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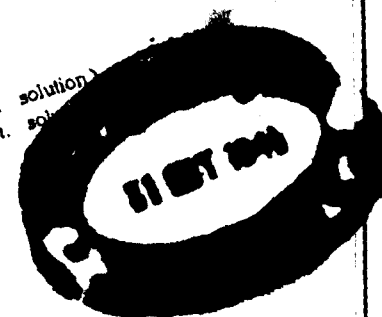
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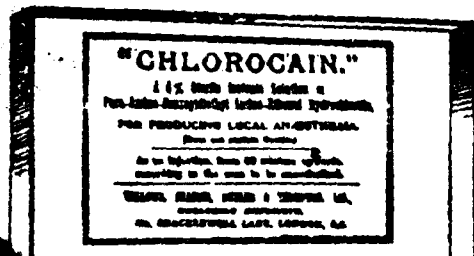
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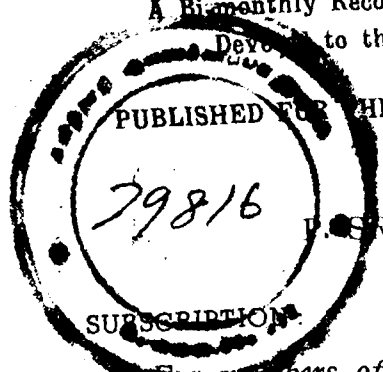
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(The Journal of The All-India Veterinary Association)

Vol. XXII

JULY, 1945

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Vol. XXII

JULY, 1945

No. 1

Original Article

SCHISTOSOMA NAIRI n.sp. FROM AN ELEPHANT

By

S. V. MUDALIAR, G.M.V.C.,

Lecturer in Parasitology, Madras Veterinary College

and

G. RAMANUJACHARY, B.Sc., B.V.Sc.,

Assistant to Lecturer.

Several species of Schistosomes are on record parasitising the blood of man and domestic animals. But no schistosome has so far been met with in the elephant, either in India or elsewhere. This paper records the occurrence of a species of schistosome, for the first time, as far as is known, in an Indian elephant, which is interesting.

Engaged in identifying the helminths obtained from a cow elephant-Eva which died in the 'Topslip' area of Coimbatore District in South India, this parasite under record was met with. The host was an aged beast, 68 years of age and till very near her end, on active work in the Coimbatore forest area under Government control. She was pensioned off from 6-9-44 and the only symptoms noticed prior to death consisted of a gradual going down in condition, inability and weakness. The specimen was in a bad state of preservation, having been picked up dead from the liver of the elephant, possibly several hours after the death of the elephant. However, a more or less satisfactory study of the worm was possible and the following morphological features were observed.

The entire specimen consisted of 104 worms inclusive of 26 pairs (male and female together) 56 free males and 22 free females.

Males.—Male worms (Fig. 1) are fairly stout and long and measure 9.4 mm. (average) in length and 0.5 mm. at the greatest width. The cuticle is densely studded over with coarse tubercles (Fig. 2) arranged in longitudinal

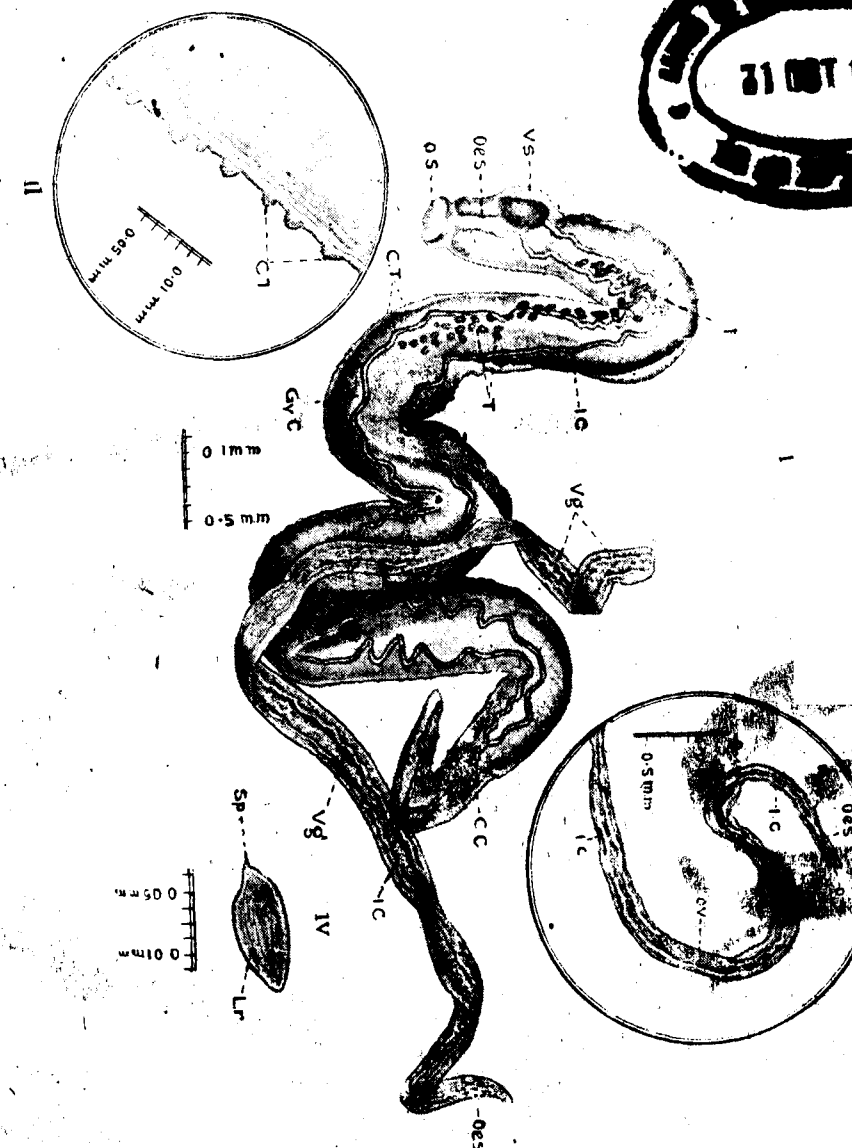
rows from below the ventral sucker to the tail end, on the dorsal surface. The ventral surface is smooth and both the edges are prominently intumed so as to form a well-developed gynaecophoral canal.

The oral sucker is almost circular, fleshy and surrounds the oral opening. It measures 0.3 mm. in diameter. The oesophagus is muscular, 0.45 mm. long and bifurcates into two intestinal caeca, at the level of the ventral sucker. The latter organ is a little larger than the oral sucker and measures 0.4 mm. in diameter with a well developed fleshy rim. The caeca continue a widely wavy track till very near the end and unite into a short common caecum, which is almost 1/12th of the entire length. In a few individuals, the common caecum again bifurcates, the divided caeca reuniting again after a very short distance to form a short second common caecum.

The male genitalia consist of a maximum of 52 testicular glands, all arranged in a chain or string from below the ventral sucker. The posteriorly situated testes are distinct, small, round glands while the anterior ones are irregularly flattened in shape, one opposed to another. The vasa efferentia and vas deferens are not easily discernible while the genital pore is near the lower border of the ventral sucker.

Females.—The female worm (Fig. 3) is slender and longer than the male, measuring up to 10.5 mm. in length and 0.25 mm. in width. The cuticle is devoid of tubercles. The suckers are more delicate and smaller than those of the male. The oesophagus is 0.15 mm. in length and the caecal branches reunite after a very zigzag course, very near the hind end. The common caecum is very short as in the male and in a few instances a second branching or bifurcation of the common caecum is noticed as in the male worm. The ovary is in the anterior fourth of the worm and 0.4 mm. in length. The uterus has a winding serpentine course ending in the genital pore situated at the ventral surface in the posterior margin of the ventral sucker. There is a single ovum (Fig. 4) seen in the uterus and the shape of the ovum is that of an elongate cone with one side flatter than the other and a short abrupt spine at one extremity. In the shell, could be seen a few longitudinal rugae or ridges. The egg measures 0.08 x 0.03 mm. The vitelline glands extend from behind the ovary to the very end of the body, between and on both sides of the intestinal caeca.

Discussion.—The morphology of the worm differs in more than one respect from that of *schistosoma* species recorded so far. The presence of a large number of testes is suggestive that this parasite may be related to the *bomfordi* group. But in *S. bomfordi* (Baylis, 1929) the female worm is smaller and shorter than the male and the common caecum thrice as long as the paired caeca; while in the *schistosoma* under record the female is distinctly longer than the male and the common caecum is very much shorter than the



Schistosoma Nairi n.sp.



III-a



IV-a

Schistosoma Nairi n.sp.
Microphotograph

Plate No. III

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I-a

- I. *Schistosoma nairi*, n.s.p.
 With the female attached to a portion of the gynaecophoral canal.
 - Ia. Do. (Microphotograph).
 - II. Part of dorsal surface of male worm showing tuberculation on the cuticle.
 - III. Female worm—anterior part showing ovum, uterus and ovary.
 - IIIa. Entire female worm. (Microphotograph).
 - IV. Ovum.
 - IV-a. Do. (Microphotograph).
-
- | | | |
|-------|---|----------------------|
| O.S. | — | Oral sucker. |
| V.S. | — | Ventral sucker. |
| T. | — | Testes. |
| I.C. | — | Intestinal Caeca. |
| C.T. | — | Cuticular tubercles. |
| C.C. | — | Common Caecum. |
| Gy.C. | — | Gynaecophoral canal. |
| O. | — | Ovum. |
| Ov. | — | Ovary. |
| U. | — | Uterus. |
| Sp. | — | Spine. |
| Lr. | — | Longitudinal rugae. |

Error — In page No. 2, in the body of the article, in the second line in the second para and fifth line from above for eusophagus is 'muscular' please read eusophagus is 'thick'.

paired caeca, the latter being almost 10 or 12 times as long as the former. Girges (1934) describes the length of *S. bomfordi* as 15 mm. in the male and 25 mm. in the female which does not agree with Montgomery's (1906) description, quoted by Baylis (1929) and Bhalerao (1935).

In *S. turkestanicum* Baylis, (1929) the number of testes is as many as 78—80; but the male cuticle is without tubercles; the common caecum is thrice as long as the divided portion; and the ova have a spine at each extremity. On the above factors, the schistosome under study is considered different from the two species of *Schistosomes*, (viz) *S. bomfordi* and *S. turkestanicum* to which alone a relationship could be thought of, judged by the large number of testes possessed by this parasite. Hence, it is new to science and the authors propose to name this schistosome, *Schistosoma nairi* n. sp. in honour of Mr. K.S. Nair, Principal of this College.

Specific identity.—

Males—9.4 mm. long; cuticle covered with coarse tubercles from the ventral sucker down to the tail end dorsally. Testes up to 52; common caecum very short, about 1/12th of the entire length.

Females—10.5 mm. long; cuticle without tubercle; ovary at the anterior fourth of worm; vitellaria occupying the entire worm from behind ovary. Common caecum very short comparatively; ovum elongate oval with one side flatter, a short abrupt spine and longitudinal rugae on shell.

Species—*Schistosoma nairi* n.sp.

Mudaliar, S.V. and Achary, G.R. 1945.

Host—Elephant

Location—Liver (Portal vein)

Locality—Coimbatore, S. India.

Acknowledgement

It is a pleasant duty to thank Mr. T. J. Hurley, the Director of Veterinary Services and Mr. K.S. Nair who gave all encouragement to the authors in this study. To Mr. Ramanujachary, Assistant to the Lecturer, thanks are due for having brought to the notice of the senior author this specimen from among other helminths and assistance in the study of this; to the artists of the College, the author is obliged for the illustrations in the paper—(to Mr. Dharmalingam for the camera lucida drawing and to Mr. Duraiswamy Mudaliar for the micro-photographs). Last, but not in any way least, the authors' thanks are due to Mr. S. Gopalan, the Veterinary Assistant Surgeon, who was scrutinising enough to collect these worms from the liver of the elephant.

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General Articles

DETERIORATION OF CATTLE IN CERTAIN PARTS OF INDIA AND ITS PROBABLE CAUSES WITH SOME PRACTICAL SUGGESTIONS TO OVERCOME THEM *

By

R. L. KAURA, B.V.Sc., M.R.C.V.S.,

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The existence of good and bad areas for cattle in India can easily be mapped out and correlated with certain types of cultivation. Good breed of cattle are confined to comparatively dry areas such as Sind, the Hariana and Dhanni tracts of the Punjab, Rajputana States, Kathiawar and in such parts of other Provinces where similar conditions exist. Pasture in these dry areas may be good in quality but is often scarce and the uncertainty of rainfall makes it obligatory on the part of zamindars to grow crops, the residue of which provides a good supply of fodder for cattle. Conversely in tracts with a humid climate which are subject to heavy rainfall or are provided with ample irrigation water a very poor type of cattle is found, in spite of the availability of grazing. In these areas, cash crops are given the most attention and fodders suitable for cattle are seldom grown (Figs. 1 and 2). Other areas which fall midway between these two possess cattle of intermediate quality and the reasons for deterioration are not so easily explained.

* Reprinted from the Indian Journal of Veterinary Science and Animal Husbandry, Vol. XIV Part 2 June 1944.

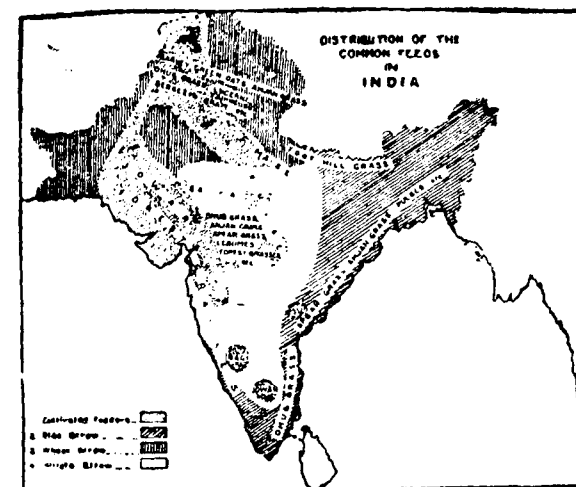


Fig. 1. Distribution of common cattle feeds in India

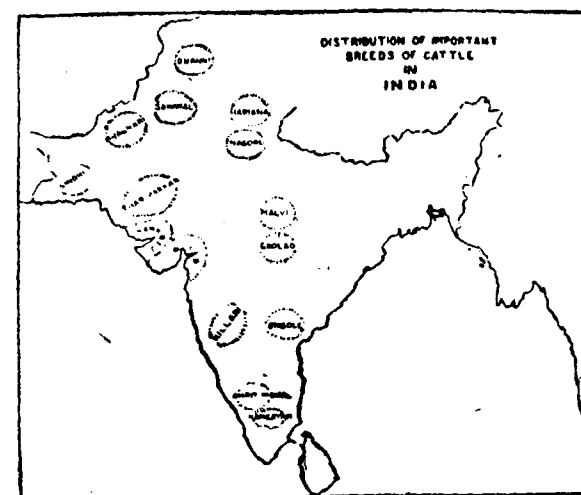


Fig. 2. Distribution of important breeds of cattle in India

It is a well-known fact that in the rice growing tracts and flooded areas of Assam, Bengal, Bihar, Orissa, Madras, Travancore, etc. cattle are generally found to be greatly deteriorated, both as regards their physical development and capacity for work and milk production. They are also more prone to diseases, and reproductive defects are common in them. It is also a common experience in these tracts that when foreign animals of any breed are introduced for the grading up of local cattle they deteriorate rapidly. In other scattered rice growing areas like Kangra district in the Punjab, Gorakhpur district in the United Provinces, Malabar coast of Madras, Chhattisgarh district in the Central Provinces, a similar type of

deteriorated cattle is found. In these areas the cattle being inefficient, the number of cattle required for agricultural purposes and for milk production is necessarily larger, even three to four times as compared to that of other areas where good cattle exist. The larger number of cattle causes greater strain on the available pastures which results in their further deterioration, thus producing a vicious circle.

In the States of Travancore and Cochin where the cattle are of a mongrel, non-descript type and where there are no recognized breeds, cows are notoriously poor milkers, the yield obtained being not more than that of a good goat elsewhere. The bullocks are puny and weak and on this account the ryot is generally unable to adopt and make use of modern, efficient and labour-saving implements. To improve the agricultural practices and provide more milk for the people the Travancore Agricultural Department imported bulls from the adjoining British Indian districts and Indian States, with a view to grade up local cattle. The Ongole, the Kangayam and the Amritmahal were the chief among these breeds. These carefully selected bulls were stationed at the Government Cattle Farms to serve the farm cows as well as the cows belonging to the local public, but the bulls did not thrive well and soon deteriorated. The calves born to them were also not satisfactory. They were, therefore, discarded. Yet another attempt was made and bulls from upper India belonging to the Sahiwal, the Sindhi and English cross-breeds were imported and tested. Of all these breeds, the Sindhi, a medium sized breed, has fared the best and appears able to withstand the local conditions admirably.

The United Provinces has been divided into five definite tracts according to the types of cattle found :

(i) The dry western tract (rainfall 20-30 inches) which includes the area west of the Ganges, stretching from Cawnpore to Saharanpur, including 14 districts which form part of the Agra, Meerut and Allahabad Divisions. In this tract good types of cattle, sheep and goats are to be found, and the soil and climatic conditions of the tract lend themselves to improvement being effected in the existing types.

(ii) The central humid tract (rainfall 30-45 inches) consisting of the highly cultivated areas of parts of the Rohilkhand, Lucknow and Fyzabad Divisions. In this tract only animals of moderate size and mediocre efficiency in draft and milk are produced and better classes of animals, if introduced, tend to degenerate.

(iii) The *tarai* tract, situated at the foot of the Himalayas (rainfall 45-65 inches). This tract includes areas where grazing is in abundance, but only small types of draft cattle can be raised. This tract has no cattle or buffaloes of milk type and better types of cattle degenerate rapidly.

(iv) The Bundelkhand area of many different soil formations where types vary noticeably with the different types of soils.

(v) Hill tracts which can produce only the poorest and smallest types of cattle and where cattle from other tracts tend to rapid degeneration.

