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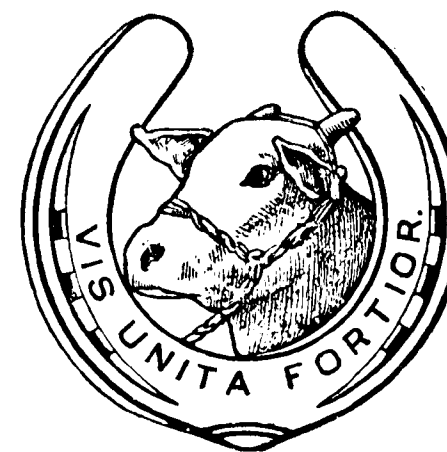
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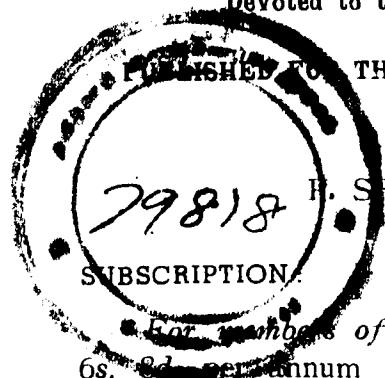
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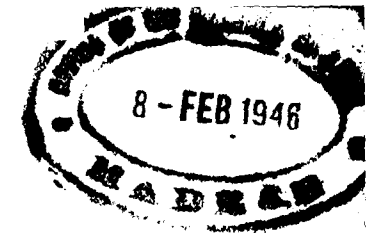
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General Articles 440

OBSERVATIONS ON NEOPLASMS OF THE TEGUMENTARY SYSTEM OF THE DOMESTICATED ANIMALS

By

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There are 3 main questions in connection with neoplasms which confront the practitioner:

(1) What tumours are most likely to be met with in connection with any particular species of animal and any particular part of the animal body.

(2) How may the tumours be recognised?

(3) What advice should be given to the client with respect to the tumour.

(a) Is it benign or malignant?

(b) Is operative interference justifiable?

(c) Is the growth likely to recur after surgical removal? and, if so, how soon after excision may a recurrence be expected?

The motive of the present article is to furnish some data towards an answer to the first question; his clinical experience, pathological knowledge and surgical skill, will enable the practitioner to answer, at least tentatively, the other questions.

The fact that some of the answers to those questions can only be of a tentative nature will suggest to the surgeon and to the pathologist the desirability of recording observations from which reliable data can be compiled with a view to more accurate answers to the questions than can be given at the present time.

Veterinary pathology is in need of such data.

The particulars required include :

- (1) The species, sex, age, and condition of the patient.
 - (2) The site of the tumour.
 - (3) The length of time the tumour has been growing.
- and if operative interference be practised :—
- (a) The data of the removal of the growth.
 - (b) The macroscopical and microscopical characters of the growth with a view to diagnosis and classification.
 - (c) If the growth recur after excision the data on which a recurrence was observed.
 - (d) If a post-mortem examination be made, the site of the primary growth; sites of the any secondary growths; or in the case of a multicentric tumour, the situations of the lesions.

Of the twenty-nine neoplasms of the tegumentary system of the horse, five were fibromata; one of these involved an ear; another, of the soft variety, developed in connection with an eyelid; the third was multiple and occurred in connection with the prepuce; the fourth, of the hard variety, developed in connection with a hind limb; the fifth is recorded simply as occurring in connection with the skin. A fibro-lipoma occurred in connection with the skin of the stifle joint.

Two melanomata of the common variety were encountered; two sarcomata, one of which, of the mixed cell type, was multiple; and one fibro-sarcoma.

Of the more complex growths, six papillomata were found; of these, three arose in connection with the membrana nictitans or third eyelid; and one of these showed microscopical characters which suggested that it might prove recurrent after excision; one arose in connection with the right orbital region; one affected the skin of the prepuce; and one the skin of a hind leg; a fibro-papilloma occurred in connection with the skin of a hind leg of a colt.

One adenoma was encountered.

Of the five carcinomata met with, two occurred in connection with the intermandibular space; one of these in an aged horse; a third is recorded as affecting the head; a fourth as involving the region of an eye; the fifth a hind fetlock.

Of the six epitheliomata encountered, one involved a jaw; two the membrana nictitans or third eyelid; one of these in a mare; one the skin of an orbital region; and one a lower eyelid; again of a mare; the sixth

occurred in connection with the left inguinal region in a sixteen years old horse; this growth was decidedly malignant, with secondary growths in the substance of the lungs.

Among the neoplasms of the horse, fourteen occurred in connection with the head, including the ears; and of these no less than nine arose in connection with the orbit, eyelids, or the so-called third eyelid—membrana nictitans; while five occurred in connection with the hind limbs, and one in the inguinal region.

Tumours occurring in connection with the skin of the horse may not receive much attention unless they interfere with the usefulness of the animal: growths in connection with the eyes or their surrounding parts may readily impair the working capacity of the animal; therefore the advice of the veterinary surgeon is sought and operative interference considered; the surgeon is interested in the histology of the growth and after its removal, it is sent to the laboratory for an opinion; that may be one reason why growths in connection with the eye region are so prominent among our cases.

Tumours in the ox are represented by an epithelioma affecting a lip and extending to the palate; two carcinomata affecting, in each case, the region of the brisket; a round cell sarcoma of the skin and two fibromata, one of the soft variety arising in connection with the skin over the penis; and two melanomata. It must be noted that of these eight tumours affecting oxen, four are malignant in type.

Of the twenty-two fibromata, affecting the skin of the dog, thirteen were found in connection with the limbs and of these ten were in connection with the forelimbs; of these latter growths one, affecting a Spaniel dog, was multiple; while another, affecting a Scots Terrier, contained sufficient adipose tissue to warrant the use of the term lipo-fibroma.

Of the growths in connection with the skin of the forelegs two were of the "soft" variety affecting respectively a Spaniel and an Airedale dog. Three other fibromata of the "soft" variety were encountered; one in connection with the skin of the orbital region; this growth at one place showed a tendency to develop sarcomatous characters; a second occurred in the skin of a Dandy Dimont dog; while the third growing in connection with the skin of the thoracic wall in a Spaniel also showed a tendency towards sarcomatous change. One fibroma affecting the skin over the sternum, showed some degree of myxomatous degeneration.

Six lipomata were encountered, one of which was present in the perineal region of an Airedale dog aged seven years.

Of the eight benign melanomata found, three occurred in connection with the limbs, and one in connection with the skin of the prepuce; in this

case melanin was present in an inguinal gland; one occurred in connection with the skin of the mammary gland which organ was affected with an adeno-chondroma, one of the few cases in which a dog was found to harbour two neoplasms of different types.

Thirty-six sarcomata were found in connection with the tegumentary system of the dog; these were made up as follows:

Nine sarcomata of which the cell type was not specified; two of the mixed cell type; seven spindle celled; six melanotic sarcomata of which four were of the spindle celled type; six round celled sarcomata; five fibro-sarcomata and one angiomatous sarcoma.

With regard to the areas of the body affected, six growths occurred in connection with the neck region; three of them in Retriever dogs, of which one was a female aged four years, the sarcoma being of the mixed cell type. Two growths occurred in connection with the ears; and two in connection with the skin of the thoracic-wall in a bull-terrier and a pug-dog respectively; while five occurred in connection with the forelegs, of which three were in the carpal region and eleven in connection with the hind limbs. Two others involved the limbs but, unfortunately, which, were not specified. This predominance of the limbs as sites of sarcomata, among the dogs under consideration, may be compared with the occurrence, already noted, of fibromata in these situations.

