly for still further efforts in this direction.

294 (252) cattle shows were held.

Total mortality from contagious diseases was 33696 (31063) out of a total cattle population of nearly 16 millions in the province. R.P. and H.S. continued to claim a great percentage of deaths. It is satisfactory that 1417812 (851195) animals were immunised against various diseases. 30 cases of glanders were detected and destroyed. 3908 (3762) horses and camels were treated in 50 (46) centres. 83006 (73384) villages were visited and 520245 (556403) cases were treated on tours. In 304 (300) Veterinary hospitals, 1704578 (1637507) cases were treated and 262564 (330668) cases not brought to the hospitals were supplied with medicines. 395837-(355415) castrations in the hospitals and 268437 (271787) castrations on tours were done. 27 more of the administratively sanctioned hospitals were not opened for want of trained hands. Even retired Veterinarians and compounders were also employed to meet the increasing demand for Veterinary aid. There were 1216 (1200) outlying weekly dispensaries. The number of Veterinary first aid centres increased.

The Punjab Veterinary College continued to maintain its usefulness of popularity. 87 new students were admitted. 10 candidates out of 11 in the final year obtained the L.V.P. diploma. Refresher course and classes for training Dressers, Farriers, and Syces were continued. Starting of courses for training stock assistants and compounders was under consideration. Much valuable research work was continued in the College. Total expenditure in the department was Rs. 2352000/- (Rs. 2147000/-). Brief mention is made in the report of the effect given to the recommendations of the Royal Commission on Agriculture in India under several headings. The high standard of the work of the Department has been much appreciated by the Government who have been pleased to note that various prizes and medals were won by the cattle of the Punjab at the First All India Cattle Show in Delhi in 1938 and also the award of gold medal to the college hospital Surgeon Chaudari Mushtaq Ahmad, by the All India Association at its Conference in Bombay for his valuable Veterinary Instruments and appliances. While handing over this medal to the worthy recipient, the late Mr. Quirke, the then D.V.S. said; "His work and genius should be an example to the young men. We are proud of him and he is an honour

to the Punjab C.V.D. Our congratulations to Dr. Ch. M. Ahmad and the Punjab. The report is a record of "steady progress made on all fronts."

Annual Report of the Veterinary Department, Gwalior Government (1938-39):—His Highness the Maharaja Scindia has taken a great initiative in the expansion of the veterinary services in the Gwalior State and graciously provided the means to achieve it. This has greatly facilitated the work of giving prompt and effective veterinary aid to thousands of cattle which constitute a great part of the State's wealth. The Veterinary Department in its turn is sparing no effort in using the increased facilities for the utmost benefit of the people in general and the villagers in particular.

During the year under report the Department trained 39 local men as stockmen for the 39 paragnas of the State and 20 others as compounders. The work of castration of undesirable bulls and preventive inoculation of cattle against contagious diseases will be carried out on a very large scale by these stockmen who will work under the guidance of the Veterinary Assistant Surgeons of their respective circles. The stockmen are also trained to do Propaganda work in livestock-improvement and preventive measures to be adopted to check the spread of contagious diseases by reading and explaining to the villagers the Departmental pamphlets on these subjects issued from time to time.

In the year 1938-39, 1,000 in-patients and 1,37,015 out-patients were treated in the Veterinary Hospitals and 12,606 patients were supplied medicines. The 19 touring Veterinary Assistant Surgeons treated 32,793 patients for contagious diseases and 13,921 patients for non-contagious diseases, in their tour of 3,773 villages in the State.

The main contagious diseases which broke out in the State during the year under report were rinderpest, foot and mouth disease, hæmorrhagic septicaemia and surra, the last two affecting only limited areas. Nine thousand animals were inoculated against rinderpest by serum alone method and 4,000 by G.T.V. method. This latter method which confers permanent immunity on the animals inoculated, has been started for the first time in this State and the results are quite satisfactory. Seven hundred thirty animals were inoculated against hæmorrhagic septicaemia.

The work of castrating scrub and undesirable bulls is progressing steadily and satisfactorily. During the year 27,247 animals were castrated.

In the Army 1,851 in-patients were treated in 9 Veterinary Hospitals.

OBITUARY

T. R. NAGARAJAN, G.M.V.C.

It is with deep regret we have to record the sad demise of one of our Colleagues, Mr. T. R. Nagarajan, G.M.V.C., Veterinary Assistant Surgeon incharge Veterinary Dispensary, Royapuram, Madras, on 20th May 1940, from Diabetic Carbuncle.

We tender our heartfelt condolences to the members of the bereaved family.

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