Within the above tracts, however, there are to be found some areas which, though situated in a tract where generally poor types of cattle are raised are favoured in some way or other by suitable soil and fodder conditions and are, therefore, able to produce within these circumscribed areas cattle much superior in type to the general type of the tract.

In the rice-growing tracts of Bengal and Bihar, the condition of the cattle is very similar to that seen in other rice-growing tracts of India. Poor specimens of small stunted animals are commonly found in these areas. In Bihar, in spite of availability of plenty of grazing in the region where the Kosi river flows, the cattle and buffaloes are of a degenerate type, the average milk yield of cows rarely exceeding one seer a day and that of buffaloes varies from two to five seers a day.

At the Military Dairy Farms in the Punjab, Sind, North-West Frontier Province, and Baluchistan, it is said that the cattle do not appear to suffer from any mineral deficiency. There is some evidence to show that cows in the United Provinces and the Central Provinces benefit by the addition of minerals to their diet. Generally, yields of cows increase as one travels north and east of Delhi upto a height of 5,000 feet but excluding a narrow strip at the foothills of the Himalayas. In addition, the high country in the Central Provinces and the Deccan is fairly good in certain localities, for example Jubbulpore and Secunderabad, although it rains too much at Jubbulpore and cows fall off in condition during monsoon. The United Provinces is not good and gets worse as one travels towards Bengal. Coastal areas are bad, until Karachi is reached which area is fairly good and improving as one travels north. Ruk and Rohri are too humid for cows due to the Indus river. In this broad outline, there are, of course, certain local exceptions. High humidity combined with high temperature has been found to be the worst combination. In the opinion of many, no milch animal can stand the strain of producing large quantities of milk in such a climate for long and the breed deteriorates. The best buffaloes are bred in fairly dry localities and the ideal locality for buffaloes appears to be a place where there is a temperature of about 100°F. in the day and about 70°F. at night, lots of green fodder, coarse if necessary, and opportunity to wallow during the major portion of the day.

The deterioration is not confined to individuals only but also extends to their progeny, thus causing a long range drop in efficiency of incalculable magnitude. The under-fed bullock is unable to perform work satisfactorily, the semistarved bull is incapable of producing strong and virile progeny and

the ill-nourished cow gives very little milk. Besides the loss in milk yield, the cow under such conditions of malnutrition does not breed properly or regularly, often brings forth weak and sickly or dead calf and thus causes a further deterioration of the stock. All these under-fed animals fall easy victims of the ravages of disease and thus cause further expense and loss. This deterioration of cattle has a far-reaching effect on the agricultural operations and human nutrition and health. In the words of Sir Robert McCarrison [1927] it must be realized that the problems of animal husbandry are also the problems of human husbandry.

In these notorious areas, improvement of cattle cannot be effected by any method of breeding, unless the causes of deterioration are removed. The scientific demonstration of a definite cause or causes for a condition offers the best chance for introducing preventive and curative treatment. The problem of deterioration of cattle is a very vast one and its causes may be many.

From the information available from other countries, it is probable that diseases and internal parasites like helminths, intestinal and blood protozoa etc. play an important role in livestock deterioration and bring about heavy losses, though there can be no doubt that the low nutritive value of the natural pasture is another main cause of stock deterioration, especially amongst village cattle in India which depend almost entirely on grazing. The endocrines as affected by the deficiency of minerals, vitamins and proteins, trace elements like cobalt, manganese, fluorine, selenium, etc., and environmental factors such as climate, humidity, temperature, rainfall, etc. also significantly affect the health of cattle.

REVIEW OF WORK DONE

A. Foreign countries

A review of available literature on the subject shows that many notoriously bad areas for cattle breeding are known in Africa, Europe, Australia and other countries. A revolution has followed the discovery of phosphorus deficiency as the immediate or ultimate cause of serious losses in this branch of Agriculture. Extensive research work has been carried out on the various aspects of the problem and it will be of interest to review the same briefly in this note.

It has long been known that food must contain lime and phosphorus for the formation of bone and other inorganic salts for the blood and soft tissues. As early as the beginning of last century it was recognized that the lack of these might be the cause of abnormal conditions in sheep and cattle. By the middle of last century it was proved that some of these conditions in cattle, occurring in certain districts in Europe, and especially in the winter months and in seasons of drought, were due to the lack of either lime or phosphorus in the pasture or fodder.

In parts of South Africa, Australia and the United States lack of phosphorus in the pasture is associated with a disease which goes by various names, but is characterized during the life of the animal by stiffness of gait, slow growth, poor breeding capacity, general unthriftiness and pica (i.e., a 'depraved' appetite for substances such as old bones or earth) and on *post-mortem* examination, by a soft or brittle condition of the bones.

It has been shown, under experimental conditions, that lack of lime in the rations of cows may be the cause of failure to breed successfully, the calves being either born dead or with such low vitality that the death rate is high. Lack of sodium and chlorine has been proved to be a cause of unthriftiness in milk cows. Iron and iodine are also needed by the animal, but only in traces.

It is believed, however, that deficiencies, less marked than those referred to above as the direct cause of certain abnormal conditions, may exist and be the cause of a degree of malnutrition which affects the rate of growth and production, and may possibly render the animals more susceptible to specific diseases. Orr [1930] has suggested that in order to balance up the rations with minerals one should calculate from the known composition of the carcasses of animals or of products such as milk, the amounts of each of the different minerals which must be absorbed from the intestine and retained in the body for the building up of the bones and other tissues in growth, or used for the elaboration of products such as milk. For example, calcium (calculated as CaO) is present in the bodies of cattle to the extent of about 2 per cent and the percentage of phosphorus (calculated as P_2O_5) is only slightly less. Therefore, young cattle putting on 2 lb. per day live P_2O_5 weight would need to absorb and retain more than $\frac{1}{2}$ oz. of lime per day. Every gallon of milk contains about $\frac{1}{4}$ oz. of lime and $\frac{1}{8}$ oz. of phosphoric acid; hence a cow giving four gallons of milk a day would lose each day about 1 oz. of the former and $1\frac{1}{8}$ oz. of the latter in the milk. Only part of what is contained in the food is absorbed from the intestine and even what is absorbed is not all available for formation of new tissue or for milk, because there is a continuous loss through excretion. Hence, the food must contain more than is required to be retained in the body or secreted in the milk. To make up for calcium and phosphorus deficiencies, ground limestone and sterilized bone meal may be used respectively. Fraser [1935] has stated that wild herbivora and native breeds of cattle seem to be less liable to the effects of mineral deficiency than imported breeds of high fertility, rapid growth and heavy milking type, because such functions require more phosphorus than the natural pastures of a large area of the world can supply and therefore the improved breeds may die, lose type or revert to scrub under less favourable conditions. Progressive depletion of minerals in pasture lands exerts quite an apparent influence on the general well-being of the stock resulting in conditions like osteophagia,

delayed maturity, etc. He has suggested that the mineral deficiency can be combated by supplying the deficient mineral element in adequate amount either by direct feeding or indirectly through crop by manuring the soil, the latter appearing theoretically a more natural method.

Recently du Toit, Louw and Malan [1941] have published their final report on a study of the mineral content and feeding value of natural pastures in the Union of South Africa. In this study, originally it was decided to analyse the soil from selected areas, the herbage growing on the soil and the blood of cattle grazing on the pasturage. It was thought that a definite correlation existed between these three sets of data. But after the first three surveys which were reported on separately by du Toit *et al* [1932], the collection of soil samples was discontinued. The results warranted the conclusion that soil analysis does not provide a satisfactory method for studying the feeding value of natural pastures, as pasture on poor soil may yield excellent values if the samples for analysis are taken at an early stage of growth of the pasture. 'Animal' samples of natural pasturage were collected and chemically analysed. These samples were collected by following the animals at pasture in order to ensure that such samples were as closely as possible representative of what the animals actually consumed on the day of collection. Judged by the estimated requirements of cattle and sheep for growth all South African natural pastures, composed mainly or wholly of grasses are deficient in phosphorus, crude protein and in certain areas, sodium for a period ranging from five to nine months of the year, depending on the area. There are indications that in certain of those regions the pasture may be deficient in phosphorus also throughout the year. Furthermore, on the basis of the average value for phosphorus, these grass pastures contain at no time of the year sufficient of this nutrient to provide in the requirement for an additional function (e.g., gestation or lactation) of the animal, superimposed on growth. Theiler [1934] described in detail the clinical and histopathological features of the skeletal diseases of animals caused by mineral deficiency or imbalance and has cleared up the existing confusion in their classification by using the terms in their precise histopathological sense. He has also suggested that the endocrine mechanism may be of significance in controlling the mineral metabolism, a point which needs further research.

Humphrey [1931] has remarked that vitamins are substances of very pronounced physiological activity, and can produce remarkable changes in the normal body, even in minute doses. An adequate supply of vitamin A in the blood is necessary to maintain the mucous membranes in a stage of full physiological activity, including their functions of preventing bacterial infections and parasitic infestations, Vitamin D can be used with advantage to increase the bactericidal power of the blood and is of importance in connection with calcium and phosphorous metabolism. Vitamin E appears

to be essential for normal reproduction and lactation. It is found in the unsaponifiable fraction of wheat-germ oil, and shows close relationship to the group containing Vitamins A and D.

Green [1938] has reviewed the importance of trace elements in veterinary science. Many of the obscure diseases have now been attributed to the trace elements. Since plant food is the basis of animal life, any trace elements present in the plant are likely to be found in traces in the animal body as well, where they may exercise a beneficial effect (e.g. copper, cobalt, manganese) or a harmful effect (e.g. fluorine, selenium and molybdenum) or be entirely inert (e.g. boron). 'Nutritional anaemias' described under various names in various countries were considered to be due to iron deficiency and prevention of the disease could be achieved by providing licks of crude iron compounds. But, it is now known that catalytic trace elements are frequently involved in the aetiology of these naturally occurring conditions—sometimes copper, sometimes cobalt and sometimes both apart from ensuring sufficient iron for actual haemoglobin formation. Stewart and Ponsford [1940] have stated that although administration of cobalt has failed to cure pinning, the possibility is not ruled out that specific deficiency of this element may play an initial part in some areas in the cause of pinning by lowering resistance to parasitic diseases. Manganese is now regarded as an essential trace element for animal life, appears to stimulate growth, is involved in haematopoietic function, in skeletal metabolism and in reproduction. An excess of fluorine in drinking water interferes with bone metabolism and causes dental defects, osteoporosis, etc. An excess of selenium is manifested in cattle, horses and swine by a depressed rate of growth, loss of hair, most conspicuous in the mane and tail of horses, abnormal development and sloughing off of hoofs. Watson [1938] has suggested that the scouring and reduced milk yield of cows in certain seasons may be caused by a higher content of molybdenum in herbage of certain grazing areas of Somerset. Boron is known to be essential for plant life and hence finds its way in traces into the animal economy where, however, there seems to be as yet no proof that it performs any specific function. Traces of zinc, which seems to function as a stimulant to the growth of certain crops, increasing chlorophyll production and photosynthetic activity etc., would naturally find their way into the animal economy and are apparently sufficient since no naturally occurring zinc deficiency disease has been reported, although rats experimentally fed upon a purified diet containing less than 0.02 mg. per day showed delayed intestinal absorption and decrease in growth rate.

Cuthbertson [1940], while discussing the quality and quantity of protein in relation to human health and disease, has stated that although the adult physical pattern is determined by hereditary influences, yet in the period of growth it may be enhanced, dwarfed, warped, or mutilated by the

influence of the environment of which man's food supply and its protein element form a part. McCay [1912], quoted by Cuthbertson, states that there is ample proof of the all-important influence exerted by food and particularly protein, in determining the degree of muscular development, the general physical endowment, the powers of endurance, resistance to disease, and most of all the place a tribe or race has won for itself in manliness, courage and soldierly instincts, etc. The higher the level of protein interchange, the more robust and energetic, and the more manly the race. The density of population in relation to available food supply determines the protein intake. Low protein in diet reduces an animal's resistance to disease and retards the healing of wounds and prolongs convalescence,

Du Toit *et al.* [1941] have concluded that since, unlike phosphorus or calcium, the reserves of which in the animal's body may tide it over a long period of inadequate intake without appreciably affecting its productive performance, protein undernourishment may immediately limit production or prevent it entirely. The low level of this constituent existing for several months in each year in most natural pasturages must be considered the limiting factor in the productivity of both cattle and sheep in the Union of South Africa. They have further stated that the extreme deficiency of protein in the grass pastures during winter is a problem of equal, if not greater importance than that of phosphorus deficiency and they surmise that the improvement or supplementation of winter pasture with the object of increasing the protein intake of animals should greatly benefit the cattle and sheep industries of their country.

Leitch [1937] has remarked that in addition to the direct influence of under-nutrition or malnutrition due to the imbalance of the constituents of diet, vitamins, proteins or minerals on growth, fertility and production, there is the other, possibly even more interesting and important, indirect effect through its modifying action on susceptibility to infections. There is evidence that it may be an important pre-disposing factor in infection with *Br. abortus*. Ross and Graham [1933] have specifically investigated the effect of the improved pastures in (a) increasing the degree of parasitism owing to the heavier stocking carried, or (b) so improving the nutritional state of the sheep that the animals are able to resist infestation or at least the effects of infestation. Ross and Gordon [1933] pointed out that in sheep kept on a diet low in protein and minerals the resistance to *Haemonchus contortus* was completely broken down.

Richardson [1935] has stated that it may be that *climatic* factors affect the protein and mineral contents of a pasture and the difference in mineral content of pastures in tropical and temperate regions may be caused by a differential effect of climate on the rate of nitrogen and mineral uptake on the one hand and rate of growth on the other. Bonsma [1940] has discussed the influence of climatological factors on cattle and is of opinion that

livestock react strongly to climatic changes, because these changes affect their vital physiological functions such as internal combustion or metabolism, respiration, body temperature, habit, fertility, etc. The activity of endocrines like the pituitary and adrenal glands is also affected. The problem of under-development of cattle in tropical and sub-tropical regions is closely connected with the climate and temperature of the regions in which the animals are kept. Teodoreanu [1938] has reported that domestic animals brought from one region to another show variability of different degrees depending on the influences of climatic and food changes on their constitution, resistance, production, etc. It is possible to distinguish three types of such modifications.

1. In the first, the animals are subjected to non-hereditary modifications which can be observed and appraised by a competent eye and combated by prophylactic measures. The different parts of the body are subjected to slight diminutions from the original size. Robustness suffers as well as the productions of milk and beef.

2. The second class embraces animals showing hereditary variations during several generations. Constitution and production diminish until approaching that of the local breeds.

3. The third class embraces those animals that fail to become acclimatized. These degenerate gradually and disappear after three or four generations.

Henderson [1931] in discussing relationship of pica in cattle to trypanosomiasis has concluded that (a) Pica in Northern Nigeria bears a close relationship to trypanosomiasis of cattle, (b) the infection by trypanosomiasis causes an acidosis in animals with consequent upset of the 'alkali reserve' of the blood, (c) the excessive excretion of sodium and calcium during acidosis cannot be compensated by the amount of these elements in the herbage normally grazed by cattle, (d) the uncompensated loss of sodium and calcium leads to a craving for salts containing these elements and it is expressed by the showing of a pica symptoms.

Bisschop [1940] read a paper entitled 'Bionomic studies on indigenous and exogenous cattle in the semi-arid regions of the Union of South Africa' at the Seventh International Genetical Congress, Edinburgh in August 1939 and the suggestions for work under Indian conditions contained in this note are based largely on the work reported in his article.

B. India.

Under-nutrition, owing to lack of sufficient fodder for animals in the country, is probably the most important limiting factor to the development of cattle in India. In addition to general lack of fodder, however, there are in some areas marked deficiencies of minerals, protein and certain vitamins in the fodder. It is known that in many districts, in this sub-continent, the

soil is poor in phosphates. Thus in Bihar soils, Davis [1918] found that the total phosphorus percentage varied between 0.086 to 0.137 and the amount available from a trace to 0.002 compared with about 0.27 and 0.16 respectively in good soils. The report of the Department of Agriculture of Madras for 1918-19 states that crying need for almost all crops in Southern India is phosphoric acid. This poverty of the soil in phosphorus affects not only the composition but also the bulk of the pasture. Deficiency of phosphorus in the soil is, therefore, probably an important factor, both in under-nutrition and in malnutrition. Davis [1917] attributes low milk yield of cows in Bihar to deficiency in phosphorus in the pastures, and McCarrison [1927] has stated that in Bihar and on the coast of Malabar mortality among cattle is high, sterility is common, and the milk yield of cows low. These conditions are associated with pica. McCarrison suspects the cause to be lack of phosphorus. Warth [1927] puts forward the idea that it is probable that cattle in India suffer from deficiency of minerals other than phosphorus and that there may be a deficiency of common salt, i.e. of sodium and chlorine. It is a well-known fact that lack of salt has an adverse effect on the health and productivity of cattle and that the requirements for salt are specially high in hot climates.

The extensive investigations of McCarrison [1913] have indicated that there is a shortage of iodine in areas in the region of the Himalayas, but so far as is known this shortage is not associated with high incidence of goitre and its sequelae in cattle, though these conditions are very prevalent in human beings in some of the Himalayan regions.

The economic importance of deficiency of minerals in the pasture was referred to by several witnesses giving evidence before the Royal Commission on Agriculture in India. Warth [1927] offered the opinion that it was impossible to lay too much stress on this subject. He believed shortage of calcium, phosphorus, sodium and chlorine occurred in various parts of the Empire and that deficiency of phosphorus was perhaps the most important Indian problem. McCarrison [1927] who has done exceedingly valuable work on deficiency diseases also emphasized the importance of deficiency of minerals, especially of phosphorus and iodine, in causing malnutrition which he regarded as the most far-reaching cause of disease in India. Olver [1933] has stated that one of the fundamental causes of degeneration of stock and loss to stock-owners is defective nutrition due to ill-balance or actual deficiency of essential food ingredients.