The sites of remaining sarcomata were not recorded.

Of the four adenomata one, of the sebaceous type, occurred in an old English Sheep dog.

Nine papillomata were encountered; of these two affected the skin of the ears; one of them in a Dalmatian dog; one the orbital region in a Spaniel; one, which recurred after excision, affected the shoulder of an Airedale dog; while three affected the skin of the hind legs, one of these growths occurred in a female Scots Terrier which also suffered from a malignant carcinoma. The sites of the other two growths were not recorded.

Among the seventeen carcinomata, including five adeno-carcinomata encountered, two occurred in the neck region, one of a Fox Terrier, the other of a Spaniel; in the latter case, secondary growths were present in the lymphatic glands; one in connection with the skin of the lower eyelid was melanotic; one in connection with the skin of the right elbow joint, showed secondary growths in the axillary lymphatic nodes. An adeno-carcinomatous growth occurred in connection with the skin of the left shoulder of a Sealyham terrier; another in connection with the skin of the abdomen in a fourteen year old bitch. A carcinoma growing in connection with the skin of the back of a Collie dog was decidedly malignant.

In view of the frequency with which fibromata and sarcomata have been recorded in the present series as affecting the limbs of dogs, it is interesting to note that only three carcinomata have been found in those situations, two of these have been referred to already; the third occurred in the left hind leg of a Spaniel. Carcinomata are also recorded from the inguinal region and from the groin—the latter in a Fox Terrier. A carcinoma affecting the skin of the anal region was also found.

Of the thirty-nine epitheliomata encountered in the dog, nine occurred in connection with the region of the head, affecting the lips, forehead, temporal region, orbits and ears respectively. Three cases occurred in connection with the skin of an ear, one of these, in a Spaniel was of the basal cell type; one growth arose in connection with an eyelid, another in connection with the conjunctiva; in one case affecting the skin of the head of a Spaniel, the growth was of the basal cell type. One growth in connection with the skin of a Samoyede dog exhibited marked ulceration; another affected the region of the elbow joint in a Fox Terrier. Three epitheliomata were found affecting the skin over the mammary gland; one of these, occurring in an Irish Setter, showed marked ulceration. One growth occurred in connection with the skin of the region of the left stifle joint in a Dalmatian dog; two in connection with the region of the groin; one of these in a Fox Terrier.

One growth of the basal cell variety occurred in connection with the prepuce; another in connection with the sheath of the penis; both were of the "rodent ulcer" type. Eleven epitheliomata were encountered affecting the anal region; one of these, involving the perineum, was of the basal cell type; another, also affecting the perineum, was melanotic. The tail was affected in two cases; one of the growths was of the basal cell type.

The remaining growths are recorded as occurring in connection with the skin of a Bull-dog, a Pomeranian, a Collie and two Spaniels, the breeds of the remaining two cases were not recorded; one of these growths recurred after surgical excision.

Thirteen neoplasms of the cat come under consideration in the present connection; of these, five were sarcomata,—of these five, one was a spindle cell sarcoma affecting the face; two were sarcomata affecting an orbital cavity and an ear respectively; and two were of the mixed cell sarcoma type involving the region of the neck and the scrotum.

A carcinoma was encountered affecting a lip and an adeno-carcinoma the skin of the abdomen. A lipoma was found involving the thorax; and three fibromata, one involving the skin of the abdomen; another, of the soft variety, affected the skin of a foot; while the third involved the skin of the tail.

A basal cell epithelioma was met with in the region of the flank, and one fibro-papilloma of the skin is also recorded.

One basal cell epithelioma involving the skin of the anal region in a rabbit was encountered.

Attention may be drawn to the frequency with which the ears, and orbital regions are affected in the various animals concerned.

ANIMAL PARASITISM*

By

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I. INTRODUCTION

It is not unusual to come across persons who are a burden to the family and a menace to the society and who cleverly snatch out a happy existence at the expense of others, without doing any work or giving any service in return; in the same manner, among the lower animals there are creatures of similar kind. Thus a parasite is an individual, lodging upon or within another individual, deriving the entire livelihood from the latter viz. the host. Parasitism is nothing but a very successful device to compete with the continuous struggle of the survival of the fittest.

The word 'parasite' is of Greek derivation and means "one who eats at another man's table". No living being is free from parasite, and even man has offered hospitality to a good number.

Some of the parasites feed on blood and flesh, some take shelter in the layers of the skin, while some inside the various organs; some have a liking for the young, whereas others infect the adult. No organ is immune to the attack of these most ingenious invaders. They have been detected in brain, ear, eyes, heart, lungs, muscles, bones and even spinal cord. Some hosts harbour only a few parasites, but others maintain a regular army.

II. ORIGIN OF PARASITISM

No organism is entirely self-sufficient to lead an absolutely independent existence. Every individual must depend on others for mutual co-operation and help. In every sphere of life, viz. land, water and air, there is a constant struggle for existence; every living being strives for selfish motives—food and protection—for himself and sometimes even for the young ones.

* Paper read at the Annual Conference of the Bombay Veterinary Medical Association held at Bombay, on 25th December 1944.

This constant warfare, this constant struggle for the survival of the fittest, has, slowly and surely led to the parasitic mode of existence, wherein an animal or plant, very ingeniously ekes out an existence at the expense of others without returning any service to them (the hosts).

Parasites have been evolved from free-living progenitors by gradual and progressive adaptations due to continuous and repeated endeavour to achieve a comfortable existence, at the expense of freedom, in this world of deadly struggle. The stronger exist at the sacrifice of the weak, but the latter, by remarkably clever adaptations impose themselves on the stronger, and profit thereby, first temporarily and later permanently, deriving boarding as well as lodging from the host.

Clark (1921), after a considerable study of numerous parasites among fossil animals, has come to the conclusion that the adoption of sedentary life is the beginning of parasitism and also asserts that commensals have often assumed parasitic existence. Wheeler (1925) asserts that social life is responsible for the evolution of parasitism, whereas Wasmann (1911) opines that inter-specific parasitism in ants has originated from former habits of robbery and slavery, and also from temporary parasitism, mutations and mutual feeding.

III. CLASSIFICATION OF PARASITES

Apart from the natural taxonomic classification, parasites can be divided bionomically into the following groups:

1. According to their duration of life on the host:
 - (a) Temporary, periodic, partial, intermittent or occasional parasites.
 - (b) Permanent, true or total parasites.
2. According to the degree of parasitism:
 - (a) Facultative or optional parasites:
 - (b) Obligatory or compulsory parasites.
3. According to the habitat of the parasite, whether within or without the host:
 - (a) External, superficial or ectoparasites.
 - (b) Internal, intimate or endoparasites.
4. According to the host specificity:
 - (a) Incidental or cosmopolitan.
 - (b) Specific parasites.

1. (a) Temporary parasites:

These lead a parasitic existence only during a certain period of their life but carry on independent existence for the remaining part. They come in contact with the host only at intervals or during a certain stage of their life-cycle.

In some cases the adult depends on the host, while the young are free; e.g. dog or cat flea whose young days are passed in the cracks of the flooring, from where it derives nourishment. Another example is that of *Sacculina*, a Crustacian, whose adolescent life is absolutely independent, whereas the degenerate adult entirely depends on the host.

Those that are parasitic in adult condition, exhibit extreme degeneracy, when compared with the young. The graceful form of the young is so much altered that without referring to their embryonic development, it is difficult to name their taxonomic position. All systems degenerate, except the reproductive, and the creature is nothing but a bag of eggs and embryo.

In other cases the young are parasitic, while the adult are free. These parasites need help at the commencement of life; the adult live at their own expense, once they emerge out of the host and see the day. Some of the members entrust the young to strangers even, to nourish and bring them up. The nurse gives them shelter and even the last drop of her blood.

Typical examples of this class are furnished by oestrus ovis of sheep and Warble flies. The adult female lays eggs on the body of the host and the parasitic larvae emerge out and instead of passing the youth on dumps of waste organic matter, attack the host and cause the most dreaded disease.

The parasitic ingenuity of the cuckoo is another illustration. The female deposits the eggs in the nest of the host for the purpose of being hatched and nourished.

1. (b) Permanent parasites:

These unfortunate creatures have no free existence and remain in continuous contact with the host. Every stage of their life is spent under the care of a neighbour; some of them require a succession of hosts, without whom they cannot exist. The wellknown *Trichina* worm is a typical case. It is noticed encysted in the flesh of one of the hosts and goes over to the next, when the latter eats the flesh of the former and thus indefinite generations pass, without the parasite leaving any of the hosts.

The parasitic insects of the order Strepsiptera, furnish another example. These do not kill the Hymenopterus larvae on whom they feed but suck the blood slowly, leaving only that much, necessary for the victim to undergo metamorphosis. The females are wingless and remain constantly attached to the host, while the winged males loiter about. Most of the Round and Tape worms also come under this category.

2. According to the degree of parasitism:

(a) Facultative parasites:

These have great power of adaptability and in the absence of a normal host, seek another or even lead an independent existence, e.g. Blow-fly larvae.

Accidental parasites come under this heading; these are usually non-parasitic but become a parasite when forced to.

(b) Obligate parasites:

They require a particular host or a succession of hosts and are quite unable to carry out an existence outside the bars; e.g. most of the parasitic worms.

Cysticercus cellulosae is found only in pigs and *C. bovis* only in cattle, while the adult *Taenia* are noticed in man. Experiments to infect dog, cat, donkey, rabbit and pig have failed.

3. According to the habitat of the parasite, whether within or without the host:

(a) Ectoparasites:

They remain attached outside the host; e.g. ticks, mites, leeches, fleas, mosquitoes, lice, etc. Majority of these are Arthropods, and act as carriers of infectious diseases, when they themselves are parasitized.

(b) Endoparasites:

These live inside the body of the host; e.g. Tape and Round worms of the alimentary canal *Fasciola* in liver, *Coenurus cerebralis* in brain, *Trichinella* in flesh, Protozoa and Bacteria in blood, etc.

4. According to the host specificity:

(a) Incidental parasites:

A parasite specific for a particular host may also infect other species; *Dipylidium caninum* though specific in dog is also found in man; *Ascaris lumbricoides* of children is also noticed in horse, ox, ass and pig; *Fasciola hepatica* of sheep have been detected in man, rabbit, horse, ass, pig, stag, etc.

(b) Specific parasites:

These infect the special host or allied species; e.g. *Echinococcus granulosus* of dog and cat, and *Syngamus trachea* of chicken.

IV. LIFE-CYCLE OF PARASITES

The life-cycle of a parasite is so adapted as to suit the habits and Peculiarities of the host. That is why the duration of life and timings of different stages vary within a wide range.

Among ectoparasites the life-cycle is simple and direct. For the perpetuation of species, the dispersive stages leave the original host and infect the new ones, the channel of infection being contact and migration.

In endoparasites, on the other hand, the life-cycle is much complicated and illustrates the phenomenon of metamorphosis, exhibiting much diversity and numerous modifications, enabling the parasite to compete with the vagaries of environment; e.g. the malarial parasite and numerous

helminths. Metamorphosis is an absolute necessity for the acquisition of new hosts, the transfer being effected by cysts in protozoan and eggs and larvae in helminths. The adult or sexual stage takes place in a host of one species (primary or final host), whereas the immature stages in another, of a different species (intermediate or secondary host), as in the *Taenia* and *Trichinella*.

Alternation of generation is noticed in Cestodes and Trematodes, whose eggs containing a hexacanth embryo are usually devoured by arthropods, acting as the first intermediate host. These infect all the vertebrate classes.

V METHODS OF INFECTION

For the sake of a most effective propagation of species and dispersal of the young, the parasites have devised numerous intelligent modes of infecting the host. The first step is to leave the primary host and this is affected in the following ways:

1. Discharge from wounds: guinea worm.
2. Death of the host: Myxosporidia.
3. Infecting the eggs of the host: piroplasma.
4. Transfer to the intermediate host through blood-sucking creatures: surra (*Tabanus* fly), sleeping sickness (*Tsetse* fly), dengue (*Culex* mosquito), piroplasmosis (ticks) and malaria (*Anopheles* mosquito).
5. Expulsion of eggs or embryo through natural orifices such as the urethra, anus, mouth, nostrils: majority of round and tape worms, flukes, etc.

Various modes of gaining entrance into a host have been made use of and these may be summed up as follows:

1. Entrance to the alimentary canal through food or water: consumption of encysted flesh (*Taenia*, *Trichina*), eggs of *Ascaris*, intake of grass carrying encysted cercaria of Liver fluke, swallowing of infected insects which have devoured eggs of the parasite (*Dipylidium caninum* through fleas and lice).
2. Bites of insects: This method of exchange is widely resorted to; e.g. malaria, dengue and surra through the saliva of the intermediate host.
3. Sexual intercourse: Spirochaete of syphilis, *Trypanosoma equiperdum* of dourine and some nematodes in insects are transferred by this method.
4. By direct contact: ticks, lice and mites are transferred by coming in close touch with an infected animal or man. Tape worms of dog have been acquired by kissing these pets.
5. Intelligence, cunning and theft: Cuckoo.

VI. FERTILITY AND POWER OF PROPAGATION

Extreme specialization to attain the highest degree of capacity for reproduction is nowhere else more remarkably illustrated than among parasites. In order to secure facility for multiplication, fertilization, protection of the off-spring and method of infection, the parasites undergo curious morphological and physiological modifications. In a majority of cases the reproductive methods are so modified as to suit particular hosts and a particular environment. Very few eggs and larvae are liable to survive, and as the chances of death are enormous, there is a great loss of progeny; hence the necessity for the production of an enormous number of eggs. *Taenia solium* and *Ascaris* are stated to lay annually 80 millions and 64 millions of eggs respectively.

Asexual reproduction:

Free-living parasites exhibit a tendency towards the asexual method of multiplication, when the environmental conditions are favourable, and when food for the new-comers is easily available. This type of multiplication takes place through fission, budding or parthenogenesis, usually in the young or the larval stages of the parasite, at the time of invading a secondary or intermediate host. It is common in protozoa, tape worms, flukes, parasitic Crustacea and insects (Hymenopterus parasites).

VII. ADAPTIVE CHARACTERS OF PARASITES

Since parasitism is a reaction to the struggle for existence, the absolute dependence on the host for food and shelter gives rise to a life of ease, with the result that parasites have developed peculiar structures for leading such a luxurious life.

Ectoparasites get flattened, the organs of locomotion degenerate, just as in sedentary forms; the organs of attachment to the host, on the other hand, are well-developed: teeth (hook-worm), suckers (tape-worm), hold-fasts (parasitic Copepods); the digestive canal has great storage capacity and is well-suited for continuous feeding (leech). Fleas possess unusual ability for locomotion, and this is facilitated by the lateral body-compression, to permit free movement inside the thickets of mammalian hairs and avian feathers.