Ware and Sen [1937] have indicated as a result of a survey of the problem of malnutrition carried out at the Imperial Veterinary Research Institute, Mukteswar, that the effect of these deficiencies is not confined to a general physical deterioration of the stock, their productive power has been affected, breeding difficulties have become more common and susceptibility to certain classes of disease has been increased. To give a

few illustrations on the above point, mineral deficiency has given rise to pica and osteomalacia in Madras and Hyderabad and the stunted growth of animals in Berar has been ascribed to the same cause. This is probably also true in parts of Bengal, Bihar, and Assam. Milk yield in most of these areas is low, mortality is high and sterility is common. The disease known as 'blindness in calves' which is usually associated with a nonspecific form of abortion in cattle has been shown to be due to malnutrition. It will thus be seen that the problem of malnutrition is an all-India one, but it may be found necessary to tackle this subject regionally because the type of malnutrition may not be the same in every part of the country. They have emphasized the necessity for investigations of a comprehensive nature to study the problem of animal nutrition in relation to maintenance of health, normal growth and increased productive capacity of animals in India. Ware [1937] has discussed the importance of grazing in regard to the development of cattle and dairying industries in India and has made appropriate suggestions for the extension and improvement of pastures in India. Valuable studies of Indian grasses and grasslands have been made by Burns, Kulkarni and Godbole [1925 and 1928] with special reference to the Province of Bombay having varied climatic conditions and consequently different kinds of grasslands and have made useful recommendations for the improvement and proper utilization of grasslands.

Lander [1937] has briefly summarized the grazing condition in the different provinces and has recorded the results of chemical analysis of common Indian fodders and grasses grown on different soils and under different geographical and climate conditions and at various stages of growth. He has also given the results of mineral survey of the Punjab soils carried out by him. Referring to certain special areas which are noted for the richness of natural fodder and the excellence of animals which graze it, he has stated that the most notable of these is perhaps the Government Cattle Breeding Farm at Hissar comprising some 37,000 acres of natural grazing land, part of which is enclosed as irrigated paddocks. Hissar is the home of the famous breed of Hissar cattle which thrive to perfection on the highly nutritious grasses found in this area. The chief of these are (1) *Anjan* (*Pennisetum cenchroides*), (2) *Bur* (*Andropogon laniger*), (3) *Panni* (*Andropogon muricatus*), (4) *Palwan* (*Andropogon pertusus*) and (5) *Dub* (*Cynodon dactylon*). *Anjan* is the best grass on the *bir* (grazing ground); it grows over vast areas and is highly nutritious; it makes first class hay and has proved to be a most satisfactory ration.

Viswanath [1941] in his presidential address to the Section of Chemistry and Biology at the 10th Annual Meeting of the National Academy of Sciences has reviewed the recent developments in the Science of Plant and Animal Nutrition and their significance to national nutrition and health and has emphasized the importance and value of cattle manure

for the growing of crops. It is unfortunate that at present cattle manure, an extremely valuable fertilizer, is used more as a fuel in the form of *uplas* than as a manure. His experiments carried out in collaboration with McCarrison (1927), and with Suryanarayana (1927), have shown that the grain from cattle-manured crops, which showed greater vigour and grew a better plant, also possessed better nutritive value and higher protein and vitamin content than the grain from the mineral-manured or unmanured crop. Organic manures, besides improving the physical condition of the soil and being sources of the primary food constituents for plants, also supply some agents like auxinones or vitamins which contribute greatly to the growth and reproduction of plants. In addition to their bio-chemical activity, the micro-biological population of the soil contributed directly to the plant some stimulant which is ultimately passed on to the animal. It appears that auxinones for plants and vitamins for animals are probably the same, or of different, exist together and are independent, functioning in different ways, according to the manner in which they are introduced and the conditions under which they operate.

Sen (1935) has stated that a good breed will deteriorate if kept for a long time in a hot climate. He has referred to the harmful effects produced by the excess of fluorine in the diet of cattle in fluorine-rich areas, especially where fluor spar deposits occur and has stated that this substance is found in India in certain parts of the Central Provinces (Raipur District) and in some places in the Punjab and Madras Presidency. He is of the opinion that deranged endocrine functions (e.g. thyroid, pituitary) are likely to be associated with unbalanced rations supplied to the animals. He has stated that a very curious fact is that most of the good animals in India come from the tracts where rainfall is low and water is scarcely available. With the increase in the irrigated areas and consequent increase of crop production, growing areas are getting fewer and fewer and animals coming from irrigated tracts are much inferior in condition, so far as their performance is concerned and, moreover, these animals are more susceptible to parasitic infestations and diseases in general. Experiments carried out by Roy and Sen (1935) at Malkeswar, which is situated at an average elevation of about 7,000 feet above sea level in the Kaimur hills, show that with the growth of the plants and increase in rainfall, the percentages of lime and phosphorus in pasture grasses increase to a maximum in September-October. After this period, the amount of phosphorus decreases considerably with the approach of winter and dry conditions. No marked decrease in the lime content, however, takes place. They are of opinion that during the winter months, the ratio between lime and phosphorus may be abnormally high, and hence a ration composed mainly of a winter-cut hay without the addition of phosphorus-rich concentrates, may induce aphosphorosis and malnutrition in cattle. Sen (1935) has stated that

deterioration seen in most of the indigenous breeds in India is due to a number of cause, of which malnutrition and disease are probably the most important causes and which are to a large measure interdependent. To a great extent indigenous animals appear to have adapted themselves to the type of food stuffs available in this country, namely to a diet containing a low amount of protein and minerals and a fairly high amount of fibre, but the net consequence of this malnutrition has been the survival of a type of animal which is small, undeveloped and economically very unproductive. The milk yield of the cow is low, breeding difficulties are common and in the case of draught animals, the return in terms of work is very small. Large numbers of such animals exist throughout India and are, from an economic standpoint, a serious loss to the country. Any attempt to improve the animal industries of India must, therefore, take into account the need for adequate and well balanced diets for domesticated animals of all kinds, and in order to do this, which constitute a well balanced diet, systematic research work on the nature of our food-stuffs is essential. He has also emphasized that there is an intimate connection between malnutrition in cattle and malnutrition in human beings. Sen and Seshan (1938) have described the various conditions, e.g. congenital blindness, night blindness, abortion, lowered vitality, etc., associated with avitaminosis A in cattle and have suggested the ways and means of controlling these conditions in the field. The available sources of this vitamin or its precursor (carotene) for livestock are discussed and suitable methods of preserving green fodder with minimum loss of carotene are given.

Lander (1939) who made a comprehensive nutritional survey of the Kangra Valley has remarked in introducing his note on the correlation between soil deficiencies, poor cultivation, unthrifty cattle and human nutrition that not only were the cattle of this district of a small size but they give very little milk and a majority of these were dry during the greater part of the year. The main fodder of these cattle during the greater part of the year was rice straw, very rarely supplemented by concentrated food. It was deficient in protein, calcium and phosphates. This unsatisfactory system of agriculture led to insufficient supplies of animal products like milk to the inhabitants who, therefore, suffered from deficiency diseases like osteomalacia, goitre, etc. He stated that high rainfall involved considerable leaching from the soil of soluble minerals, the most conspicuous of which was calcium. He suggested that each province should endeavour to concentrate on most outstanding features of malnutrition in their territory and having found the causes should set to work to remedy them. Olver (1937) in discussing the relation of animal nutrition to public health in India has suggested that village cultivators and stock-owners should produce more fodder crops, more and better farmyard manure or compost and better stock, thereby increasing their income and

the nutrition of the family, while maintaining the fertility of their holdings and making a substantial contribution to the maintenance of public health.

Gorrie [1937] has stated that the awful deterioration in the type of cattle wherever common grazing persists as the usual practice is a most striking and consistent feature of Indian animal husbandry. This deterioration is seen at its worst in all districts containing large areas of wild land, too steep or too poor for cultivation, and, therefore, includes the whole of the Western Himalayas and the many ranges of lower hills further south. In these common grazing areas almost every kind of livestock competes for a living and large migratory flocks of sheep and goats which descend from the high hills every autumn to the adjoining plains, like locusts in their number, cause sheer destruction of the available grazing. On the other hand, better-known breeds of Indian cattle are found in areas where there is practically no common grazing ground left. e.g., dry areas of the Punjab and where the people have been forced to rely mainly upon stall-feeding and to concentrate upon fewer and better animals. At the time when hay ought to be made in the months immediately following the monsoon, the cultivator is busy with his autumn ploughing, so the cutting of grass is inevitably delayed until only the dry bones of the grass crop are left. It is not possible to alter the agricultural calendar, so improvements appear to lie along the lines of grass cultivation by contour ridging and by any other means which keep the grass green for a longer period. Shah [1939] has stated that it is a well-recognized fact that the intense over-grazing to which the ravines and other grazing grounds in the United Provinces are subjected prevents the maximum production of fodder, and that the only way to increase the fodder supply from uncultivated lands is to reduce the incidence of grazing. In ravine areas, goats, in particular, are most destructive to the natural vegetation. The finest cattle in the Provinces are to be found in districts like Meerut where the grazing grounds are at a minimum and the worst cattle in districts such as Jhansi where the grazing grounds are at a maximum. It is of little use to spend money on breeding bulls and improved breeds of cattle, unless the improved breeds and their progeny are better fed. The only way to do this is to grow more fodder on cultivated lands and to reduce the intensity of grazing on uncultivated lands.

Aiyer and Kayasth [1931] have analysed the grasses and fodders growing in different parts of Central Provinces and Berar and have found that the grasses are very poor in phosphoric acid, calcium and nitrogen contents. The grasses grown on heavy black soil are, however, richer in mineral content than those grown on light soil. The poor stunted growth of the cattle in Chhattisgarh may be due to the phosphate deficiency in the ration. They are of the opinion that the lime deficiency may not be so pronounced as phosphate deficiency, for *jowar*, *kadbi*, paddy straw and wheat straw which form a good part of the ration contain high proportion

of lime. They have suggested that the addition of an oil-cake may make up the phosphate deficiency and the lime or nitrogen deficiency, if any, can be made up by the addition of leguminous fodders, e. g., berseem, *jowar*, soyabean *kulthi*, etc., in the ration. In the rice tract, the rice polishing (*kunda*) which is rich in phosphoric acid should not be wasted but utilized in feeding to the cattle. In the wheat tract *bhusa* of the leguminous crops should form a part of the ration to the cattle. Iyer [1935] has shown that the mineral composition of grasses may be affected by the type of the soil, the species of grasses, maturing and cultivation. Chaudhuri [1933] has reported that calves which were stunted in growth improved considerably in weight and condition after being fed a mineral supplement.

Bhalerao [1934] has stated that in India there are numbers of ailments of cattle which go unnoticed and undiagnosed and which, although not in all cases apparently serious, undermine the health gradually and render them incapable of serving humanity to their proper extent, while in some cases they even take their toll of life. Such diseases are usually caused through the agency of worms which are parasitic in the various organs of these animals. Although exact data are not available at present in regard to the loss that is actually caused by worms, it is certainly larger than generally imagined. The Veterinary Investigation Officers working under the Imperial Council of Agricultural Research schemes have discovered the existence of nutritional disorders, e.g., osteomalacia, pica, infertility, eye-troubles etc. and high incidence of parasitic infestations in certain parts of India which include the notorious tracts referred to in this note. The Council's Helminthological schemes and the nutritional schemes have thrown and will throw in due course more light on these aspects of this vast problem of deterioration of cattle. Carbery, Chatterjee and Talapatra [1937] have carried out a fairly comprehensive series of experiments to determine the mineral requirements of cattle in the rice growing tracts in north-east India. The results indicate that *aus* straw is considerably superior to *aman* straw in minerals and protein and hence in general feeding values, but both straws are poor in phosphate and slightly deficient in lime. The phosphate might be conveniently supplied through cake while a small supplement of chalk would make up lime deficiency. Rice *kura* (bran) is very poor in CaO and unusually rich in phosphate (over 6 per cent). The CaO and chlorine figures have definitely given a negative balance; while in spite of heavy P₂O₅ ingestion (39 to 59 gm.) a negative balance has been recorded up to the stage of 43 gm. This is probably due to the presence of phosphorus in the rice bran mainly as phytin which is not readily assimilable. Rice bran should, therefore, be supplemented with lime and chlorine on one side, while its phosphorus compound should be brought into assimilable form by hydrolysis. In the case of green feeds, Guinea grass is better balanced than Napier and Hyacinth, but the feeding

should be regulated in order to avoid a large ingestion of lime. Napier grass should be supplemented with CaCO_3 and both Napier and Hyacinth should be so regulated as not to involve a larger ingestion of potash through them. They both (specially Hyacinth) require some cake supplement. Hyacinth is often used as a fodder in some parts of Bengal when there is a fodder scarcity.

Chatterjee [1942] has stated that in the rice-growing tracts rice straw has been and will probably remain the chief roughage and as its use must have largely contributed towards the present situation its judicious feeding is of much importance to the future well-being of cattle. The main deficiency with rice straw is that it is very poor in protein and phosphorus and contains a large quantity of crude fibre on one side and an interfering substance (oxalic acid) against a proper absorption of lime on the other. Again depending on the nature of feed combinations, the digestibility of straw protein varies from nil or even negative to 3, 4, 5 per cent going up to 37 per cent. When a balance sheet was drawn of the intake and outgo of the essential body components, more protein, lime, magnesia and phosphorus were drained out of the body than were supplied in the feed, with the inevitable result that the animal lost in condition, body weight and thriftiness. As soon as the animals were provided with a suitable concentrate (linseed cake) a valuable combination of protein and phosphorus ensued with the result that not only did the general appetite and consumption go up but there was definitely better utilization and assimilation of the food components and the animals gained in the weight.

Ramiah [1939] has stated that an area in the Kurnool district was investigated as a deficient area in phosphoric acid as revealed in the pasture survey. A disease commonly known as Vayu-Potlu resembling ostomalacia or arthritis is endemic in that area. Blood phosphorus was very low, giving a blood picture of pronounced imbalance. The presence of fluorine and mineral imbalance are factors operative in the incidence of the disease. A similar field survey of cattle in South Kanara district showed less pronounced symptoms of deficiency resulting in general poverty of condition in cattle. Herbage protein studies revealed that manuring has a marked effect on the total nitrogen content and type of distribution of nitrogen in the herbage of cereals.

Anwar Ullah [1939] has stated that most of the constituents, especially the minerals in the fodders, tended to decrease with advancing age, the main exception being in the case of nitrogen-free extract which always increased with age. In certain cases, of course, this did not hold true which is mainly explained by some disturbing conditions, such as damages due to drought, flood, etc., or disturbing conditions like manuring, etc. Influence of soil conditions in Bihar was very marked and it may be said that all fodders grown at Sabour, Darbhanga, Pusa and Patna are expected to be

rich in most constituents, especially the important ones like protein, calcium and phosphoric acid, whereas the fodders grown at Kanke, Jamui, Nawada and Banka are generally expected to be poorer. Exceptions, of course, exist but these show the general trend. Though there were no controlled experiments on the effect of seasons on the composition of fodders, yet it is observed in a general way that the fodders grown in the 1938 season were richer than the fodders grown in 1936 or 1937. In some cases the 1936 crop was also richer than the 1937 crop, which seem to have been the poorest in recent years.

SOME PRACTICAL SUGGESTIONS

To elucidate precisely the causes of degeneration of cattle in various parts of India is a difficult and complicated problem requiring systematic investigation and involving considerable expense and time. For such an investigation it is necessary that data should be collected from the affected areas regarding local environment, e. g., climatological factors, condition of soil and water, nutritional deficiency including that of important minerals like calcium and phosphorus or their imbalance and of vitamins, especially fat soluble vitamins, A, D and E, the excess or absence of trace elements like fluorine, cobalt, manganese, etc. and the incidence of diseases and parasitic infestations including blood parasites etc. The probable causes of deterioration in these areas should first be sorted out and the point settled whether the various suspected causative factors act singly or in combination by actual experimentation upon batches of local cattle and cattle imported from good areas where deterioration is not marked. The actual number of these batches will depend upon the number of suspected etiological factors e. g., climate, diet, parasites, etc. and the possible combinations in which these factors may be operating, keeping suitable control.

In each experimental batch the unwanted factor or factors should be completely eliminated as far as possible, e.g., by supplying the deficient mineral or vitamin or protein in adequate quantities by the most suitable route, by overcoming parasites by regular use of suitable drugs and examination of faeces or blood as the case may be, by dealing with the trace elements as required, and by regular immunization of the animals against the prevalent contagious diseases like rinderpest, haemorrhagic septicaemia, etc. Regular data in detail with photographic records should be collected from all the animals before the commencement of the experiment and during the course of the experiment and the beneficial results accruing therefrom in regard to growth, milk production, capacity for draught and reproduction should be observed. Chemical and biological analysis of blood, skin and hair studies and, where necessary, accurate clinical and detailed *post-mortem* examination should be carried out. This kind of investigation can be carried out successfully only if long-range experiments are planned.

say for a period of at least ten years, and it should be remembered that such a comprehensive investigation may produce very important and far reaching results.

However, by a careful analysis of the available information on the subject, some general conclusion can be drawn with which it might be possible to take some steps immediately with a view to tackling this serious problem with some degree of success. The following points arising out of the review of the existing literature deserve careful consideration :

1. *Grow fodder crops.* Good cattle are found in comparatively drier parts of the country where people grow or are forced to grow fodder crops for the maintenance of their cattle in the absence of sufficient pastures. It seems, therefore, necessary that if cattle-wealth of the poorer areas is to be improved a suitable proportion of the land should be under fodder crops. To make the agriculture more remunerative and the cultivators healthier and more prosperous, it is essential that fewer cattle with greater production and capacity for work should be maintained and fed properly utilizing the limited fodder resources in the best possible way.

2. *Balance rice straw.* Rice straw is the staple cattle feed in the humid rice growing tracts of India where poor type of cattle with stunted growth, very low milk yield, stamina and capacity for work are generally found. Even good cattle imported from healthier areas tend to deteriorate in these areas in course of time. Rice straw is deficient in protein, phosphorus and vitamins and contains a large quantity of crude fibre on one hand and oxalic acid which interferes with the proper absorption of lime on the other. Knowing that protein is the body builder, calcium and phosphorus the bone former and vitamins essential for wholesome assimilation of food and proper development and functioning of the body, it is not difficult to imagine what the cattle lose when they are fed mainly on rice straw. Under the Imperial Council of Agricultural Research animal nutrition scheme in Bengal, Indu Bhushan Chatterjee has shown that these defects in rice straw can be remedied by balancing it up with the addition of the locally available feeds such as oil-cakes (ensures valuable combination of protein and phosphorus), rice bran (contains protein of high biological value and is rich in oil and phosphorus*) and pulses (rich in proteins) in small quantities along with some green forage (especially to supply vitamins). Calcium and phosphorus supplement, e.g. a small quantity of powdered chalk and sterilized bone meal flour may be added to the diet when necessary. A fairly good sterile bone-meal flour can be prepared locally by the following method :

* It is not present in an assimilable form, but it can be rendered assimilable by hydrolysis.