Endoparasites have, on the other hand, completely lost the symmetrical form, with loss of vision and defective sense organs, degeneracy of nervous system and diminution in enteric organs, but exhibit a very high degree of specialization for prolific reproduction, to secure the propagation of species during migration from host to host, and for the very purpose, hermaphroditism is noticed, while in some cases, even self-fertilization is resorted to. Due to an extreme reduction of metabolism there is absolute simplification or complete absence of digestive, respiratory and circulatory systems,

because the organism virtually swims in digested food which is absorbed through skin, covered over with a chitinous layer to prevent the action of digestive juices of the host; e.g. tape worms.

Adaptations as regards the method of reproduction are:

1. Resistant egg-shell: *Platyhelminthes*.
2. Liberation of entire proglottids: *Taenia*.
3. Intimate association with the opposite sex: *Bilharzia* (male carries female) and *Chondrocanthus* (female carries male).
4. Self-fertilization: Liver fluke.

VIII. HOST SPECIFICITY

The pioneers of the science of parasitology have asserted the relations between a particular parasite with a specific host. Parasites of birds are quite different from those of dogs and cats. Due to a completely dependent life, the parasites have developed a tendency to accommodate themselves within a very narrow range of adaptability; hence the necessity for a specific host, though some of the parasites have secured a wide belt of hosts. *Echinococcus granulosus* is found in canine species only, but *Diphyllbothrium latum*—the tape worm of fish—has been detected in all the fish-consuming mammals.

Malarial parasites (*Plasmodium vivax*) are noticed only in man and *Anopheline* mosquito. The cuckoo which lays eggs in the nest of birds has relation with a definite species.

Specificity is the result of prolonged association and food, afforded by the host, and the effect of environment.

IX. QUALITIES OF THE HOST

A benevolent host should be tolerant, supply a good amount of nutrition and have a capacious lodging space for the parasite as well as its progeny. A limited habitat lessens the chances of being attacked by a parasite.

Some hosts carry only a few parasites because the period during which they are likely to be infected is very limited. The distribution of a parasite depends on the time taken to infect a host, the period spent by the larval parasite in an intermediate host and migration of the final hosts.

Three factors determine whether a parasite will infect a given host:

1. Habits of the parasite and the host, and the opportunity offered by the host: *Tabanus* may inject *Trypanosomes* into any terrestrial creature but cannot bite an aquatic animal.
2. Environmental conditions furnished by the host: Parasites of poultry are very rarely noticed in cattle due to the difference in body temperature and nature of the body fluid.

3. Power of resistance possessed by the parasite to adapt itself to various surroundings, e.g. *Diphyllbothrium latum* is found in almost all the mammalian species.

X. FOOD RELATIONS OF PARASITE TO HOSTS

Since parasites derive food from the host, it is necessary that the host should be harmed as little as possible, so long as the parasite thrives. A parasite that kills a host, cuts the branch on which it sits. *Pinnotheres*, a crab taking shelter in an oyster, constantly steals food from the gills of the host but does not injure its body at all. Lice and ticks, though of the same phylum, have different food relations, because the former needs a constant supply of food while the latter can endure starvation for months. Larvae of certain Chalcids feed on ant-pupae, whereas larvae of some parasites feed on reserve food of bees. Haviland has noticed a parasitic larva which is hyperparasitic on aphids.

XI. CONDITIONS FAVOURING PARASITISM

There is a very keen struggle for existence among the parasites too. A parasite comes across innumerable difficulties in searching out, gaining entrance and even residing in a suitable host. After penetrating a host it has to compete with other usurpers. There are various conditions which help or interfere with a parasite, in leading such a dependent life. A parasite should search out such a benevolent host which must remain so permanently, must be resistant to other diseases and parasites, and should live for a fairly long period for the supply of free boarding and lodging. A very wide range of adaptability and food of various types helps a parasite.

As mites are widely distributed and are sanguivorous, they secure hosts within a very short period and also receive a fairly large quantity of food. This wide distribution is due to walking legs, ovoviviparity, laying of eggs away from the host and resistance to environmental variations. On the other hand, degenerative digestive system, endoparasitism, inability to live without a host due to climatic factors, difficulty in movement when away from the host, etc., serve as hindrance to parasitic existence.

XII. EFFECT OF PARASITISM

On the host:

The parasitic association is injurious to the host but may not prove fatal immediately. The majority of the hosts do not mature normally and their power of reproduction affected due to loss of vitality.

Parasites deprive the host of its nutrition, secrete toxins, block the various systems and in many other ways retard the growth, thus forcing the host to exist in a poor debilitated condition, sexually impotent, with modifications of shape and size of the body structures, and finally kill the host. Parasitic diseases are usually caused by the mass-infection.

These uninvited guests harm the host in the following manner:

1. Absorption of nourishment from the host : intestinal worms.
2. Obstructing the passage of various systems: Gapes in the respiratory passage of chicken, *Coenurus cerebralis* in the brain of sheep.
3. Feeding on the tissues of the host: mosquitoes and blood-sucking worms.
4. Production of toxins due to the metabolic activities—products of excretion, digestive juices, etc.
5. Traumatic damage by boring holes in the skin (Warbles), penetration of tissues for the deposition of eggs (*Filaria* and Lung-worms).
6. Acting as carriers of infection: Fleas (plague), Sand-flies (Kala-azar), Ticks (*Babesia*), Tsetse-fly (sleeping sickness), lice (typhus).
7. Facilitating the entrance of bacteria: stomach-worms of pig permit the entrance of *Bacillus necrophorus*.
8. Causing inflammation in invaded tissues: pneumonia, gastritis, hepatitis.
9. Parasitic castration: Male Spider-crab assumes feminine characters, when infected with *Sacculina*. Crickets, ants and termites, when parasitized, increase in size but become sterile.

Effect on the parasite:

The effect is towards degenerative specialization, more among the permanent parasites than in temporary ones. The parasites exhibit the most characteristic example of environmental adaptations or reaction according to the requirement. The feeding habits, methods of reproduction, structural modifications, physiological qualities, etc., are specialized to such a degree so as to most conveniently adapt the possessor to a particular host.

Reaction of the host:

The type of reaction varies according to the nature of the parasite as well as the host and the seat of location of the former into the body of the latter. The action is grouped into two categories:

- (1) Cellular or tissue reaction.
- (2) Humoral reaction.

In the former, the resistance is offered by the phagocytes which digest small parasites or surround a large one and form a layer of cells forming cysts, thus separating the parasite from the body of the host. In the second type, the body of the host develops immunity being "less frequent and seldom complete".

Peculiar behaviour of the host to safe-guard against the attack of parasites: Kangaroo-rats avoid Warble-flies by the nocturnal habits. Reindeer remain away from the same scourge by visiting windy coastal barrens during summer. Pelicans of Peru rinse their pouch with sea-water to avoid the infection of lice. Many birds and poultry recourse to sun-bath and dust-bath for the same purpose.

XIII. HYPERPARASITISM

Every living individual, from the unicellular protozoa to the mightiest of vertebrates, harbour parasites and even parasites themselves are parasitized, constituting what is known as hyperparasitism. Gregarines, Cestodes, Trematodes and Nematodes have been detected to carry Microsporidia, the Opalinids contain amoeba and the Trematodes shelter Flagellates in the excretory system. Thus parasites have invaded almost every group of animals and even man.

XIV. SEXUAL DIMORPHISM AND SEXUAL PARASITISM

Remarkable illustrations of sexual dimorphism are noticed among parasites. In the majority of the parasites, the female, in order to satisfy the necessities of life, goes in search of food and protection, while the male loiters about. Therefore the female, by gradual changes, for the sake of adaptability, undergoes extreme modifications and so much increases in size that in some cases she does not resemble the male at all.

The dwarfed degenerated male lives upon or inside the normal female; e.g. *Bonellia*, an Annelid, where the microscopic male inhabits the nephridia of the female. In *Tricosomoides crassicauda*, a parasitic nematode infecting the bladder of rats, the male lodges in the uterus of the female. In some fishes the degenerated males are always attached to the body of the female.

XV. NUMBER OF PARASITES IN A SINGLE HOST

This is a very interesting consideration because the number detected in a single host is sometimes unbelievable and amazing. Some of the hosts lodge a few, while others maintain an army. It is said that the Abyssinians do not consider themselves healthy, unless they are known to support a few tape-worms. Every dog-fish shelters 20 to 30 tape worms. Howard and Anson state that fishes are capable of harbouring 250 to 2500 Glochidia without sustaining any harmful effect. Every drop of human blood may contain 200 to 300 larvae of Filarial worms and an individual intestine may support upto 4000 hook-worms. Leukart detected seven lacs of *Trichina* and Zuker even 50 lacs, in one pound of human flesh.

Nathusius detected a black stork which nourished 24 *Filaria* in lungs, 16 *Syngamus trachea* in the trachea, more than a hundred *Spiropterae* in gastric walls, hundreds of *Holostomum* in small intestine, 21 *Distoma hians* in oesophagus and yet the creature remained in perfect health.

Krause of Belgrade cites the instance of a horse, about two years of age, which commanded an army of 500 *Ascaris equorum*, 190 *Oxyuris equi*, 214 *Strongylus equinus*, millions of *Trichonema tetracanthi*, 69 *Anoplocephala perfoliata*, 287 *Parafilaria multipapillosa* and 6 *Cysticerci*.

The size of parasites covers a wide range: a *Bothryocephalus* has measured 375 yards, a *Taenia solium* 1000 yards and a female *Strongylus* one meter.

XVI. PARASITES AS AGENTS OF HELP TO MANKIND

The majority of the parasites no doubt produce a detrimental effect on the host but others are of great economic importance and are therefore beneficial to mankind:

1. Utilization as therapeutic agents: In some cases, hyperpyrexia is of great help to a patient harbouring some of the chronic infections. A person suffering from syphilitic paralysis is artificially infected with malarial parasites.

2. Parasites as agents of biological control: Some of the animal and plant parasites are hyperparasitized by the utilization of other parasites; e.g. the employment of Hymenopterus insects in checking the multiplication of plant-aphids.

3. Pollination of flowers by parasites: Flowers of fig are usually pollinated by Blastophaga flies.

4. Parasites helping in the formation of pearls: Pearls are formed by the deposition of material secreted by the mantle of the oyster, around a foreign nucleus, which acts as an irritant, and which, in majority of the cases, is nothing but a larva of parasitic worms.

5. Production of useful products by the parasites: Parasitic scale-insects (Coccids) produce cochineal dye stick-lac (from which shellac is obtained) of great commercial value.

XVII. TREATMENT AND PREVENTIVE MEASURES

An infected individual may recover due to the body reactions but the recovery is accelerated if the host undergoes treatment—surgical (removal of the parasite, e.g. Hydatid) or medical which consists of chemotherapy through anthelmintics or immune therapy by the introduction of antitoxins (vaccines and sera). A thorough knowledge of the life-history, therefore, is of utmost importance to find out a stage where the parasitic enemy can easily be tapped.

The preventive measures may be enumerated as follows:

1. Prevention against the dissemination of parasites by avoiding the pollution of soil or water in case of typhoid, cholera, entamoeba, schistosomes and Tape and Hook-worms. When parasites are transferred by insects, the host can be protected from the bites of such insects, e.g. malaria, surra, piroplasmosis, filariasis, etc.

2. Destruction of parasites inside the host: This is carried out by the utilization of anthelmintics. This treatment lessens the opportunities of the dispersal of parasites. Parasites may also be tackled in the body of the intermediate host by the destruction of the latter; e.g. mosquito in malaria, snail in liver-fluke, Tabanus in surra.

3. Measures to avoid infection vary according to the nature of the parasite: Parasites admitted through food can easily be prevented by a thorough inspection, as in *Trichinella* and some of the intestinal parasites. Boiling and filtering of water prevents the attack of Guinea-worm, cholera, enteric fever and dysentery. Protecting the skin from polluted soil or water lessens the chances of Hook-worms and Bilharziasis, whereas protection from the bites of blood-sucking insects makes one safe from typhus, spirochaetosis, surra, etc.

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CANARIES AND THEIR COMMON AILMENTS

BY

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Introduction.—Canaries are imported cage birds from countries such as England, Germany, Italy, China and Japan, their place of origin being the Canary Islands and some parts of South Africa. These charming little birds are also bred in India, more for their beauty than for their usefulness. They have got an exceptionally melodious voice and are capable of singing beautiful songs. They are generally yellow and buff in colour and there are different specific breeds such as "the Norwich", "the Yorkshire", "the Lizard", "the Border Fancy", "the Cinnamon", "the London Fancy", "the Scotch Fancy", "the Lancashire Coppy" and "the Belgian", with their respective characteristic features and show points. It is not my intention here to go into the minute details of these various breeds, but to place on record some of the common ailments which these little fellows suffer in our aviary and the treatment afforded to them from time to time.

The following are some of their important diseases treated :—

1. *Constipation.*—This is mainly a disease of dietetic origin. The Canaries get this complaint often due to wrong methods of feeding. Generally speaking, their staple diet is the canary seed mixture. But they will also enjoy and appreciate a change in their diet, such as the yellow of hard-boiled egg twice a week, green foods, such as Cabbage, Mustard leaves, Lettuce leaves, and also a variety of other seeds, viz. rape seed, hemp-seed, poppy seed and linseed. It is always a good plan to hang a piece of cuttle-fish in the corner of the cage for the birds to peck, and spread in the tray at the bottom of the cage fine sand with a little nicely crushed oyster-shell and also small gravel stone. Feeding the birds always with one particular variety of seed will cause this trouble.

The bird appears very dull, and the droppings hard.

Treatment.—Administer one drop of Ol. Recini by means of a dropper in the beak; also add a pinch of Mag. Sulph in drinking water twice.

2. *Coryza.*—The Canary birds often suffer from this complaint when they are exposed to chill weather.

There will be discharge from the nostrils and the bird will begin to shake its head as if to get rid of something.

Treatment.—Clean the mouth and nostrills of the bird with potassium permanganate solution 1 in 1000 strength. Keep the bird in a quiet dry place. Put few drops of honey in drinking water. Allow egg food as diet with Super D Cod-liver oil 5 minims added to it.

3. *Bronchitis.*—This follows generally as a sequel to catarrh.

The Canary becomes restless with a husky and dry cough; a sort of rattling noise in the throat is observed, Feathers look ruffled.

Treatment.—Spts. Camphor Co. m i. Trigacanth. gr ii and Glycerin mx. Add this to one ounce of its drinking water. The bird appears better after a couple of days. Then stop this mixture, and add Tr. Ferri m. ii, Tr. Gentian Co. m. v, change the diet to bread soaked in milk (milk being squeezed out of bread) with poppy seed sprinkled on it. Also Linseed meal may be given.

4. *Asthma.*—Caused by neglected chills; overheated aviaries, and lack of proper ventilation. This is differentiated from ordinary bronchitis when there is difficulty in respiration and the Canary appears wheezing and panting.

Treatment.—The same as for bronchitis. But add one drop of Tr. Aconite or one drop of Tr. Lobellia aetheris to about an ounce of its drinking water. These two drugs have given successful results. Attend to ventilation.

5. *Fits and Fainting.*—These are observed in Canaries when they are accommodated in very small cages, and exposed to the direct rays of the scorching sun, and also when they are frightened.