In an open vessel, meat-free and comparatively fresh bones may be cooked in boiling water for sufficiently long period till the bones become soft enough to disintegrate on beating. The broken chips of bones are again cooked twice, every time in fresh boiling water. The cooked bones are finally washed thoroughly in hot water. After allowing them to dry in the sun for two to three days, they are crushed into powder. This bone meal powder or flour prepared for feeding stock, should have but little odour, and should be nearly white in colour.

3. *Control of parasitic and bacterial diseases.* Humidity in the soil and air is more favourable for the development of parasites, especially helminths and the spread of soil-borne bacterial infections like Anthrax, Black-quarter, etc. Acute bacterial infections may cause heavy mortality, but losses from these diseases can be prevented by the use of appropriate sera and vaccines issued by the Imperial Veterinary Research Institute, Mukteswar. Regular vaccination of stock against these diseases in infected localities preferably before the onset of monsoons is desirable. Parasitic infestations both external and internal and chronic protozoan infections cause deterioration of the affected animals by adversely affecting their growth, milk yield and capacity for work, although in most cases they may not succumb for years. Regular administration of parasitocides against internal parasites and the use of cattle-dips against external parasites and the tick-borne protozoan infections should be extensively employed in these areas as a routine.

4. *Prevent soil erosion.* As a result of heavy rains the soil may be denuded of mineral matter and the fodder on such areas does not grow luxuriantly and does not contain enough of mineral constituents essential for proper animal growth, production and reproduction. Where necessary soil erosion may be prevented by resorting to *bunding* in the plains and by terracing and gully trapping in the hills, etc.

5. *Improve pastures.* Pasture where available is usually the cheaper feed as well as one of the best for feeding either milch or draught cattle. Although in humid areas pasture lands are found here and there, yet on account of injudicious and overgrazing by much larger number of livestock than can be maintained on them and due to their ill management they do not serve the desired purpose. Not only the grazing areas should be extended by utilizing more of the land under the control of the Forest Department and that classified as 'cultivable waste', but what perhaps is more important is that the existing pastures should be properly developed and well managed. Improved varieties of grasses should be introduced, 'bunding' may be made use of, rotational grazing, both in regard to pasture land and species of animal grazed, should be practised allowing restricted number of healthy livestock only, shady trees and drinking water should be

made available, the land should be suitably dressed and manured where the soil and plant analysis indicates and deficiency, etc.

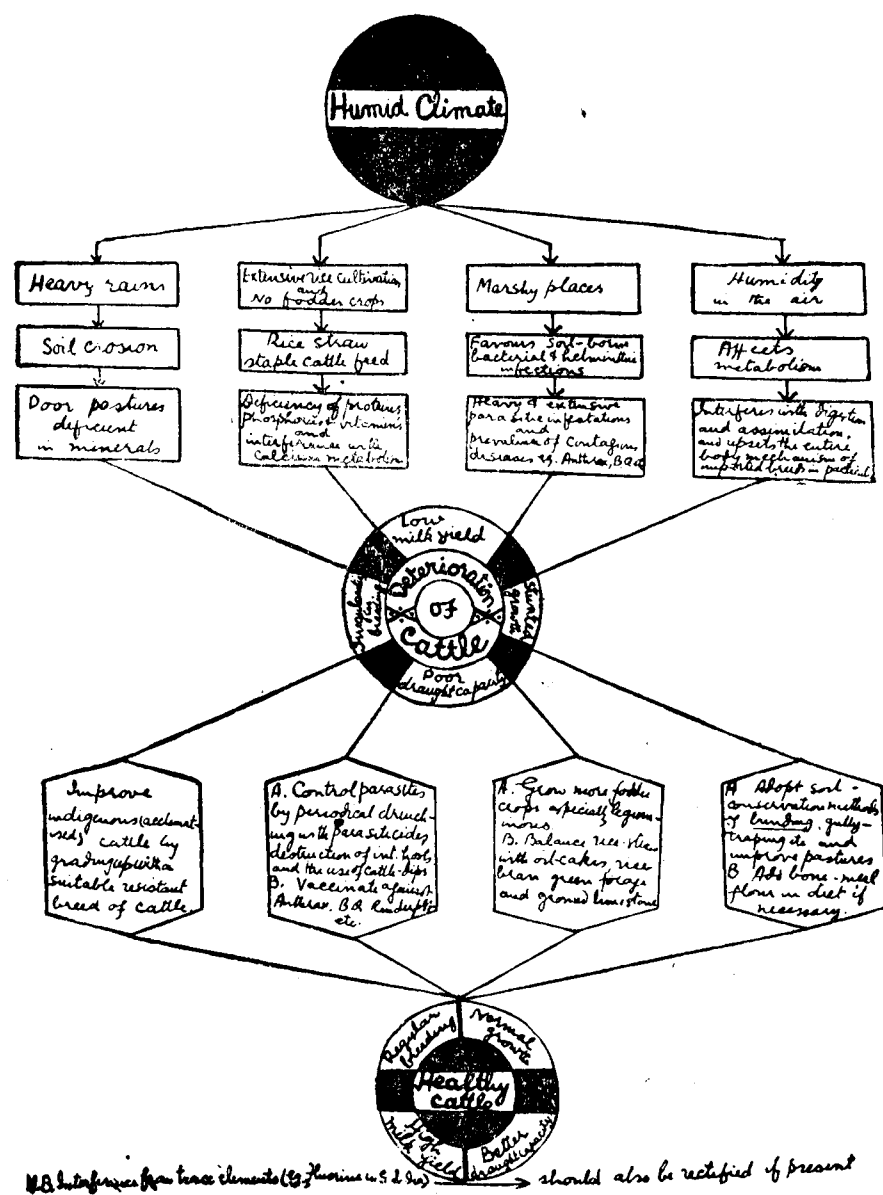


Fig. 3.

6. **Trace elements.** Where there is an indication that any of the beneficial trace elements e.g. copper, cobalt, manganese, etc. is lacking in the cattle feed, it should be provided in a suitable form. On the other hand, if there be evidence to believe that any of the harmful trace elements

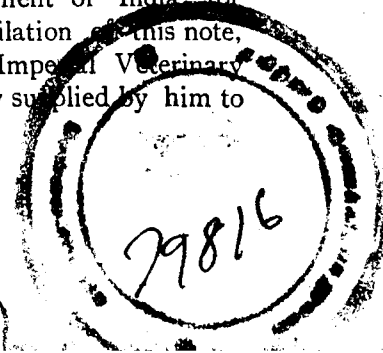
e.g. fluorine, selenium, etc., is present in intolerable quantities in the diet, necessary steps should be taken to get rid of such an element by the proper method. In the Province of Madras fluorosis has been shown to be the cause of rheumatic arthritis locally called 'Vayu-Potlu'. If drinking water contains 1.0 part or more of fluorine per million parts of water, it causes fluorosis. It has been found that the addition of lime removes the greater part of fluorine from water and renders it harmless.

7. **Resistant breeds.** There is some evidence to show that different breeds of cattle and buffaloes vary in their ability to stand the conditions prevailing in humid rice-growing tracts. Some are more susceptible than the others, though ultimately all might revert to something like the local cattle. Undoubtedly, the local cattle having adapted themselves, though degenerated, can stand these conditions best. Therefore, the best policy seems to be to improve the local cattle on one side by grading them up with a suitable breed possessing sufficient ability to resist the local environments and on the other by providing economically balanced food and freedom from parasitic and other diseases. Under a scheme to be financed by the Imperial Council of Agricultural Research it is proposed to study the effect of humid climate in rice-growing tracts on the four important breeds of cattle and buffaloes which are largely imported into such areas viz., Haryana, Sahiwal, Sindhi and Murrah, keeping suitable controls in a healthier area and providing similar food in similar quantities and freedom from parasitic and other diseases. The results of this scheme will show the order of resistance amongst these breeds. Fig. 3 illustrates how deterioration of cattle is probably brought about in the humid areas and briefly indicates the methods to be adopted to remedy the same.

It is hoped that the above suggestions will be of some interest to those who are confronted with the problem and that they will collect systematically where possible such data as might indicate the suitability of certain recognized Indian breeds of cattle for different tracts in the country where cattle are deteriorated at present. Such data and those to be obtained in due course under the Imperial Council of Agricultural Research scheme might help the livestock officers, cattle owners and the Government in affected areas to plan a well organized scheme of work on a large scale in order to tackle this intricate and important problem effectively.

ACKNOWLEDGEMENTS

The author is greatly indebted to Mr. F. Ware, C.I.E., F.R.C.V.S., I.V.S., Animal Husbandry Commissioner with the Government of India for valuable suggestions kindly given by him in the compilation of this note, and to Dr. F. C. Minett, D.Sc., M.R.C.V.S., Director, Imperial Veterinary Research Institute, Mukteswar, for the two maps kindly supplied by him to illustrate it.



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A BRIEF SURVEY OF MILK PRODUCTION AND DISTRIBUTION IN HOSUR CATTLE FARM *

BY

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Introduction.—An Officer of the Indian Civil Service from a typical dairy country who had an opportunity to taste the milk produced on this Farm remarked that the milk "is of admirable quality—surpassing what is supplied as 'Milk' in England". This remark will naturally make one inquisitive to go into the details of production and distribution of milk on this Farm which is one of the biggest cattle-breeding centres in India.

It should be mentioned at the outset that the Farm which had been in the occupation of the Army Remount Depot for over 96 years was taken over by the Madras Government in the year 1924, as a cattle-breeding station. Of the very few places in this Presidency that are favourably situated to rear stock of the first class variety, Hosur Cattle Farm stands pre-eminent. Plenty of pasture lands divided into paddocks, a big patch of irrigated land located almost in the heart of the Farm, where fodder crops can be grown, divided into fields with masonry irrigation channels to convey water from the tanks, the lines of buildings where animals can be accommodated against inclemencies of weather, a very equable climate, neither too hot nor too unpleasantly cold—all these go a long way to make Hosur Cattle Farm an ideal cattle-breeding station.

The necessity of an organised Dairy in a cattle-breeding station need not be over-emphasised when it is considered from the following factors which are so intimately connected with any breeding policy of a desirable type.

(a) It is the only place where many of the factors connected with inheritance can be observed.

(b) It is the place where a study of the reproductive capacity of an animal can be made and

(c) It is the most suitable place where weeding out of animals can be made at a primary stage.

The factors associated with milk-production on this Farm may be grouped under the following heads:—

1. The dairy building and its equipment.
2. The farm milch-herd and its management.
3. Production of milk and lay products.

* Presented to the Provincial Veterinary Conference, Madras, held in April '45.

Dairy Building and its Equipment.—Over a height of about 3000 ft., constructed of solid stone and presenting the appearance of a small fort, with a small room overlooking the vicinity stands the main dairy building. It has two main entrances, one in front and the other at the rear. The location of the building is in the best possible sanitary surroundings. The building is provided with the following:—A main room in which provisions for milk testing, butter storage, office accommodation, a small window for delivering milk to customers have been made.

(ii) Adjacent to this is another room where the main activities are cream separation, butter making, storage of milk and by-products. This room is also furnished with facilities to store cold water, sterilization of cream etc.

(iii) A room where hot and cold water tubes are provided for washing purposes and a steam jet for sterilization. The necessary steam is obtained from a boiler which is solely intended for this purpose.

(iv) A milk record room.

(v) A feed room to store concentrates to meet the daily requirements.

(vi) A Store room.

The dairy is furnished with fly proof arrangements, care being taken at the same time to provide proper ventilation. All the doors are provided with self-closing hinges. A verandah on one side of the dairy helps to keep it cool. Located on two sides of the main building are the milking stalls where the Farm milch-herd can be accommodated in batches at the time of milking. The stalls are provided with mangers in front and a drainage behind. In front of the manger and behind the drainage are walking spaces. Iron pipe lines extending well over the shoulders of animals are furnished to separate the individual animals. Thus it can be seen that easy control and supervision, adequate ventilation, easy removal of excreta etc., less likelihood of excitement for the animals and greater chances of proper feeding of individual animals are ruling factors. The flooring is of cement concrete to prevent slipping.

There are also closed stalls where cows nearing parturition, those that have just calved and calves according to ages are housed. Behind the main dairy building are five big open enclosures, where animals are let loose during night time. A row of stalls are attached to these enclosures where the animals take shelter during bad weather conditions. Adequate number of water troughs, both within these enclosures and the main dairy building, supplied with water from an overhead tank by means of pipe lines not only provide drinking water to the animals but also for the effective cleansing of the milking stalls and the dairy.

The dairy is equipped with sanitary milk pails. Milk cans of various sizes, milk strainers, cream separators, butter churns, and the accessories, milk testing apparatus and butter storage box.

The Farm Milch Herd and its Management.—It was in the year 1924, the surplus stock from the Coimbatore Agricultural College Dairy was transferred to this station and the breeding of cross-bred, Ongole, Sindhi, Kangayam and Montgomery animals was taken up. Later on, the breeding of many breeds of animals was given up for some reason or other, and only three pure bred animals have been developed. The present milch herd maintained at the Dairy consists of pure Sindhis, Kangayams, a small herd of Hallikars and a few cross breeds (Sindhi graded animals). The present herd owes its origin to years of patient and strenuous work of selective breeding and careful management. A close study will certainly reveal to any one the possibilities of improving the animals under village conditions by exploring the hidden strains in the field, and grading up the village stock by selective breeding and proper management.

A short note on each breed is given below as it is not possible to give an elaborate account in this small article.

Sindhi Herd.—It has now become an established fact that the Sindhi breed is recognised as the best dairy breed in India and this herd has done very well on this Farm. The main aim has been to build up a good milk yielding breed of cows. There has been a steady increase both in number and yield. The highest individual average over cows in milk so far reached is 15.7 lbs. Two Sindhi Champion cows 132 and 143 which have yielded exceptionally very high yields by giving 11,448 lbs. in 368 days with a daily average of 31.1 lbs. and 10,081 lbs. in 373 days with a daily average of 27 lbs. respectively have created new records for Sindhi herd in South India.

Kangayam Herd.—This breed is considered to be the best draught animal in the South of the Presidency and is said to be eminently suitable on a farm. This station has been attempting to raise a strain with high milk yield. without impairing the draught qualities of the breed. The daily individual average of cows in milk, so far attained in this herd is 7.2 lbs.

Hallikars.—This breed was introduced on this Farm in 1935 and the third generation is coming up. The main idea of maintaining this herd is to rear up pedigreed animals and distribute them to the adjoining districts to grade up the local stock.

Cross-bred animals. (Sindhi graded animals).—The system of breeding this herd has been changed and the present system is that cross bred cows are now being mated to a pure Sindhi bull in order to breed back to the indigenous variety on this Farm.

Classification of milch animals for feeding purposes.—The cows in milk are classified according to their milk yield into

(a) Special Class—those that give 20 lbs. of milk per day.

(b) A class—those that yield 15 to 20 lbs. of milk per day.

(c) B class—yielding from 10 to 15 lbs. per day.

(d) C class—giving less than 10 lbs. a day and

(e) N. P. class (Nearing Parturition) which are due to calve within 6 to 8 weeks.

The idea underlying this system of classification is to feed them with maintenance and productive rations, according to their milk yields. Moreover, it is unprofitable to feed all alike and animals which are better yielders should naturally be given more food. Even a very good cow yields less when her lactation advances, and so can do with less food.

The concentrate feed consists of groundnut cake, rice bran, Bengal gram husk and cotton seed which are ordinarily available in the locality. Salt, lime and bone meal are also included in the daily rations.

The animals are fed twice daily, half the quantity after milking in the morning, and the other half before milking in the afternoon. Of the concentrated feed, cotton seed and groundnut cake are soaked over night and the other stuffs are added afterwards according to proportions with sufficient quantity of water. Besides the concentrated food, green fodder and hay are supplied as soon as the animals return from pasture. The animals are sent to pasture lands daily for a period of about 6 to 7 hours and the paddocks for grazing are allotted by rotation. This serves as a good exercise for the milch animals.

Production of milk and its disposal.—It may be of interest to indicate the general daily programme of the dairy. The dairy is open from 5 A.M. to 7 P.M., with an interval of about 3 hours in the middle of the day. Milking commences at 4 in the morning and 4 in the afternoon. Particular attention is paid to the removal of all dirt from the lower and hind parts of abdomen, the udder, tail, groins, flanks and legs before milking. Immediately before milking, the udders, teats and the surrounding parts are washed with clean water and thoroughly wiped with a clean dry cloth. The milk-men are provided with white uniforms which are used at the time of milking.

The milk from each cow, as it is drawn is brought to the milk record room, which is fly proof. A big tinned brass cup with a lid with lever arrangements is fixed outside the milk record room, where the milk-men pour the milk. The milk is then conveyed through a tube inside the milk record room, where arrangements for weighing the same have been made. The milk-man informs the milk recorder the number and breed of the cow from which the milk was drawn and the milk recorder records the quantity of milk from each cow in a daily milk-memorandum sheet. Milk is then strained and collected in big milk cans which are removed to another room where it is disposed off. This room which may otherwise be styled as 'Creamery' is the place where the bulk milk is divided into two parts, one

part intended for sale to the Estate staff and others and the other separated by cream separator into cream and skim milk. The former in turn is converted into butter and butter milk and ghee during summer months.

Milk for Sales and Feeding.—The main object of this station is the breeding of cattle and therefore great importance is attached to calf rearing. Not only milk is essential to the newly born but also for the growing calves. Therefore the calves are allowed to suckle directly from their dams, both morning and evening, before and after milking. Once a week the animals are completely milked, which gives the correct quantity an animal is capable of yielding and this figure is maintained for record purposes. This also helps to arrive at the quantity of milk suckled by the calves on the other days of the week. Such of those weak calves or those that do not get sufficient quantity of milk from their dams are fed with whole milk.