The Canary suddenly falls from the perch with its beak striking against the tray in the cage and becomes very stiff. If not attended to immediately, may die in a few minutes.

Treatment.—Dash ice melted water against the head and put some in its beak. With this simple treatment, the bird generally recovers. Then keep the bird in a very cool, quiet, comfortable and dark room. Feed him as usual, also add a pinch of Mag. Sulph to drinking water later on.

6. *Cholera.*—This is a highly fatal infectious disease caused by microbes of the intestinal tract similar to *Bacillus Asepticus* of the fowls; the source of infection being dirty water and unhygienic methods of feeding.

The birds will have diarrhoea with an offensive odour, thirst, vomiting and shivering; also cramps and convulsions eventually ending in death.

Treatment.—Drugs such as Trigacanth, Kaolin, Chlorodyne and B. 1. Intesti-phage in drinking water have been tried without any success, the mortality being cent per cent. So, the best method adopted is preven-

tion. Destroy the affected bird by adding a teaspoonful of Camphor water to its drinking water. Strict isolation of the cages, seed-hoppers, drinking vessels, and other utensils of the aviary should be done.

7. *Diphtheria*.—This is blood infection caused by a filterable virus, generally brought about by bad food, dirty water and neglected cold. This condition is recognised by examining the mouth of the canary, wherein we find a yellow or greyish growth extending up to throat region with foetid odour.

Treatment.—Destroy the infected canary at once, burn the cage and its belongings. Remove the rest of the birds from the aviary and give them a good bath by keeping the birds in a bath cage, taking care to see that some reliable disinfectant such as phenyle, Izol or Lysol is added to water in the tub. This is the only method of saving the lives of the other canary birds.

Sweating.—This happens to growing young birds in the nest during breeding season, the hen will sit very close to the young ones causing them lot of annoyance. Hence the young birds appear very miserable instead of looking hairy and fluffy.

Treatment.—Separate the cock from the hen; also the youngsters at times. Add five drops of Tr. Gentian co and two drops of Tr. Ferri Perchlor to drinking water. This procedure will generally set right the hen and prevent her from this bad practice.

9. *Egg-bound*.—This complaint also occurs during breeding season. The hen shows signs of distress with feathers muffled and sits in a corner of the cage, as if she is about to die.

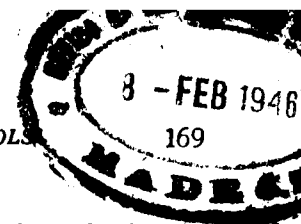
Treatment.—Remove the hen from the cage and hold her over a glass jar containing boiling water. Keep the hen in such a position as to expose the vent to the rising steam. After a few minutes of steaming, gently drop a little sweet oil or olive oil in the region of the vent and leave her in the nest. This will set right the hen and the egg will be safely deposited. Another treatment is to put a drop of Ol. Recini in the beak of the hen.

10. *Pip*. Is a condition in which the anal gland at the root of the tail enlarges with the accumulation of pus like material.

Treatment.—Open the gland with a sharp pin or needle; allow the bad material to escape. Clean the part with aseptic cotton wool and touch with a glycerine swab. If this complaint is neglected, the bird dies in a couple of days.

11. *Sore feet*.—This condition is brought about by bad perches.

Treatment.—Dip the bird's feet in warm water, thoroughly clean and dry them. Apply cream or boric ointment.



12. *Inflation or Emphysema of the body*.—

In this trouble, air gets accumulated underneath the skin and subcutis, and the bird appears bigger than its usual size.

Treatment.—Take hold of the skin between the thumb and the finger and puncture the skin with a sharp needle. The air will escape. Apply turmeric or Tr. Benzoin co to the wound. Allow green food, and add Tr. Ferri 2 minims and Tr. Gentian co, 5 minims, Glycerine 10 minims to the drinking water.

In addition to the diseases quoted above, these Canary birds also suffer, and develop many other minor complaints such as overgrown beak, overgrown toe nails, cuts and injuries, etc., which do not require any special methods of treatment other than the usual routine and also careful handling during sickness as the patients are very small.

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CLASSING AND AGMARKING OF INDIAN WOOLS

BY

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Hitherto no 'classing' of Indian Wools has been attempted. The trade names like Joria and Bikaneri imply the tract from which the wool is collected. Perhaps, formerly when grazing was in plenty, the sheep had not to move far for food and the purity of the breed was maintained and the wool collected from a tract was of one type at least. At present there are different breeds coexisting. Nomadic sheep which have to travel far in search of pasture are shorn at different places in different seasons. Also there is a great deal of variation from sheep to sheep and region to region of a sheep within a breed, that the wool produced in an area is no longer of one type but a mixture of different types and qualities. Added to this natural disadvantage there are the various tricks played by the primary merchants which further degrade the condition of the wool resulting in a great economic loss to the wool trade. Often care is not taken to present it even in a clean state. As a result, the shrinkage loss which should be easy to estimate cannot be estimated with any certainty as most of our wools are light conditioned. The buyers find it almost impossible to assess the value of such an undefined and unguaranteed material and have to quote their lowest to be on their safe side.

The producer is hit hardest by this state of affairs. Instead of making the best use of his product, the worst use is made and the lowest prices obtained. He himself is too ignorant and poor to make an effort to improve upon this. The middlemen are not interested as they are satisfied with the commission they are already earning. The manufacturers though interested are too far removed from the wool growers and primary collection of wool, that they do not care to be bothered with it, especially when alternative products are available. As such the duty falls upon the State to take this up and make a systematic and effective start in this line.

It is not true that our Indian wools do not admit of classing or that it is not profitable. The very fact that even now differently named wools are being marketed at different rates disproves this statement. There are different qualities in each type of wool. There are superior and inferior carpet wools just as there are different grades of clothing and combing wools and it is worthwhile keeping them apart. Even by observing 'classing' on the broadest lines a vast improvement can be made in the bulk of the wool marketed and moreover a certain standard and specified product can be supplied which will be more than welcome by the buyers who will be able to choose what they want, know definitely what they are purchasing and hence bid their best for it.

Before attempting to lay out the classing policy it is necessary to make a thorough survey of the particular area regarding:

1. Standardisation of the different pure breeds in that locality.
2. Number of sheep available in each breed.
3. The type of wool of each breed, the individual and regional variation within each type, (Results verified by laboratory analysis, if possible) and the utility of each type of wool.
4. Local methods of sheep husbandry and collection and sale of wool.

A detailed study of these questions will be helpful in determining how many lots to make in that area, what types of lots to make and the best and cheapest way to make them. It may not be possible to strike at the right way at once. But the experience and the demands of the trade will soon set one in the correct line.

In an area where the sheep are well bred, of a single type and in large numbers, different lots of great uniformity in quality are possible, whereas, where different types of sheep are found, a wider range in quality will have to be allowed. Thus a grader will have to possess a thorough knowledge of sheep of that area to arrange his classes correctly. Generally speaking in carpet wools skirting, keeping out the stained pieces and maintaining the uniformity of staple length as far as possible will appreciably improve the value of the bulk of wool. Even here it might be profitable to sort out the lamb wool

and Hoggets wool if there are sufficient quantity of them. In a clothing wool classes can be made according to the fineness and character, whereas in a combing wool length and soundness become the main criterion of difference. In all these media and fine types of wool both individual and regional variations in sheep will have to be considered and each main part of the fleece will have to be judged independently. Grading can best be done at the shearing yard fleece by fleece and a skirting table or any sort of mesh will help to keep out the small pieces.

Taking up to classing may not be profitable at once.

Cost of collection will be increased on account of the additional cost of grading. Classing will not be as efficient as theoretically expected for the first few attempts. Also buyers who will be willing to pay higher prices for these grades and specified wools will be limited. But as experience is gained, classing will be as perfect as possible and collecting cost will go down. As confidence is gained in these guaranteed wools, their reputation will spread and higher offers will be forthcoming. Soon as purchasers get accustomed to these graded wools and insist upon them all will have to fall in line.

For a short period at least the agency which tries to introduce classing and collecting the wool on new lines cannot expect a considerable profit. The State will have to provide for this either by starting a large scale experiment itself or subsidising any concern which may be prepared to take up this job. The quantities of the different grades collected in this experiment should be large enough for the manufacturers to test and make use of them separately. Representative samples from each bag or bale of wool in each grade should be taken and analysed in the laboratory separately to study the variations in each character. If these values are kept up from season to season and if the buyers are also satisfied with the constancy in the quality and the utility of each grade Agmarking could be introduced fixing the specifications on these values.

Legislation may then be helpful in seeing that all the wool produced is collected and marked in this way. If such experiments are carried out simultaneously, in all the different parts of the country, classing may be introduced and grades may be fixed for each type of wool produced and soon there will be a revolutionary change in this direction.

THE OCCURRENCE OF BOVINE CONTAGIOUS PLEUROPNEUMONIA IN ASSAM*

By

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Contagious bovine pleuropneumonia or 'Lung Plague' is undoubtedly one of the most serious cattle diseases causing considerable losses. Baldrey and Williams [1909] and Huttyra and Marek [1926] mention the occurrence of the disease in India; Edmonds and Walker [1929] doubt its existence in this country while Edwards [1927] considers that India has escaped its ravages. Similarly, a perusal of the available annual reports of the Provincial Civil Veterinary Department indicates that opinion was always divided as to the existence of the disease in India.

In the last few years some work has been done, in collaboration with the Imperial Veterinary Research Institute, Mukteswar, to investigate the disease, as it occurs in Assam. Efforts were made to study in detail the incidence and epidemiology of the condition. The first outbreak that the writer had the opportunity to investigate was in Deosiri grazing area, Goalpara district, in the month of January 1940. A study of the epidemic was undertaken, and suitable materials were collected for examination at the Imperial Veterinary Research Institute, Mukteswar, and for preliminary transmission experiments at Gauhati.

As more outbreaks occurred in other centres, further material was obtained for experimental work, and additional information relating to the disease was collected. The disease has so far been investigated in three districts of Assam. Careful field observations suggest the specific and contagious nature of the infection. A few forms of pneumonia of different etiology are known to occur in cattle, but the specific nature of this condition was really noteworthy. Almost identical clinical syndromes in affected animals in various centres of outbreak, similar courses of the disease with high mortality and uniform *post mortem* lesions strengthened the suggestion of its contagious nature and specificity. Transmission experiments carried out in Assam gave sufficient evidence that the disease can be reproduced in cattle, and that goats were resistant, thus confirming the observations in the field. The causal organism of the disease, as it occurs in Assam, has been isolated at the Imperial Veterinary Research Institute, Mukteswar, from natural cases, the first one being from Deosiri area. The organism was reported to belong to the same group as that of *Pleuropneumonia Contagiosa*, i.e. *Borrelomyces peripneumoniae*.

* Paper read at the Indian Science Congress (Section of Medical and Veterinary Research), held at Calcutta in January 1943.

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A strain of the organism obtained from Sibsagar was also found to be immunologically identical with the original Assam strain. There seems to be substantial evidence now to show that the disease, as it occurs in Assam, is the same Contagious bovine pleuropneumonia as, occurring in other parts of the world. Besides, in India this disease seems to have been in existence only in the province of Assam.

Geographical and climatic conditions of Assam.—

It appears necessary to give a brief description of the natural features and geographical and climatic conditions of the province to appreciate fully the epidemiology of the disease. Assam is essentially a land of hills and valleys abounding in forests and ample vegetation. It is a land locked province forming the north-eastern frontier of India, almost touching Tibet, China and Burma. The general topography presents numerous undulations consisting of hills and dales. There are two main valleys—the Brahmaputra and the Surma—that constitute mainly, though not entirely, the whole province. Sloping downwards from the Bhutan Hills, or the foothills of the Himalayan range on the north, numerous tributaries, big and small, flow southwards to join the Brahmaputra. To the south of the river, there are many hill ranges—Khasi and Jaintia Hills, Garo Hills, etc. The districts of the Brahmaputra or Assam valley lie on either side of the Brahmaputra river, extending from Lakhimpur in the north-east to Goalpara on the west. Further south of the hill ranges that border the Assam valley lies the Surma valley, named after the river which flows in that area.

In the Brahmaputra valley, where the occurrence of the disease has been recorded, extensive forest areas and low-lying marshy tracts, which are inundated during rains and floods, border the course of the river. Vast areas of lands with rank and wild grasses and coarse herbage, constitute the main grazing reserves. Cattle are maintained in these areas in groups in places known as *khutis*. Besides, there are many islands in the bed of the river, known as *charson charland*, which are very fertile, and cattle are kept there for cultivation as well as for grazing.

The climate of Assam is humid, and the rainfall is high. The winter season is short, and dry summer is shorter still. Due to heavy rainfall and annual floods, large areas of low-lying land are inundated, and several areas remain waterlogged and are open for grazing during the winter only.

Nature of the epidemic and locality affected.—

Outbreaks of bovine contagious pleuropneumonia have been observed only in the Assam valley and that too in certain localities lying on either bank of the Brahmaputra and its major tributaries.

Particulars regarding the outbreaks are given in Table I.

Table I

Serial No.	Locality of the outbreak	Name of district	Date of prevalence
1	Deosiri grazing area	Goalpara	January 1940
2	Sobanshah village	Kamrup	June 1940
3	Patakatachar, an Island in the bed of the Brahmaputra	Goalpara	August 1943
4	Bordangi forest reserve	Goalpara	September 1940
5	Barchandra village	Kamrup	September 1940
6	Patabari forest reserve	Goalpara	January 1941
7	Majuly area	Sibsagar	May 1941
8	Kokilamori village	Sibsagar	October 1941
9	Kadamialgaon village	Lakhimpur	January 1942
10	Lowly village	Kamrup	February 1942
11	Dikhowmukh area	Sibsagar	March 1942
12	Tarabari village	Darrang	May 1942
13	Kamalabari village	Sibsagar	June 1942

Data collected in these outbreaks as well as information obtained from other sources indicate that there is no particular season for the incidence of the disease. However, some of the outbreaks have been observed about a week or two after heavy rains. There is also evidence to suggest the possibility of endemic and soil-borne nature of the infection in some of the outbreaks. The disease usually breaks out in the same area or in its neighbourhood from time to time. However, full information regarding periodical nature of its incidence could not be obtained, but there is reliable evidence of its spread in a slow and steady manner.

The epidemic is characteristic in its slow and progressive course. In the early stage of the outbreak, deaths are not so very frequent or in large numbers, with the result that one might overlook the existence of the infection. The slow and insidious nature of its course in the herds usually extends from four to six months and occasionally even to a period of about a year.

Cattle of both sexes and of all ages are equally susceptible. The mortality amongst the affected cattle ranged from 60 to 70 per cent. Cattle are the primary victims, and buffaloes contract the infection, though rarely, at the later stage of the epidemic. In certain outbreaks, no death was observed among

buffaloes, in spite of the fact that they were living in the infected locality. Goats and sheep, howsoever intimately in contact with the infected cattle, seem to be resistant to natural infection.