Skimmed milk.—This is mainly intended for feeding the calves: it is also used for preparing the starter for butter manufacture. The starter of each day is made by boiling a small quantity of skim milk and inoculating it with a small quantity of previous day's starter. Skimmed milk is also supplied for poultry feeding.

Cream.—After separation of milk, the cream which is mainly intended for butter manufacture is sterilized and ripened over-night by the addition of starter and early next morning it will be ready for butter manufacture. Cream ripened by starter over night will develop the required level of acidity which facilitates the easy separation of butter. During summer as it is not possible to maintain the required temperature of cold water, it is deemed necessary to have recourse to ice which is obtained daily from Bangalore. It has been found necessary to use ice not only in connection with the manufacture of butter but also for its storage during summer months.

Butter milk.—During the process of butter manufacture, butter milk is obtained, and is used for calf feeding and poultry feeding.

It may not be out of place to mention that Hosur Cattle Farm is a silent worker in the activities connected with the present war. Food is an important problem to solve and has perplexed many war workers. Milk and butter are important articles of diet and these are supplied by this farm to the Southern Army at Bangalore.

[The Secretary, A. I. V. A., Madras Branch expresses much regret that in the list of articles presented to the recent Provincial Veterinary Conference held at Madras in April 1945, the above article had been omitted by oversight. *Ed.*]

A FURTHER ANALYSIS OF CASE RECORDS, ETC.

By

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(Continued from page 302, *Indian Veterinary Journal* Vol. XXI, No. 5)

An inheritance implies three things; firstly, the benefit which accrues to the recipient from the boon received; secondly, a due recognition of the obligation which the benefit entails; thirdly, the obligation to pass on the boon unimpaired and, if possible, augmented to one's successors.

As students we inherited much knowledge from the labours of other men; as practitioners the obligation is laid upon us to add to that knowledge and to pass it on duly augmented to our successors. To be able to do so is one of life's rewards; the possibility may be an incentive to us all.

The present article is a continuation of the analysis of case records, etc., which was published in a recent issue of the *Indian Veterinary Journal* (Matheson¹) and deals with the tegumentary system; for convenience of reference the data are set forth in the following table.

Tegumentary System

DISEASES	Horse	Oxen	Sheep	Pigs	Dogs	Cats	Goat	Fox	Rabbit	Others	Total
Granuloma	3	1	...	1	1	...	...	...	...	...	6
Erysipelas	1	...	...	1	4	1	...	...	...	...	1
Dermatitis	1	...	2	...	...	...	...	...	...	...	9
Burns	1	...	...	...	...	...	...	...	...	...	1
Gangrene	...	1	...	...	...	...	...	...	...	...	1
Necrosis	...	1	2	...	1	...	...	...	...	...	4
Fat Necrosis	...	1	1	...	...	...	...	...	...	...	2
Skin Injury	...	...	...	1	...	...	...	...	...	...	1
Erythema	...	...	...	1	...	...	...	...	...	...	1
Folliculitis	...	...	...	...	1	...	...	...	...	...	1
Bruising	...	...	...	...	6	2	...	...	...	...	1
Ulceration	...	...	...	...	1	...	...	...	...	...	8
Scalds	...	...	...	...	1	...	...	...	...	...	1
Furunculosis	...	...	...	...	1	...	...	...	...	...	1
Melunosis	...	...	...	...	1	...	...	...	...	...	1
Impacted Anal Gland	...	...	...	...	...	...	...	...	...	...	1
"Thrush"	...	...	...	...	...	...	...	...	...	3	3
Tumours	31	9	...	...	160	15	...	...	1	...	216
Abscesses	8	3	3	...	15	4	2	...	1	...	36
TOTALS	45	16	8	4	193	22	2	...	2	3	295

The fact that tumours (neoplasms) of the skin are included accounts at once for the relatively large number of cases, but that does not mean that neoplasms of the skin are particularly common, as compared with the other

conditions tabulated; what it does mean is that relatively large numbers of cases of neoplasms are sent in to the laboratory for examination, whereas the other conditions, more are less easily diagnosed and treated by the practitioner, are not sent to the laboratory nearly so frequently: the practitioner is always interested to know the histological character of a tumour he removes by operation, or from a post-mortem subject, hence the relatively large number received at the laboratory. Again the prominence of the dog and horse—both animals which reach what has been called the "cancer age"—among our patients tends to increase the numbers of neoplasms coming under examination.

Wounds of the skin, in the earlier stages, are apt to be neglected, hence suppuration is not uncommon and this accounts for the number of cases of abscess formation recorded in the table. The cases of "thrush" occurred in mules. Attention was drawn in the previous article to the desirability of examining for the presence of mycobacterium tuberculosis, every case of ulceration of the skin of the dog or cat.

By fat necrosis is meant a condition in the living animal body in which some of the cells of adipose tissue undergo necrosis and the fat becomes split up into glycerol and fatty acids. It is usually but not invariably associated with demonstrable lesions of the pancreas! e.g. a haemorrhagic pancreatitis, the escaping pancreatic juice splitting up the fat in the necrotic cells of the adipose tissue. Wide spread fat necrosis is sometimes met with in animals, e.g. sheep, in which no lesion of the pancreas can be demonstrated; such cases have been attributed to injury during transport, since it is mainly at the abattoir that they are found. Areas of fat necrosis appear in the adipose tissue as white or yellowish white, dull, opaque, rounded or irregular nodules scattered throughout the affected tissue from which they are readily differentiated. They may be surrounded by a haemorrhagic or leucocytic zone. The size varies from that of a pin's head to that of a bean or even larger. Neighbouring areas may become confluent. The periphery of the nodule may be relatively firm, or tallow like but the centre is often grumous in consistency recalling curdled milk; calcification may follow and encapsulation occur. Sometimes the condition accompanies catarrhal jaundice and then the areas of fat necrosis may be stained yellow by the bile. The condition of fat necrosis is of importance from the Meat Inspector's point of view. Inflammatory foci affecting the deeper layers of the skin or subcutis and accompanied by suppuration and necrosis associated with micrococci which have gained entrance through a hair follicle or sebaceous gland etc., are termed furuncles. When the furuncles are very numerous the condition is termed furunculosis. As indicated in the table, it is occasionally met with in dogs; it also occurs in horses and cattle.

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BRAXY IN SHEEP *

By

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Introduction.—This is a very uncommon disease in this country. This is the first time a record of it is made in Madras Presidency and also in India. The disease might have been in existence even before but it has not been brought to notice till now.

In the year 1942 a heavy mortality among sheep was reported by the Superintendent, Livestock Research Station, Hosur. 125 sheep in a flock of 267 had died of the disease in the course of about 2 months. The mortality was at its height during the first two weeks, but later on the majority of the ailing animals lingered for a time.

Animals affected.—Good conditioned animals, young and old, rams, ewes, both pregnant and non-pregnant—all were affected.

Period of incubation.—24 hours to 2 days.

Symptoms.—Moderate rise of temperature, discharge from nostrils, colicky pains, groaning, swelling of the submaxillary region extending to cheeks and head in some instances, hairs peeling off easily from these places, diarrhoea greenish, in some instances clay coloured, no dysentery, grinding of the teeth, dyspnoea, coma and death without any struggle, generally with the head turned one side, and sometimes extended.

Autopsy.—18 post-mortems were conducted. The lesions found in all of them were identical and characteristic. The abomasum, duodenum, liver and kidneys were the only organs mainly affected.

The lesion in the abomasum was one of hæmorrhagic abomasitis either complete or partial with patches—2 or 3 inches in diameter—of reddish purple discolouration of the mucosa scattered throughout the abomasum. This was associated with oedema and thickening of the affected portion.

Differential Diagnosis.—(1) Rinderpest.—This was eliminated by the inoculation of virus into susceptible animals with negative results.

(2) Hæmorrhagic Septicaemia.—This was also eliminated by the inoculation of materials with rabbits. H. S. serum also did not give protection.

(3) Helminths.—No helminths were noticed either in the abomasum or intestines on post-mortem. This was in all probability due to the periodical and systematic dosing of the flock for worms.

* A summary of a talk and discussion at the Provincial Veterinary Conference, A.I.V.A., Madras, April, 1943.

(4) Pregnancy Toxæmia.—Rams, lambs and non-pregnant ewes also were affected in this outbreak.

(5) Johne's disease.—Absence of organisms on microscopical examination of rectal washings and smears from the intestinal mucosa negated this disease; also the acute nature of the outbreak.

The other organisms mentioned above were highly congested. An extensive study of the causal organism of the disease was made as to its morphology, cultural characters, pathogenicity to guinea pigs, mice and pigeons, etc.

Vibron Septique was invariably present and obtained in pure cultures from the abomasum, peritoneal fluid and other organs. The cultures were sent to the Imperial Veterinary Research Institute, Mukteswar, who by cultural, serological and immunological reactions confirmed the same to be one of Vibron Septique. They had also made a comparative study of the cultures with known strains from abroad and found that this strain was more virulent.

The organism proved fatal to sheep upon subcutaneous and intravenous inoculation and produced gastritis in addition to local reaction.

Discussion.—A disease of a similar nature occurs in other countries and has been recorded there. It is called Braxy in Scotland, Bradsot in Norway, also Shear Gangrene. In those countries the mortality is only 35% whereas in Hosur it was nearly 50%, owing probably to the virulence of the strain.

The disease occurred after shearing of the animals and therefore the usual method of infection is by inoculation. It is also possible to get the infection by ingestion.

It may be said that shearing has been practised in Hosur for a long number of years without any such incidental disease but it must be remembered that the number of animals on the Farm has been increased only latterly and that organised shearing is being practised only since recent years. It is also possible that the disease might have occurred before but not diagnosed.

The treatment of this disease has not been satisfactory. N. A. B., has been tried but not with much of a success.

By way of prophylaxis, inoculations with formalised culture may be done before the season begins. More work should however be done on this aspect of the disease before anything definite is advocated.

GRADING OF VILLAGE BUFFALOES

BY

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The buffaloes of East and West Godavari Districts are of the local type generally with long horns, defective confirmation, long and thin limbs, and with a colour not definitely black. Some of the Zamindars of East Godavari like the Rajas of Pittapuram and Tuni imported some Delhi Buffalo-cows and bulls years ago mostly attracted by their size, colour, appearance and milk yield. They were keeping up the purity of the breed meticulously. If at all any attempt was made in other parts of the District to improve or grade up their local buffaloes, it was primarily done with some male stock got from one of these places.

Alumpuram is a small village in Tadepalligudem Taluk, West Godavari District with a human population of 2,000 and a cattle population of 1,500 about 45% of which are buffaloes. One Sri G. Pedda Soma Raju, an influential ryot of this village, purchased one Delhi Buffalo-bull about the year 1922 from the male stock of the Raja of Pittapuram referred to above, for the purposes of improving his own Buffalo stock. The grading was started in right earnest and he was very much impressed with the first generation calves which were definitely improved in their general structure, colour, disposition of the horns etc. After a period of 4 or 5 years, he purchased another Delhi Buffalo-bull mostly to avoid inbreeding. Further grading went on and the 2nd, 3rd and 4th generations were decidedly better in every respect simulating the original breed. He has changed three bulls within a period of about 20 years and he is having a fourth bull in succession for the past two years. This is a pure Murrah and is in the Premium Scheme of the Government of Madras.

The ryots of the village although they were not very enthusiastic at first have seen practically before their very eyes the improvement effected in the breed and steadily made use of the breeding bulls owned by this above mentioned ryot and owner who was thus not only able to improve his own Buffalo stock but could also transform the whole of the Buffalo population of the village to various grades in the process of evolution of a pure Delhi breed.

Another great feature is that all male calves are either sold or castrated. The ryots have decidedly learnt, by thus grading and improving the buffaloes, they can get better prices and better milk yield.

The following photoes taken in the village will clearly illustrate the various stages in the grading going on in the village :—

- (1) 50% pure buffalo-cow. The size, colour, confirmation and the disposition of the horns are thoroughly changed.



Grading up of Village Buffaloes.

- (2) 75% pure buffalo-cow. There is a definite improvement in the confirmation, colour and horns taking a short curve, legs sufficiently thick and short.
- (3) 87½% pure. The characteristics are still further improved, the forehead very much like that of the Delhi buffalo.
- (4) 93¾% pure. } These are more or less very like the pure breed.
- (5) 96⅞% pure. }
- (6) Is the Murrah Buffalo-bull at stud at present in the village.

There is a growing tendency in many of the villages to take up this kind of grading. There are 12 Murrah buffalo-bulls distributed under Government of India Scheme towards Livestock improvement and there are 30 Delhi Buffalo-bulls owned by private persons in the Premium Scheme. It is expected that in the course of about 10 to 15 years most of the local buffaloes would have acquired most of the characteristics of the Delhi breeds.

GRADING UP OF BUFFALOES IN GUDIVADA TALUK, (KRISTNA DISTRICT)

BY

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and

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Locality :—Gudivada is a purely delta Taluk in the Kristna District. The ryots of this Taluk are rich and evince keen interest in agricultural and livestock improvement. It is well suited for Buffalo breeding as there is plenty of water. There are 106 villages in the Taluk. The total bovine population of the Taluk is 86,711 of which 41,779 are buffaloes. There is a Veterinary Dispensary at Gudivada and it is also the head-quarters of the Touring Veterinary Assistant Surgeon.

Past and Present :—The majority of the buffaloes are of local breed. They are brownish in colour, about 48" in height. They have long straight horns growing backwards from the fore-head. The head is elongated. The limbs are slender. The body is not massive. They weigh about 600 lbs. Their milk yield is about 10 lbs. per day on an average. There are no professional breeders in the Taluk. Each ryot keeps 2 or 3 buffalo-cows for milk. The ryots depend on buffaloes for milk. They keep only a few cows for replacing their agricultural animals. Bollocks are used for agriculture and draught purposes.

About 15 years back a few well-to-do ryots purchased some Murrah buffalo-cows. The ryots though keenly interested in agriculture and livestock improvement never thought of improving the breed by grading up with Murrah buffalo-bulls. Up to 1938 there were only 2 Murrah Buffalo-bulls at stud in this taluk.

In the year 1938 when the Livestock section was transferred to the Veterinary Department, intensive propaganda was done in the villages and the ryots were advised to grade up their buffaloes with Murrah Buffalo-bulls. As a result there are now 23 Buffalo-bulls at stud in this taluk. Improvement is best seen in Gudlavalleru village where the first nucleus of scientific improvement was begun. The first and second crosses of the Murrah Bulls are coming up well. Their milk yield averages about 20 lbs. per day. They are black in colour with a massive body and limbs. Their average height is about 52". The horns are curled. The ryots take good care of their heifer calves but unfortunately neglect the male progeny. The improvement so far achieved though appreciable in some villages, it is very little if the whole taluk were taken into consideration. With a view to increase the enthusiasm of the ryots, one day cattle show is being held at Gudlavalleru for the past three years. A milking competition was also held during 1944 and 1945. The best milker at the show yielded 32 lbs. in 24 hours. A rolling cup was also contributed by ryots of the place.

For a long time ghee and butter were being exported to other places, chiefly to Madras. The present inflation in prices has given a fillip to the livestock industry. On an average about 200 tins of butter are exported every week from Gudivada. The demand for good Buffalo-bulls is now great. Each and every village wants to have a Buffalo-bull. Paucity of bulls is standing in the way of future development. The premium of Rs. 130/- now being granted is too small. Ryots are now willing to pay Rs. 2/- for service. It is to be hoped that this taluk will show the maximum improvement in grading up of buffaloes if more buffalo-bulls are made available.

SELECTION, PURCHASE AND DESPATCH OF COWS AND BUFFALOES FROM SIND TO MADRAS PROVINCE

By

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In selecting cattle for dairy purpose, one should give special attention to the particular object for which the milk is to be produced. If marketing liquid milk is the object, then the farmer should strive to get a greater quantity of milk, the quality of which will meet the requirements for the sale of milk regulations. If the object is for butter production, the richness of the milk is to be considered. In purchasing animals care should be taken to ascertain the pedigree of both the sire and dam as far as possible. Cows that will yield 3,500 to 5,000 lbs. of milk a year are a most valuable asset.

Before discussing the special characteristic of a dairy cow the suitability of dairy breeds for certain districts has to be considered.

Sindhi breed one of the purest and distinct Indian breeds of cattle is the only breed of commercially profitable dairy cattle in this country which can thrive in

any climate. The predominating colour of Sindhi animal is deep red varying to light or yellowish red. White sparkling on dewlap and underneath the barrel is no disqualification, for the breed.

Murrah Buffaloes are found generally in Punjab and have been introduced in many other parts of India and they have been found to thrive well everywhere. Murrah buffalo-cows are amongst the most efficient milk and butter fat producers in India. They are used for milk and ghee production in almost large cities. The popular colour of the animal is black with sometimes white markings on the forehead and tail. They have got well developed udder with prominent milk veins. The teats are long and widely spaced.

It is necessary to get Government permit for the transport of the animals from one Province to another before contemplating any purchase. It is also necessary that a reliable agency should be fixed up for the supply of animals for selection in a far off place like Sind.

Points of Dairy Cattle:—The special points to be considered in the purchase and judging of dairy cattle are:—(1) General appearance denoting constitution and milking qualities, (2) Shape and capacity of the udder, (3) Size of milk veins and teats, (4) General indications of suitability for dairy type.

General Appearance:—The ideal dairy cow, no matter of what breed, should be wedge shaped, the side lines tapering from the hind quarters towards the neck. A cow of good dairy quality when she is milking freely is likely to be of a lean appearance over every part of the body showing thereby that she utilises all her food for the production of milk. The cow should have a feminine and docile look. The eyes should be bright. The chest must be deep and the nostrils should be large permitting easy access of air to the lungs. The dewlap should be silky to the touch. Cows with large fleshy dewlap covered with a fine silky hair hanging in folds are generally good milkers. The skin should be soft and pliable.

Shape of Udder:—The udder should extend well forward. It should be full and capacious, but not fleshy. The teats should be evenly placed, squarely set, and of a uniform size for milking. The milk veins should be large, prominent and branched.

The most important qualification for a dairy cow is her milk yield which can be ascertained only by actual record. If she is a dry cow her previous lactations have to be taken into consideration. If she is in milk the quantity of milk should be weighed in 3 subsequent milkings and the price fixed after taking into consideration the following points.

- (1) The number of lactations the cow has finished,
- (2) The age of the cow,

- (3) Condition of udder, teats, and eye, her gait in walking and the nature of breathing should also be observed before coming to a final settlement.

The cost of cows:—The cost is always fixed according to the milk yield. She-buffaloes generally cost more than the cows, on the mere consideration that the butter-fat content of milk is almost 50% more than that of the milk of a cow. In Karachi the buffalo milk costs more than cows' milk. On an average a good Sindhi cow yielding 20 lbs. of milk per day costs Rs. 600 to 650. One she-buffalo yielding the same quantity of milk fetches Rs. 700 to 750.

Before despatching the animal it is essential that all cows and calves should be tattooed and the following particulars sent to the purchaser,

Serial No.	Cow No.	Descriptive mark of cow.	Descriptive mark of calf.	Sex of calf.	Milk yield E. M. E.	Lactation No.	Probable date of calving, if in calf.
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E.—Evening. M.—Morning.

as otherwise there is a chance of exchanging them on the way.

Despatch of Cows:—After selection, the most important thing is the despatch of animals to their destinations. Cattle waggons must be ready for the cows. Honest and efficient milkmen should accompany the animals as they are to be fed and milked on the way. Any slackness on the part of a Gowala, will surely bring loss to the owner. If the cows are not properly fed and milked on the way their yield will suddenly go down. Care should be taken that the calves also are properly looked after, otherwise there is a chance of losing them and make the animals go dry earlier. Sufficient quantity of fodder and concentrates should be taken for the duration of the journey.

In a broad gauge line two men travel free of charge with 8 cows and calves taking sufficient provision for the animals. Water which is available at all stations has to be taken in buckets and fed to the animals by the men in charge of the cows.

The cows will not give the same yield at the place of their destinations as they were giving originally. There are several reasons for that :—

- (1) Change of place, (2) Change of milkmen, (3) Change of feed,
- (4) Exhaustion due to long and continuous railway journey.

The cow is a very sensitive animal. She likes quietitude and regular routine. The cow roughly handled by strangers will become restive and hold her milk back. As far as possible the cow should be given the same quantity of feed as they were getting in their original place. It is natural that the yield goes down due to long railway journey, but it can be remedied to a certain extent if they are properly fed with the same quantity of ration as they were getting originally.

A Sindhi cow yielding 20 lbs. milk should be fed with at least 12 lbs. of concentrates apart from 40–50 lbs. of green fodder daily. This will have good effect in bringing them back to their original yield.

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Editorial

A SERIOUS SITUATION

We feel in duty bound, to draw the attention of the authorities to the serious situation which is steadily developing as a result of the continued failure of the Government to do the right thing by the Veterinary profession in this country. We have repeatedly appealed to the Government in these pages that their niggardly policy towards the Veterinary Department is not in keeping with their professed concern for the welfare of the ryots of the land and that, if this were allowed to continue to go on unremedied, it will lead to a serious situation affecting "the future prosperity and health of this Presidency". Our appeals have been in vain and have gone on unheeded. The Government had not the necessary vision to tackle the question in the proper way. No serious attempt seems to have been made, to remove the root cause. And with what result: Day after day, month after month, year after year, the Department has been telling the public (or shall we say, fooling the public) that the activities of the Veterinary Department could not be expanded to the extent one desired owing to paucity of staff. The district and field staff are undermanned, the educational institution is stripped to the barest minimum: the research work is put in the cold storage for the duration—all because of paucity of staff. Well, one is entitled to ask what are the steps taken to overcome this paucity of staff? What are the measures taken to attract a larger number of suitable young men to enter the profession? A paltry concession of half-fee for the first and second year of study at the

Madras Veterinary College and a halting revision of pay and prospects were all that could strike the imagination of the Government. With what effect? While all the Colleges under the University—such as Arts, Medical, Engineering, Agricultural—are all flooded with applications for admission, the Veterinary College stands unique in not being able to get even the requisite number of students. The applicants when they come to know of their future prospects simply turn right about to try other walks of life. They are simply scared away. Our appeals to the Government for a substantial improvement in the prospects of the members of the Veterinary Service have been without any effect. They have fallen on deaf ears. The Government on the other hand have tried various other baits to attract students. First they tried scholarships; that was not much of a success. Next they tried concession in fees—as though this is going to attract ‘the intelligent young men’ of the country. While the Government is thus experimenting with its various baits, the country suffers from paucity of staff. The contagious diseases still continue to levy a heavy toll and the animals continue to die of diseases which are highly preventable. Animal Husbandry Development and its expansion is greatly hampered owing to ‘paucity of staff’. The situation is becoming more and more serious and we fear that, unless it is tackled properly and promptly, the Government will have to bear the odium of doing only lip service to the suffering rural masses of the land.

In this connection, we are gratified to notice that the public are being kept informed of the real nature of things by the popular and enlightened *press* and, we are highly grateful to the *Madras Mail* for drawing attention to this editorially in its issue of May 29, 1945. We gladly reprint it in this *issue* for the benefit of our readers.

* THE WAY TO IMPROVEMENT

“Once more public attention has been called to the shortage of useful draught and milch cattle in this Province by the speech of the Director of Veterinary Services at Tirupur on Sunday. The occasion was the opening of the Tirupur Cattle Show, one of the most important of its kind in the Presidency, and one at which the famous Kangayam breed figures prominently. In this connection we particularly welcome the Director’s announcement that a society to look after the interests of that breed has been founded under the name of the Kangayam Breeders’ Society. If its officials and members act as they should they will have little difficulty in making the name Kangayam even more respected than at present, to the increasing profit of themselves and the neighbourhood. The District is fortunate in that it possesses in the Pattagar of Palayacottai one who is keenly interested in the improvement of cattle, and who is not afraid to spend money to that end. The District is also fortunate in that the District Board takes a keen interest in the improvement of local cattle, and has for many years purchased breed bulls for distribution to approved custodians. In this way Coimbatore District has earned from the Director high praise. “Coimbatore,” he said, is the most progressive district in the Presidency for livestock improvement work” thanks largely to the enthusiasm of the people.

Much is possible when local enthusiasm is rightly directed, stimulated when flagging, or awakened where non-existent. To direct, stimulate, and arouse such enthusiasm should be one of the principal talks of the Veterinary Department. Unfortunately, however, it is ill-equipped for that purpose. In their recent survey of Post-War Reconstruction and Development Schemes, the Government of Madras remark: “The need for the extension of Veterinary aid through the Province is obvious and urgent. There are only 208 Veterinary Assistant Surgeons as against 880 required on the basis of one Veterinary Assistant Surgeon for 25,000 head of cattle as suggested by the Royal Commission of Agriculture in 1928. One of the main duties of

* Reprinted from The Madras Mail, Editorial May 29th, 1945.

these Veterinary Assistant Surgeons is to organise cattle shows. Unfortunately, however, the Department does not attract the young men of Madras. Of late the Government have sought to attract them by reducing the College fees by one half, but this is not nearly enough. We have repeatedly urged that the importance of the work and its influence on the social condition of millions of rural workers and cattle owners in this Presidency demands much more.

One reason why the young people of the Presidency are not attracted to the Veterinary Services is the poorness of the prospects therein. For instance, the Government propose to pay Veterinary Assistant Surgeons in the economically difficult present and Post-War years salaries rising from Rs. 75 per mensem to Rs. 200 per mensem, but it takes the Veterinary Assistant Surgeons twenty years to earn the maximum above indicated. Intelligent young men and women are not attracted by such prospects. They want much more, but the higher appointments in the Veterinary Department are so few, that only a very small percentage of those employed in the Department can hope to secure them. Such stinginess in remuneration undoubtedly affects the standard of work in the Department. It is difficult for highly-educated young people to be enthusiastic on Rs. 75 per mensem, or, 14 years later, on Rs. 155 per mensem. If, as the Government themselves indicate, and the Director contends, the future prosperity and health of this Presidency will largely depend upon the condition and quality of its cattle population, the Government must be prepared greatly to raise the standard of the Department labouring to improve the condition and raise the quality of cattle here.

One looks in vain, however, for really progressive proposals in either the Government budget for the current year or in their Post-War Plan. The Government declare, rightly, "There is great need to increase the cattle wealth of the Province by improving the quality of important breeds," an opinion endorsed by the Director who says that the percentage of good cattle is very small, but we find that in allocating their grants the Government have increased the grant to the Veterinary

Department by approximately only Rs. 75,000 in the current year, and that they plan to spend no more than Rs. 1,61,70,000 in the five post-war years. Far bigger expenditure will be needed if the Province is to have what it needs to give it the right kind of cattle and a milk supply equal to requirements.

VETERINARY DEPARTMENT IN MYSORE

We are extremely glad that the forward state of Mysore is forging ahead in its progressive policy and that it has organised an independent Veterinary Department in its State.

Till now, Veterinary and Livestock sections formed a part of the Agricultural Department of the State under the Director of Agriculture. With the increasing importance of livestock and the need for pursuing a policy of scientific and planned expansion, it has become necessary to organise a separate Veterinary and Animal Husbandry Department. In sanctioning this reorganisation, the Government of Mysore give expression to their views in the following words. "In order that the growing and pressing problems of both agriculture and animal husbandry may receive adequate attention and that the departmental activities may be carried on in an expeditious and efficient manner, Government consider that it is necessary to separate the Veterinary and Livestock sections (Veterinary Section including Serum Institute, Poultry, Sheep Breeding, Amrutmahal, Bee-keeping, Fisheries, Dairying etc.) from the Agricultural Department and place them in charge of an officer with the designation of Superintendent of Veterinary Services and Animal Husbandry who will be independent of the Director of Agriculture and deal directly with the Government. They are accordingly pleased to sanction the post of Superintendent of Veterinary Services and Animal Husbandry on a pay of Rs. 500-50/2-750 in lieu of the existing post of Superintendent of Veterinary Services and to appoint Dr. Narayanaswamy Naidu, Veterinary Research Officer, who is now O.O.D. as Special Officer for Animal Husbandry, as Superintendent of Veterinary Services and Animal Husbandry, the new arrangement being given effect from 1st July 1945."

Dr. P. M. Narayanaswamy Naidu, B.Sc., L.V.P., D.Sc. (Ger.), F.F.A.S. (Fr.) is well-known to our readers and it is needless to say that under his able guidance the Department will have a very good start.

Well done! Mysore.

SPECIAL POULTRY NUMBER

Special issues of this *Journal* on particular subjects have been in the past greatly appreciated by our readers and there has been a demand for more and more of such special issues.

We, therefore, propose to have the next issue of this *Journal* (September 1945 issue) as a Special Poultry Number. As is well-known, poultry husbandry has taken on a new life during the last few years and both the Government and the public are taking a lively interest in its development. Poultry keeping is becoming more and more a specialised subject and it is therefore necessary to have the experiences of the specialists disseminated for the benefit of the general practitioners and the public.

We are sure that the members of the profession will co-operate with us in the compilation of this Number.

Articles for inclusion in that number should reach us before the 10th August 1945.

ANCIENT INDIAN LITERATURE ON VETERINARY SCIENCE

The two articles on this topic contributed by Mr. A. Krishnaswamy, Veterinary Research Officer, Medical College, Madras and published in the previous issue of the *Journal* give an insight into the great funds of very valuable informations on Veterinary and allied subjects that are available in the ancient Sanskrit literature. The series of articles on this subject that have been contributed by Mr. Krishnaswamy, from time to time, and that have been already published in

other journals viz. *The Indian Journal of Veterinary Science and Animal Husbandry*, *The Agriculture and Livestock in India*, *The Indian farming* etc., not only furnish information useful to Veterinarians but also disclose the urgent necessity for transcribing and compiling and thus saving from decay the vast mass of useful information now lying scattered in far and distant places and among a mass of original manuscripts which are mostly in a crumbling and decaying condition. Unfortunately, most of these valuable informations are in Sanskrit which is practically a dead language at the present time. In this connection we may point out that, while good Sanskrit scholars may be found Veterinarians who possess a fair knowledge of this language are remarkably few. It is only the latter who can appreciate the intrinsic value of such material and consequently it is only those who can have a real live interest in them. The paucity of Sanskrit knowing Veterinarians cannot, however, dispute the usefulness of the great mass of this ancient literature and its preservation for the future advancement of the Veterinary Profession.

The Imperial Council of Agricultural Research themselves appear to have been impressed with the necessity of having a survey of all the information available on Indigenous Veterinary literature and in December 1937 on the motion of Sri Biswanath Das the then Premier of Orissa, a scheme was inaugurated for investigation into the efficacy or otherwise of the indigenous systems of treatment of cattle in India. The governing body of the Imperial Council of Agricultural Research sanctioned the scheme in July 1938. The scheme worked from May 1939 to November 1939 under Mr. A. Krishnaswamy the officer appointed for the purpose. The observations of the Council on Mr. A. Krishnaswamy's report are also very interesting. The council observed that Mr. A. Krishnaswamy's report revealed the existence of a mass of manuscripts of ancient origin in Sanskrit language and other literature containing much valuable information on Veterinary medicine which is worth collecting and preserving, and that this work seemed particularly suitable for Sanskrit scholars

working for a Doctorate Degree of Indian Universities. While congratulating Sri Biswanath Das for his responsibility in originating the scheme and while congratulating the Council on their recognition of the usefulness of the information on Veterinary matters available in Indigenous Veterinary literature we cannot but differ from the Council's view that this work is particularly suitable for Sanskrit scholars working for a Doctorate Degree in Indian Universities. A Sanskrit scholar aspiring for the Doctorate Degree of an Indian University cannot afford nor can he be expected to incur the heavy expenditure of visiting all the libraries in India, collecting all the information, transcribing them from old decaying manuscripts, compiling and collecting them and translating them for purposes of printing etc. It is our firm conviction that it is only a Veterinarian with a good knowledge of Sanskrit or a Sanskrit Scholar with a knowledge of Veterinary Science that can be relied upon to undertake the work satisfactorily and it is the I.C.A.R. alone more than anybody else that must come forward to take up this work. Either it must revise the scheme already begun and left unfinished and continue the work under its direct supervision or it must ask any of the Provinces to take up the Scheme and finance it as the scheme is one of all-India importance. In these days of war, with the world-wide demand for unearthing anything useful and for the exploitation of such useful things to their fullest extent for the benefit of the country, we need not stress the importance of our ancient literature to the Veterinary profession and the desirability of taking suitable steps, by the authorities concerned, to get this literature translated into English immediately as a first step. This will undoubtedly furnish an enormous field for useful research in a comprehensive scheme in the post-war development.

We have no hesitation in saying that the great mass of literature on Veterinary Science, contained in Sanskrit as well as in other languages like Tamil, Telugu, Canarese etc., though long forgotten, and uncared for at present, contain real treasures demanding investigation. The collection of most of these require patient and continued search and all

the information so collected have to be translated into English as the manuscripts are in languages not familiar to the members of the Veterinary Profession in general.

We may conclude by saying that the collection of these manuscripts and rendering them into English will undoubtedly be a very useful contribution to the Veterinary Science and its past history in this land and we hope that the Government will not fail to take suitable and early steps in this direction as any time lost will only cause the decay of the available material beyond redemption. The work proposed is only a preliminary step which will give very useful ground work for future investigations in the post-war development of the Veterinary Department.

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VETERINARY DEPARTMENT

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M. L. GHOSAL,
Superintendent,
Veterinary Department, Bikaner State,
BIKANER, (Rajputana).

Clinical Articles

TREATMENT OF EQUINE SURRA

By

S. SESHADHRI AYYANGAR, G.M.V.C.,

District Veterinary Officer, Nellore

and

G. THEOPHILUS, G.M.V.C.

Veterinary Assistant Surgeon, Nellore

Owing to the necessity for economy in the use of petrol, animal-drawn vehicles are replacing the automobiles now-a-days and the demand for horses and good bullocks for transport purposes is fast increasing. As the demand increases, so also the prices and people also pay fabulous prices for animals. Although the cost of maintenance of horses has increased by 200-300 per cent, yet the demand for them has not decreased. In addition to these handicaps, the buyers and sellers of horses are confronted with the contagious and infectious diseases among the equines especially Surra which takes their toll unsparingly.

Surra is one of the insidious and fatal diseases which cause great loss to horse owners. It has been prevalent in India for a long time and the causative organism is *Trypanosoma Evansi*. In most cases this deadly disease is diagnosed only in the advanced stage as the owners resort to or send their affected animals for treatment to a veterinary hospital only after trying in vain other local treatments. At this stage of the disease, even the best available drug fails to cure the animal. It is possible, however, for owners to detect and diagnose the disease easily by bestowing upon their animals a reasonable care and attention. Treatment, to be successful has to be undertaken in the early stages.

During the period from April 1943 to October 1944, Nellore and Kovur taluks of the Nellore District, experienced a severe outbreak of Equine Surra. It was highly prevalent in Nellore taluk and to a lesser extent in Kovur taluk. Owners of as many as 36 horses sought the help of the Veterinary Department in this district and it is believed that an equal number of horses, probably even more, died of the disease without proper treatment.

Nellore is one of the main rice producing districts in the Madras Presidency and is situated north of Equator at 14° Lat. and 80° Longitude in the deltaic tract of the river North Pennar.

The Nellore and Kovur Taluks are wholly under paddy cultivation for about 9 months in the year. The south-west monsoon contributes its quota of rain by a few but good showers in July and August while the north east monsoon brings on heavy rains in October, November and December. The average annual rainfall is 30-35 inches. The summer is very hot and the shade temperature goes up to 116-118 generally. It commences from March and reaches its height in April and May and gradually subsides in September. The fly season is July and August. *Stomoxys calcitrans*, *Tabanidae* Sp., and *Hippoboscus* Sp., are found in these taluks.

From April 1943 to October 1944, 36 horses as detailed below were brought for treatment for Surra. In all these cases *Trypanosoma Evansi* were present in peripheral blood. The findings were all confirmed by the Principal, Veterinary College, Madras.

April	May	June	July	August	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	March
5	5	1	1	4	4	8	2	1	2	0	3

The lowest number of cases recorded was in June, July and December and no cases in February. The highest record of cases was in October while the months of April, May, August and September show next in order.

Although the incubation period of Surra is known to be 4 to 10 days, yet the time of actual infection could not be definitely determined as the cases were diagnosed at different stages of the disease.

Treatment :—Out of the 36 cases, 27 were treated with intravenous injections of Naganol and 9 with Antrypol when the former drug was not available. For ponies weighing 500 lbs or less the dose of Naganol was 2 gms. in 50 c. c. of Aq. Dist. for the first injection and 3 gms. in 50 c. c. of Aq. Dist. for the second injection given on the sixth day after the first injection. The dose of Antrypol was 0.6 gms. for 100 lbs. body weight for first injection, 0.3 gm. for the second injection on the eighth day and the same dose for the third injection on the 15th day. A reduced dose was given for weaker animals. The dose of Naganol also was modified according to the weight and condition of the animals. The injected animals were kept under observation for a period of 3 months in the case of Naganol, and 56 days in the case of Antrypol. The blood was examined periodically and the animals were considered as cured if the blood was found to be free from any organisms during that period. In cases of recurrence of the attack Naganol was again given in suitable doses. The owners were advised to give nourishing feed to the animals after the injections for about a month. In no case was an intrathecal injection of Naganol given.

The owners of horses sought veterinary aid at different stages of the disease—a few in the pyrexial stage, some with pyrexial and initial

oedematous stage, some others with advance oedema and lastly a few with symptoms of paraplegia and oedema also.

Among the 36 horses, a few weak animals (12) were given reduced doses considering the condition of the animal and the stage of the disease.

Reduced dosage adopted with Naganol for a weak animal was as follows:—

Details of treatment	Number treated	Result	
		Cured	Died
a. 1st injection. 1 gm.	4	3	1
2nd „ 1 gm.			
b. 1st „ 1 gm.	1	...	1
2nd „ 2 gm.			
c. 1st „ 2 gm.	2	1	1
2nd „ 1 gm.			
d. 1st „ 2 gm.	4	2	2
2nd „ 2 gm.			
e. 1st „ 1½ gm.	1	...	1
2nd „ 2 gm.			
	12	6	6

Out of the 12 animals treated with reduced doses 6 recovered & 6 died.

A weak animal was given one gramme of Naganol for the first injection on 30-10-43 and the second injection of Naganol was given on 6-11-43. The blood was examined on several occasions after treatment. On 23-12-43, Trypanosomes again appeared in the peripheral blood and 1 gm. of Naganol was given on 24-12-43. The animal died on 1-1-44. Blood smears were negative for Trypanosomes during this period.

Another horse in good condition weighing about 700 lbs. was given 3 gms of Naganol as 1st injection on 1-6-43 and the second injection of 4 gms on 7-6-43. Regular examination of the blood showed no trypanosomes. On 30-7-43, 3 grms of Naganol were again injected as trypanosomes reappeared in the blood smears. On 19-10-43 Trypanosomes made their appearance again in the peripheral blood smears. 3 gms of Naganol were given on 21-10-43, and the second injection of 4 gms on 27-10-43. Trypanosomes appeared again on 16-3-44. 4 gms. of Naganol was injected on 16-3-44 and a second injection of 4 gms. on 28-3-44. The blood was free from organisms till 13-4-44. A month later, the animal got an attack of strangles and fell a victim to it.

In one horse, the first injection of Naganol 1 gm. was given on 21-10-43. Second injection of 1 gm. on 27-10-43 and it was discharged cured on 28-1-44, after frequent examination of blood. Trypanosomes again appeared in the peripheral blood on 8-10-44 and there was slight

swelling in the hind limbs. This horse was again injected this time with 67 grains of Antrypol on 8-10-44, 34 grains on 15-10-44 and 34 grains on 22-10-44. The animal was kept under observation and the peripheral blood was free from trypanosomes till 10-11-44.

In about 75 per cent of the animals treated with Naganol (or Antrypol) urticarial eruptions appeared soon after the first injection and in some cases after the second injection also. They disappeared in 24 to 48 hours after the injection. After the first injection the symptoms of Surra become exaggerated; oedema gets bigger and extends further, eye lids and sometimes the face and in a few cases the whole body get swollen. There is reluctance on the part of the animal to move about. But the normal condition is restored within four or five days. They are given diuretics, stomachics and tonics after the injections and the owners are advised to give nourishing feed to the treated animal for about a month or more and sufficient rest.

To avoid all risks the injections are given slowly and pushed in small quantities. The head is bathed in cold water for about 15 minutes after the injection.

The cause of death among most of the animals treated is not only the effects of Surra but also the negligence on the part of the owners in the after care and management. Some animals were left to take care of themselves without any attention. Paraplegia was present in almost all the animals which died of Surra.

It is interesting to record here that in a locality where *Trypanosomes* was detected in a horse, the neighbouring cattle also were found infected with the same organism. In Nellore itself there was an outbreak of *Trypanosomes* among cattle which was confirmed by microscopical examination of blood.

Summary

1. Treatment of Trypanosomiasis among equines can be effectively done with Naganol and Antrypol. No ill effects were noted after injections with Antrypol.
2. Majority of the cases can be treated successfully if the after care is good.

INTUSSUSCEPTION IN LAMBS

BY

R. KUPPANNA IYENGAR, G.M.V.C.,

Veterinary Assistant Surgeon, Hosur Cattle Farm, Madras.

Intussusception (Intus-within; suscipio—I receive) is a severe, but rare, form of obstruction of the bowels in which a portion of the intestines enters the part immediately next to it. It is reported to be generally found in horses and puppies.

In this Farm during the period from 27—10—'44 to 8—3—'45 half a dozen lambs have been found to suffer from and die of this affection. It was noticed only in young lambs of 10 days to 9 months of age, but not at all in adult sheep. Although both the sexes could get this affection, it was rather strange that all the six animals were only ewe-lambs.

Causes: Increased and violent peristaltic action of bowels is reported to be the chief cause. "It may be due to the griping action of a severe purge or to the overloading of one part"—William C. Miller. "The condition is due to increased peristaltic movements brought on by such causes as dietetic errors, foreign bodies, enteritis or worms."—Gaiger and Davis. "It may follow as a sequel to the violent peristaltis set up by some irritant as indigestible food or worms."—George W. Wooldridge. Over loading with milk leading on to indigestion and diarrhoea; presence of foreign bodies as mud, sand, or awns of spear grass in the abomasum and intestines leading to gastritis and enteritis and consequent sudden and violent peristaltic movement of bowels; and lastly presence of parasites in large numbers both in the abomasum and intestines causing gastro enteritis—all these causes have been found in these young lambs.

The parasites found in two cases were *Haemonchus Contortus* in the abomasum and *Moniezia Expansia* in the intestines. In the remaining four cases, sand and awns of spear grass have been noticed in the abomasum and intestines along with curdled milk.

Symptoms: The symptoms are generally indefinite. 2 baby lambs that were quite normal the previous night were found dead the next morning revealing intussusception of bowels on post-mortem examination conducted the next morning. In 2 other cases which came under observation, the symptoms noticed were off-food, arching of the back, constant bloating, acute colicky pains, anxious expression, blood-shot eyes, slight rise of temperature—103° F, fear to lie down, when once down fear to get up, fear of movement of any sort and diarrhoea.

Parts affected: Although any part of the bowels may become affected, it was found that *Jejunum* was affected in one, *Ileum* in four and large intestines in one animal. Intussusception may occur in one or more places. Always the anterior portions have been found drawn into the posterior part immediately behind it. Portion of mesentery also may be drawn in as was seen in 2 cases.

Duration of illness: The duration of illness in these animals have been short, generally 24 hours at the most except in one older lamb in which it went up to 5 days. In 2 baby lambs of 10 and 11 days respectively, the duration of suffering was very short. The previous night they were found in good health only to be found dead the next morning.

Post-mortem lesions: Telescoping of one or other part of intestines in one or more places, the whole portion black in colour indicating gangrene of the part has been found. Portion of mesentery has been found drawn in. An unusual quantity of fluid has also been found in the peritoneal cavity. Awn of spear grass, curdled milk and *Haemonchus* species of round worms in the abomasum and tape worms in the intestines with gastro-enteritis have also been detected. All the other abdominal organs were found normal.

Treatment:—Treatment is of no avail unless correctly diagnosed and surgically interfered with by an abdominal operation. In one case, suspecting it for intussusception of bowels, plain Oleum Recini was administered with the object of relieving the bowels of any foreign body or irritant. This animal lived for 3 days and then died revealing on post-mortem only enteritis without any intussusception. It may be that the obstruction had been removed but that the animal could not withstand the enteritis.

Particulars of animals with intussusception noticed.

S No.	Date of post-mortem	Animal	Age	Duration of Illness	Portions Affected	Cause Irritant or parasite	Diarrhoea present or not
1	27-10-44	Bellary Ewe lamb Dam No. 456	10 days	Sudden	Jejunum 2 places	Curdled milk	No.
2	30-10-44	Bellary Ewe lamb Dam No. 462	11 days	do	Ileum 2 places	do	No
3	3-11-44	Bellary Ewe Lamb Dam No. 512	12 days	No intussusception, but enteritis found. Animal admitted on 30-10-44			
4	20-11-44	Bellary Ewe Lamb 564	1 month	24 hours	Ileum 1 place	Awns and curdled milk	No.
5	29-11-44	Bellary Ewe Lamb 574	do	do	Ileum 2 places	do	No.
6	30-12-44	Cross bred Ewe lamb 423	9 months	5 days	Large Intestine one place	<i>Haemonchus Contortus</i>	Yes
7	8-2-45	Bellary Ewe lamb No. 555	4 months	24 hours	Ileum one place	<i>Haemonchus Contortus</i> , <i>Moniezia Expansia</i> and sand	do

ALUM IN THE TREATMENT OF BOVINE PIROPLASMOSIS

By

B. M. PRASAD

Veterinary Assistant Surgeon, Sasaram, Bihar.

Having read the reports of Ramiah and Rahman in the *Indian Veterinary Journal* (Vol. XX, No. 1 and Vol. XXI, No. 2 respectively) I give below my experiences of the treatment of Bovine Piroplasmosis with Alum.

Case No. 1.—An Iron Grey Shahabad Bullock was admitted in the out-door clinic with a temperature of 106° F., bloody urine and complete loss of appetite. There was running from the eyes and the animal was shivering. Blood smears proved positive for *Babesia Bigemina*.

The doses of 4 drams of powdered alum with 2 drams of Boric Acid in a pint of water were given in the course of the day. Next morning the temperature came down to 102° F and the urine was reddish brown in colour. The same treatment was continued. On the third day the urine became normal in colour and the temperature came down to 100.2° F. The owner reported that the animal ate about one pound of wheat-bran mash and drank half a bucket of linseed tea. On the fourth day the bullock appeared alright and was discharged with 4 doses of tonic powder to be given twice daily in the form of electuary.

The animal is being used in cart now and there has been no relapse.

Case No. 2.—One Grey Shahabad breed cow aged 4 years was admitted as an out-door patient on 11.3.45 with a temperature of 106° F. bloody urine and other febrile symptoms. Examination of blood smears revealed Piroplasmosis.

The cow was given two doses, consisting 3 drams of powdered alum and 2 drams of Boric acid in a pint of water. Next day the temperature came down to 103° F but the urine showed no change. The doses were repeated and both the temperature and urine came to normal on the third day.

The cow is quite healthy now and giving milk.

Microscopical examination of the blood was carried out at the Bihar Veterinary College Laboratory, Patna.

Conclusion:—This article will be of interest because, should this treatment prove a success, a cheap drug will be found in treating cases of Piroplasmosis particularly when, on account of changed conditions, specific drugs are not available.

The method of administration is also easy and not attended with any harmful effect.

SUBCUTANEOUS EMPHYSEMA

By

SOROJ MOHAN DHAR, G.B.V.C., P.G., (Mukt.),

Officer-in-charge, Veterinary Hospital, Malda, Bengal.

Case of subcutaneous emphysema in animals are not commonly met with and the following cases will, therefore, be of interest to the profession.

Subject and history: The cases in question were one dog, three bullocks, one she-buffaloe and a she-goat. The owners of these animals could not give any detailed account of the trouble. According to them the onset was quite sudden.

Symptoms: Temperature 2 or 3 degrees above normal, off-feed, occasional cough, slight discharge from nose and eyes, urine and dung normal, no noticeable injury or wound externally or in the mouth, and a sunken condition of the whole body from the tip of the ear and head to tail down to the pastern; in some cases, only a portion of the body was found affected. On pressure a crepitation sound under the skin was elicited and the swelling did not pit on pressure. There was no inflammation any where. On puncture, no fluid came out but only gas. There was no heat or pain. On percussion there was a peculiar drum-like sound.

Blood film was taken from the living animal and was sent to the Veterinary Vaccine Section, Calcutta, for microscopical examination. The result was negative.

Treatment: Of the six cases treated, one dog died and the others were cured. All cases were given an initial dose of Saline and then a subcutaneous injection of Iodine and Pot. Iodide once or twice a week—the dose depending upon the size of the animal.

My thanks are due to Mr. M.B. Menon, Superintendent, Veterinary Vaccine Section, Calcutta, for examining the specimens and to Mr. S.A. Wahid, G.V.Sc., I.V.A.S., Malda and Mr. B. Sen Gupta, G.V.Sc., I.V.A.S., Gaibanda, for the interest in the case and encouragement to publish it in the *journal*.

RED WATER IN A TEN DAY OLD CALF

By

M. HANUMANTHA RAO, G.M.V.C.,

Veterinary Assistant Surgeon, Palakonda, Madras.

Introduction.—The incidence of *Babesia bigemina* in adult cattle is quite a common condition in this country but it is not so in very young calves. Hence the interest in recording the following case.

The subject of this case was a young local-bred bull-calf aged only ten days. On 24.9.44 it was noticed to be dull and disinclined to suckle milk. The urine was coffee-coloured and the bowels were costive. The temperature was 107° F. Cold applications to the head and a dose of Febrifuge mixture was given morning and evening. Next day the temperature came down to 102.4° and the animal appeared better but it died during the night. Blood smears revealed on microscopical examination a very heavy infection of *Babesia bigeminum*.

My thanks are due to Mr. Muhammad Rahimuddin Sahib Bahadur, District Veterinary Officer, Rajahmundry, for his help in arriving at a diagnosis:

EXPERIMENT OF STREPTO-STAPHYLO COCCUS VACCINE IN CHRONIC MAMMITIS

By

R. N. BOSE, G.B.V.C.,

(Retired Lecturer), Bengal Veterinary College.

Subject: A Montgomery cow.

It is a case of chronic mammitis. From the history of the case it transpires that the animal has been suffering from the trouble for the last 5/6 months. The trouble has arisen after the period of last lactation, when it had been found that a quarter of the udder had been giving only a fluid with some curd and blood-stained. That the trouble is the result of an attack of acute mammitis is evident from the fact that there was diffused swelling of the udder. The other concomittant constitutional symptoms must have passed un-noticed. I am further told that the animal was put to various sorts of treatment without any beneficial result.

It is since last two months that the animal has been placed under my treatment, while manifesting nothing of constitutional abnormality. It is that the affected quarter is found indurated with escape of pus drop by drop, either spontaneously or on traction of the feed-teat.

Before the commencement of the treatment I made no reserve of the prognosis—that the affected quarter would never resume its function and that for the safety of the remaining quarters from being attacked by the disease being extended from the affected one, a proper and systematic treatment is of utmost importance.

Obviously to free her from septic conditions I have put the animal to the injection of combined Vaccine of strepto and staphylo coccus six ampules of 1 c.c. each per dose. She has already received five such doses with the result that the escape of pus is greatly diminished and that now on traction of the teat hardly a drop comes out.

As matters stand some more injections (4 or 5) of the same agent are necessary to complete the cure.

Simultaneous use of "Sulfanil" by mouth will go a long way to shorten the period of treatment. This will be recommended duly.

As the animal is carrying foetus now and this is the 5th month one must be more careful to save the animal from a fresh attack of the disease during the next calving and I opine occasional use of "Sulfanil" in small doses with all precautions will be of striking advantage.

The animal is kept separately, necessary instructions have been given to the attendant as to the handling of the animal.

GLUCOSE IN VETERINARY PRACTICE

By

H. K. NAG CHOWDHURY, G.B.V.C.,

Veterinary Assistant Surgeon, Shillong, Assam.

The object of this note is to record certain interesting clinical observations on the use of Glucose in serious or collapsing cases manifesting alarming symptoms. In the opinion of the writer, Glucose would appear to be a drug of choice in such cases as will be evident from the case notes. One case of each species of animals which the writer had opportunity to treat is cited below.

Cattle.—A 7/8 Fresian bull, about 4 years old. On the first visit the bull was found with thready pulse, sunken eyes, 96° F. temperature and oblivious to needle pricks in the skin. The last two motions kept for inspection were found to be a 3 to 1 mixture of blood and dung. The bull was obviously suffering from Perito-Intestinal haemorrhage.

50 c.c. of 25 per cent Glucose solution (Bengal Immunity, Calcutta) was given intravenously immediately. This was followed by intramuscular injection of 20 c.c. of 10 per cent Calcium Gluconate solution.

Six hours later the pulse of the bull was found somewhat better and the temperature was 98° F. Twenty c.c. of a 10 per cent Calcium Gluconate solution was repeated.

Second day.—The bull was sensitive to needle pricks. Temperature was 99° F. Dung was semi mixture of blood and fecal matter.

Injection of Calcium Gluconate solution intramuscularly was repeated.

Third day.—Temperature 98° F; pulse still weak. Animal not active.

Glucose solution 25 per cent. 50 c.c. intravenously and Calcium Gluconate solution 10 per cent. 20 c.c. intramuscularly were repeated. In addition a dose of Mag. Carb and Sod. Bicarb with Tr. Hyosyamus and Spirits Ammon. Aromat was given.

Fourth day.—Temperature 101° F. Pulse full and steady, dung slight trace of blood. Treatment.—Repeated the mixture and the injections.

Fifth day.—The bull started taking food for the first time since it fell sick. Treatment.—Repeated mist. B. D.

Sixth day.—The bull was declared cured. The owner were cautioned to go back to the normal diet gradually.

Dog.—A Daschund Dog.

The dog was knocked by a car and there was no visible injury externally except a broken nail of a toe. The owner gave a teaspoonful of brandy, dressed the wound and was satisfied that there was no fracture of any bone. He did nothing else except keeping the dog quiet. Two days after this, the dog was found sinking and the services of the writer were requisitioned.

The dog was found semi-comatose with thready pulse and a temperature of 104° F. The condition did not permit of any further examination: on the contrary it demanded immediate treatment to prevent a sudden collapse.

5 c.c. of 25 per cent Glucose solution was given intravenously immediately and the dog left quiet for the day.

Second day.—Temperature 103.6°, pulse weak and thready, conjunctiva intensely congested. General condition however was brighter and the gloom of incoming death existed no more. The dog responded to his name by trying to wag his tail and move his head. This he could not do well.

Treatment.—M. & B. 693 one pill T. D. and hot water bag over the spines was advised.

Third day.—Temperature 101.2° F. Pulse still weak. The dog was moving from place to place at times, but he showed signs of weariness and his gait unsteady. Another dose of Glucose was given and M. & B. repeated T. D.

Fourth day.—Temperature and pulse were normal. The dog had a steady gait. M & B. was repeated this day also and from next day a vegetable tonic was given for two days. The dog came round completely.

Cat.—An aged, cross-bred queen cat.

The cat was pregnant and was a great pet of her owner, a lady. She had a fight with a wild cat and was not well since then.

The case was examined on the third day of the fight. She was found with a sub-normal temperature, below 95° F. The pulse was imperceptible and the ears were icy cold. 2.5 c.c. of a 25 per cent Glucose solution was given immediately intravenously into the saphina vein and the cat left for the day in a bed of hot water bags.

Second day.—Temperature 99° F. Urine brown coloured with highly stinking odour. The general condition was brighter, but she was very tender on the lower abdomen and was disinclined to move at all. Treatment.—2.5 c.c. of Glucose was repeated and 2½ grs. of Hexamine T. D. was prescribed.

Third day.—The cat was very much brighter and the threat of immediate danger was over.

Treatment.—Hexamine was repeated.

Fourth day.—The cat aborted 3 dead kittens. Two drops of Ergot soaked in Mag. Carb was given B. D. and 2½ grs. of Soda Hyposulph was added to her milk diet. These medicines were repeated for two days and the cat made complete recovery.

Encouraged by the successful results of the cases, the drug is being used in the Hospital as a routine now-a-days. It may, however, be mentioned that stimulant drench with/or Camphor-in-oil or Strychnine digitalin, etc., were caused for reviving the patients. But in most instances such measures had not succeeded.

The writer would be much interested to learn the experience of other workers through the medium of this esteemed journal.

College News

BENGAL VETERINARY COLLEGE

The undermentioned students have passed in order of merit the Diploma Examinations of the Bengal Veterinary College for the session, 1944-45.

No. in order of Merit.	Name.	Place of origin	Passed with distinction in
1	2	3	4
1	B. R. Das Gupta	Bengal	(a) Soundness, Ageing and Pathological Shoeing. (b) Animal Husbandry (P III) Dairy Science. (c) Animal Husbandry (P III) Milk Hygiene including Milk inspection.
2	H. C. Joshi	U. P.	
3	D. B. Mukherjee	Bengal	Parasitology and Meat Inspection-
4	K. M. Rai	U. P.	
5	B. Bahadur Singh	U. P.	
6	A. C. Roy	Bengal	
7	Md. M. Haque	Bengal	
8	T. P. Lahiry	Bengal	
9	Md. W. Hossain	Bengal	
10	S. K. Chandra	Bengal	
11	B. K. De Sarkar	Bengal	
12	Md. M. Uddin	Bengal	
13	M. C. Harbola	U. P.	
14	G. R. Gupta	U. P.	
15	Md. Hossain	Bengal	
16	A. B. Bhattacharjee	Bengal	
17	B. R. Sen Gupta	Bengal	
18	R. K' Joarder	Bengal	

Calcutta }
25-6-45 }

A. LATIFF, B.H.V.S.,
Principal,
Bengal Veterinary College-

Correspondence

Cestarsol

To THE EDITOR, I. V. J.

Sir

In small animal practice there are a few conditions which engage the attention of veterinarians more than tape-worm infestations in dogs and cats. Although several remedies have appeared in the market in the past from time to time, they have been discarded as insufficiently active. The new drug, CESTARSOL, represents the most effective chemical substance which has been used up to the present time. While it is not claimed that CESTARSOL provides the perfect answer for tape-worm infections, it is maintained that until further research in this field takes place, CESTARSOL will remain the most satisfactory product for the purpose.

Further information regarding this drug will be available on request direct from the manufacturers, Messrs. May & Baker (India) Limited, Post Box No. 693, Bombay.

Yours faithfully,

Bombay }
25-6-45 }

MAY & BAKER (India) LTD.,
Bombay.

To THE EDITOR, I. V. J.

Sir,

With reference to the article on 'Is it a case of Latent Haemorrhagic Septicaemia' published in I. V. J. Vol. XXI No. 5 of March 1945, I wish to put forth my views on the matter through the kind courtesy of your columns.

In all probability, the case in question was one of Haemorrhagic Septicaemia either in its later stages of the incubation period or in the initial stages of the disease; the injection of the vaccine naturally aggravated the condition. I would also like to draw attention to the existence of this disease in a chronic form as found in certain parts of the Tanjore District, about which mention has already been made by Mr. P. V. Doraiswamy Iyer in one of the issues of this *Journal*.

Regarding the relief obtained after the injection of Iodine, my conviction is that the injection of Liq. Iodine in suitable doses has a curative value in cases of Haemorrhagic Septicaemia, especially those in the initial stages.

The fact that 'Pasteurellosis' in hominine practice responds well to the injection of 'Neutral Iodine' intravenously adds support to the above

inference and three typical cases of H. S. have so far been treated by me successfully on these lines, viz. the use of 'Liq. Iodine (Lugol's) intravenously in suitable doses.

Yours faithfully,

Tirupanandal, Tanjore Dt. }
29-4-45.

K. S. SHANMUGASUNDARAM, B.V.Sc.,
Veterinary Asst. Surgeon.

Veterinary Hospital—Dharmathupatty

THE EDITOR, I. V. J.

On 12-5-45, Rao Sahib R. R. Iyer, Zamindar of Kannivadi, handed over the Veterinary Dispensary at Dharmathupatty to Government control on a 50% contribution basis. The dispensary was started in this rural area in 1936 and was entirely financed till now by the Zamindar who has constructed all the necessary buildings and provided the necessary up to date equipments, instruments, appliances and drugs.

A huge gathering of ryots from all round the villages was present on the occasion. The Sub-Collector of Dindigul also was present on the occasion. 6 excellent breeding bulls were exhibited by the Zamindar with a view to give a start to Livestock development work.

The local Government, Sri S. V. Ramamurty, the Adviser to the Government and Mr. T. J. Hurley, the Director of Veterinary Services, Madras were thanked by the public and Sri S.A. Sastri, District Veterinary Officer, Madura, who took charge of the hospital under Government control gave a lecture on care and treatment of animals and livestock development. The public made appreciative references to the generosity of the Zamindar for having run the institution entirely from his private resources these nine years.

13-5-'45:

V. A. S. DHARMATHUPATTI.

Is it a case of magnesium deficiency?

To

THE EDITOR, I. V. J.

An Ongole Brahmini Bull, aged about 12 years, was admitted in the Veterinary Dispensary, Gudivada on 24-3-'45, with the history that the animal fell down suddenly 6 times during the previous 24 hours and remained unconscious for about 15 to 20 minutes every time. In evidence thereof a number of abrasions on the body of the animal was present. The temperature was normal and so also the urine and dung,

I tentatively diagnosed it to be a case of Magnesium deficiency recollecting an article on the subject in the *Indian Veterinary Journal* and *Indian Farming*.

Immediately an injection of 50 c.c. of a 25% solution of Magnesium Sulphate was made subcutaneously on either side of the neck.

The fits stopped and there was no more of them. Magsulph in four ounce doses was given as a drench for a week. The swelling at the seat of injection subsided the next day and the animal has remained well till now.

* Paper read at the District Veterinary Assistant Surgeons' Conference on 22-4-45 at Bezvada.

K. V. SATYANARAYANA,
Touring Veterinary Asst. Surgeon, Gudivada.

To

THE EDITOR, I. V. J.

Sir

I have gone through the suggestions and schemes given by the highly qualified and experienced veterinarians of the Indian States and Provinces issued in the Educational Number of this *Journal* for the month of January, 1945, but in spite of their various suggestions and schemes for the future development, progress and curriculum of veterinary education none of them have thrown any light towards the treatment, care and management of elephants which is a part of the duties of a Veterinarian. Though it is difficult to restrain and control such a huge animal easily, and though it is not a common animal in all the places, yet veterinarians are being appointed in some Indian States and Provinces where they have to look after the elephants and when necessary treat them. But most of the officers experience great difficulties in the care, management and treatment of them as there are no good books on the subject. Nothing is taught to the students about elephants in any of the Indian Veterinary Colleges as far as I could judge from the curricula of Bengal, Madras and Patna Veterinary Colleges. I cannot say of Bombay and Lahore Veterinary Colleges as I have not got the information of the curricula of these two colleges. Even if it is taught in any colleges it is very limited. So my humble suggestion is that like other subjects in the syllabus, provision should be made for giving a preliminary idea about the diagnosis, treatment, care and management and about the posology of the elephants in all the Colleges either in the 2nd or 3rd year class, so that when a Veterinarian comes out of the college he will not be put into difficulties in treating any of the animals wherever he is put.

To raw men, who have not had opportunities of coming in contact with elephants, it may be impossible to handle these animals but it would be astonishing to them how easy it is when once they learn the methods of restraint and understand the little "tricks" and weaknesses of these animals. They would then be only too eager to treat such animals.

Deogarh, Bamra, E. S. A., }
1st March 1945. } N. GOUNTIA,
Veterinary Assistant Surgeon, Bamra State.

Improvement of Livestock

3 Days' Cattle Show for Indigenous Khargone—Nimari Breed of Cattle at Khandwa, C. P.

To THE EDITOR, I. V. J.

Sir,

To inculcate on the minds of cultivators the advantages of improved livestock and to infuse enthusiasm in cattle-owning ryots to breed to improve cattle, sheep, goats and poultry, a three days' Cattle Show for Nimari-Khargone breed was organised and held on 9th 10th and 11th March 1945 in the premises of late Rai Sahib Seth Champala's Jinning Factory under the patronage and guidance of K. B. F. K. Khan, Deputy Commissioner, Nimar and Mr. P. S. Nair, Deputy Director of Veterinary Services, Jubbulpore Division.

The grounds were beautifully decorated and demarcated to display separately,

1. Veterinary Section.
2. Dairy Section,
3. Poultry Section,
4. Agriculture Stall,
5. Handicraft Section.

Spacious stalls for cattle exhibits were erected and classified to show stud bulls, bullocks, cows, heifers, calves, buffaloes, sheep and Barkari type of goats.

A village model hen house, breeding cage and run was erected to exhibit white Leghorn breed of poultry from Khandwa Poultry Unit reared at the Veterinary Hospital, Khandwa.

Chhakda race competition continued for all the 3 days. Milk yield competition was also held.

Dairy Section demonstrated fodder and silo making, milk tests, butter making, etc.

A total number of 135 improved Nimari-Khargone breed cattle was admitted.

On the 9th March, 1945 at 9-30 A.M., the Show was declared open by Mr. G.L. Bedekar, B.A., L.L.B., Pleader, a famous cattle lover in Nimar. On 10th March, 1945 along with other activities of the Show a general meeting of the Zamindars and big cultivators of the Tahsil was convened to form the Livestock Improvement Society in a beautifully decorated pandal.

With Mr. P.S. Nair, Deputy Director of Veterinary Services in the chair, speeches on the necessity of improving livestock were delivered and then voluntary co-operation of the Zamindars and cultivators was sought to form the Society. 21 members not only volunteered to form the Society but also purchased 116 shares, a share value being Rs. 5/- Ginning Association, Khandwa, donated Rs. 350/- being the cost of a stud bull. Office-bearers were then elected and a resolution was passed to get the Society registered under Co-operative Societies Act 11 of 1912.

Messrs. Mohd. Razaullah Khan, G.B.V.C., Veterinary Assistant Surgeon, Burhanpur, Subba Rao, G.M.V.C., Quarantine Officer, Hoshangabad, Motilal Taishya, L.Ag., Asst. Agricultural officer, Khandwa; Kesri Chand Jain, L.Ag., Malguzar Songir formed a committee of Judges and adjudged the award of prizes after scientific inspection of the animals displayed.

On 11th March 1945 at 6 p.m. K. B. F. K. Khan, the Deputy Commissioner, Khandwa, distributed the following prizes. 45 prizes to several varieties of cattle exhibits displayed by owners, 11 prizes for agricultural exhibits, viz, grains, vegetables, fruits and juices, 13 prizes on handicraft except for 9 challenge shields and cups all the prizes were fancy articles in daily use.

For all the 3 days of the exhibition, there was a huge gathering. The philanthropy of the Ginning Factory, Khandwa in awarding Rs. 350/- to the newly formed Livestock Improvement Society has given a good stimulus to the cattle breeding scheme in the Tahsil. Obviously this is the outcome of the propaganda carried out at Cattle Show.

Although errors of centuries cannot be remedied in a day, yet patience and perseverance would overcome the difficulties and a day would dawn when a great head way would be made in the realm of Animal Husbandry to the best advantage of the country.

After prize distribution and pansupari, Mr. M. A. Samad, G.B.V.C., Veterinary Assistant Surgeon, Khandwa, organizer of the Show Committee and organiser of the function in extending his vote of thanks to one and all made an appeal for the development of livestock wealth.

Khandwa, C. P. }
5-4-45. }

M. A. SAMAD, G.B.V.C.,
Veterinary Assistant Surgeon.

The First Nuzvid Taluk Cattle Show 1945

To

THE EDITOR I. V. J.

Sir,

A 'one day' cattle show the first of its kind was held at Nuzvid on 16.2.1945 under the auspices of the Civil Veterinary Department, Madras with the co-operation of the Zamindars, the Mokhasadars, the influential

public and the cattle owners of this town and the taluk who took great interest in organising the show. Its success was mainly due to the personal instructions of the District Veterinary Officer, Bezwada and the help and guidance of Sri Rajah Rangayya Apparao Bahadur, M. A., the Kumar Zamindar of Vuyyur.

The show was run by a local committee consisting of:—

1. Sri Rajah Rangayya Apparao Bahadur, M.A., President.
2. Sri M. Mallikharjunarao, B.A., Deputy-Tahsildar,
3. Sri K. S. Gopalakrishnamurthy, B. A. LL B.,
Executive Officer, Panchayat Board. } Members.
4. Sri Akula Kantarayudu Naidu, Secretary.
5. Sri Y. Ramanujam, G.M.V.C.,
Veterinary Assistant Surgeon.

Propaganda.—Wide propaganda was done throughout the taluk by the distribution of leaflets about the holding of the show and also by the Deputy-Tahsildar, the Agricultural Demonstrator and the Health-Inspector during the course of their tours. The Secretary of the Committee during his visits to surrounding Villages distributed the leaflets and encouraged the cattle owners to get as many exhibits as possible to the show. Printed notices with the signatures of the Deputy-Tahsildar and the Secretary were issued to all the Village Officers of the taluk to encourage cattle owners to get exhibits to the show. Wall posters were attached throughout the town and in important central Villages of the taluk about the holding of the show. A Cinema slide about the same was shown from 1-1-1945 till the day of the show. Again a week before the show, printed invitations were sent to all the Zamindars, the influential public and the cattle owners of both Nuzvid town and the taluk.

The show was arranged on the Vuyyur estate ground near the Veterinary Dispensary and the Kumar Zamindar of Vuyyur was kind enough to meet the expenses for the construction of the pandal and other arrangements on the show ground.

Including the Government contribution of Rs. 150/- the total donations received from the generous Zamindars and the public amounted to Rs. 1062-10-0. In addition to this the Zamindar of Chakkapalli contributed a big silver cup as the first prize for a pair of bullocks.

Though it was the first of its kind as many as 176 exhibits were taken to the show. They were judged under 12 classes. 47 silver cups costing Rs. 842-10-6 were awarded as prizes for 45 exhibits. Out of the above cups two rolling cups costing Rs. 200/- contributed by the Raj Kumar Shaib of Mirzapuram and the Panchayat Board, Nuzvid were kept in deposit for next year as they could not be received in time.

Sri K. Mallikharjunarao, G.M.V.C., District Veterinary Officer, Bezwada, Sri V. Ramaraju and Sri Kamineni Venkatappayya acted as judges. The District Veterinary Officer, the Revenue-Divisional Officer and Sri Kamineni Venkatappayya addressed the gathering on the importance of improving the livestock. The cattle owners evinced great interest.

The show was opened by Sri Rajah Venugopala Apparao Bahadur, the Zamindar of Chimalapadu and Sri Rajah Venkatadri Apparao Bahadur, the Zamindar of Vuyyur presided over the function and distributed the prizes

M. R. Apparao Bahadur, M. A.,
President.

Nuzvid, }
1st March 1945. }

Y. Ramanujam, G.M.V.C.,
Secretary.

Cattle show Committee,

One Day Cattle Show—in Tiruturaipundi.

To
THE EDITOR, I. V. J.

Sir:

I have the honour to bring to your kind notice that in the March issue of 1945 of *The Indian Veterinary Journal* Sri B. Seshayya M. A. B. L. Secretary Omblachery Co-operative Cattle Breeding Society has written in article 'on one day cattle show at Tiruturaipundi in which he states that the cattle show was conducted under the *Joint auspices* of the Civil Veterinary Department and Omblachery cattle Breeding Society Tiruturaipundi where as the show was actually conducted under the auspices of the Civil Veterinary Department alone with the co-operation of one and all including the Omblachery Co-operative cattle Breeding Society Tiruturaipundi.

In conclusion he says, that Sri K. Seshaiya the Secretary Omblachery Co-operative cattle Breeding Society, Tiruturaipundi and the *Joint Organiser* of the function proposed vote of thanks' etc. The organisers were only members of the Civil Veterinary Department copies of notices printed before the show and invitations sent to prominent people are also enclosed to point out that the show was conducted only under the auspices of the Civil Veterinary Department and the organisers are members of the Civil Veterinary Department.

Tiruturaipundi, }
25-3-45. }

K. R. PADMASUNDARAM,
Touring Veterinary Asst. Surgeon.



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