The disease has been found prevalent in districts on either bank of the Brahmaputra. In the affected areas, there are some differences in local features and in the method of maintenance of cattle. To have a correct appreciation of these factors, it is proposed to describe the outbreaks in the three districts—one outbreak in each district.

Outbreak in Goalpara district.—

Investigation into bovine contagious pleuropneumonia was carried out in January 1940 and in subsequent years in Goalpara district. The first outbreak was received from Nijalaguri *khuti* in Deosiri grazing area, which is more or less a forest tract about 25 miles north of the Brahmaputra river near the foot of the Bhutan Hills and is situated comparatively on a higher level on the western bank of the river Aie, a tributary to the Brahmaputra. Large numbers of cattle are maintained in this area for grazing and there were about a dozen *khutis*. In Nijalaguri *khuti* there were about 220 head of cattle but no buffaloes. In the course of about two months there were 46 attacks resulting in 30 deaths.

Cattle movement, particularly for sale, is common. Villagers usually purchase cattle from *khutis*. Occasionally, movement of cattle between *khutis* by way of sale or exchange is also reported. In the grazing area, certain portions have come under cultivation where villages or *bustis* have grown. In an attempt to trace the source of infection, it was ascertained that the disease had prevailed in a neighbouring *busti* about four months earlier. Cattle of both the places usually came in contact during grazing. Information was forthcoming to show that some of the *khutis* and villages lying on the eastern side of this area had sustained severe losses in previous years, the disease having been known to occur for some years past and to spread to two neighbouring forest reserves—Bordangi and Patabari—due to contact of cattle while grazing and also to Patakatachar by purchase of diseased cattle from Deosiri area.

Outbreak in Sibsaigar district.—

The disease was investigated in Majuly area Sibsaigar, in May 1941. Majuly area is an outlying place on the northern bank of the Brahmaputra amidst thick and fairly extensive forest, intercepted by cultivated lands and low-lying areas that are usually inundated. North of this area, there is another river which flows into the Brahmaputra further down. Majuly area is fairly big, extending from three to five miles around Majuly which is only a small village. The cultivated lands are more or less scattered, and people generally live nearby. Hence unlike *Khutis*, cattle population in this area is not concentrated in one locality, but scattered in small groups, mainly for cultivation. In this area there were about 450 head of cattle, including 150 buffaloes. In

the course of two months there were 24 attacks, out of which 15 died. The disease spread in Majuly area, slower due to the scattered condition of cattle population which restricts frequent contact.

Here too, cattle movement is very common. It is a practice in this area as well as in villages adjacent to the banks of the Brahmaputra, to remove the cattle to *chars* in the month of June. The bullocks are kept for field work in the villages. Cattle are brought back in November when the grazing areas are free from inundation. There are two *chars*—Banoria and Khajua—where cattle from Majuly area and other villages are brought for grazing. This practice of movement of cattle has resulted in the spread of infection to the villages on the southern bank of the river.

Available records show that the disease prevailed in Majuly area, from 1928 to 1930 and from time to time on subsequent years. It would appear that the infection in this locality is of an enzootic nature. Another feature worth mentioning in this connection is that the disease broke out a short time after heavy rains. Information relating to the previous occurrence of the disease, as well as the particulars of this outbreak, suggests soil-borne nature of the infection.

Outbreak in Kamrup district.—

The disease prevailed in Lowly village, Kamrup, and was investigated in the month of February 1942. It was found that three villages closely adjacent to Lowly were also affected. They are situated in an extensive low-lying marshy tract of land on the north bank of the river Brahmaputra. During rains and floods the whole area remains inundated from about May to August. In winter, too, there is stagnation of water in certain localities, particularly in riverian regions. Excepting a few patches of cultivated land, the whole area serves as a common grazing ground for cattle in the neighbourhood. The total number of cattle in the affected villages was approximately 700, including 30 buffaloes. About 100 cattle were affected, out of which 70 died in the course of 3 months.

Enquiry elicited the information that the disease had spread from the neighbouring villages situated about six miles east of Lowly. In three of the neighbouring villages, the disease was prevalent in March 1941. Cattle movement in the whole area is quite common. The slow and insidious nature of its course in the village herds, extending to a period of about a year was characteristic. It was also reported that the disease had prevailed in some of these villages in the year 1934-35. The earliest available record of the occurrence of the disease in Kamrup district dates from 1913-14, and some localities had suffered severe losses from time to time at irregular intervals.

SYMPTOMS

Symptoms are fairly recognizable and even well-marked, as they vary with the stage of the disease. The onset of the disease is noticed by the dull and

inactive appearance associated with an impaired appetite and cessation of rumination. Pyrexia with temperature ranging from 104° to 105°F, staring coat, watery discharge from the eyes and nose and occasional cough are soon observed. After this early stage, more distressing symptoms of the respiratory system develop. Breathing is hurried and hard, with dilatation of the nostrils during inspiration. Occasional grunting or low husky cough, pain on pressure of the chest and dull respiratory sound on percussion are noticed. The progressive development of pneumonia is manifested by the laboured and distressed breathing which ultimately becomes abdominal. Moist rales and sometimes gurgling noises may also be heard on auscultation. The animal stands usually with the forelegs apart. Attempt to drink water during the course of the disease is often observed; but there is no inclination to feed. Urine, sometimes high coloured, is passed without difficulty. In the last stage, the animal assumes a recumbent position with marked distress in breathing. There is usually frothy discharge from the nose. General emaciation supervenes. Motions may sometimes be soft or loose but digestive disturbance is neither primary nor prominent. There is sub-normal temperature before death.

The period of incubation could not be definitely ascertained, but, from the particulars of the affected cases, it would appear to be about a week. The disease usually runs a slow course of one to three weeks or more. Where both the lungs are affected, the course is shorter—about two weeks—but when one lung is involved, the course is prolonged even up to eight or nine weeks. Recovered animals remain convalescing for a period of about three to four months.

POST MORTEM FINDINGS

Post mortem lesions are almost entirely identical in all cases examined at centres. Slight variations in degree or intensity of the lesions were observed depending upon the duration or course of the disease.

Characteristic lesions are noticed in the thoracic cavity. It contains a large quantity—about half to the three litres or even more of straw-coloured, clear, serous fluid, which coagulates quickly. Sometimes strands of yellow fibrinous membrane, soft and spongy in consistency, are also noticed in the pleuritic effusion. The pleura appears congested and somewhat thickened, with a large quantity of fibrinous deposit; and usually there are adhesions between the parietal and visceral pleurae. One or both the lungs are affected. The dorsal surface of the lungs is more or less firmly attached to the chest wall by the dense fibrinous adhesions. Fibrinous deposits are not only found on the pleura and on the adherent surface of the lung but also sometimes on the diaphragm. The lungs are much enlarged, firm, heavy, almost completely consolidated and pieces sink in water. The cut surface presents a typical 'marbled' appearance, from which exudes almost clear straw-coloured fluid. The exudate is sometimes blood-tinged and readily coagulates. On careful examination of the incised portions, all the phases of fibrinous pneumonia from the initial congestion to red and grey hepatization could be seen.

Oedema of the alveoli and the interlobular septa is observed. Oedematous infiltration of the interlobular connective tissue and thrombus formation in the blood vessels are also noticed.

A few petechiae and a little fibrinous deposit are seen on the pericardial sac which contains about 25 to 100 c.c. of clear, slightly yellowish, serous fluid. The lymph glands (broncho-mediastinal and deep cervical) are enlarged, oedematous and congested. No sequestrum formation nor any specific lesion elsewhere, particularly in joints, could be observed.

TRANSMISSION EXPERIMENTS

Experiments were undertaken at Gauhati, with a view to observing whether the disease can be artificially transmitted to healthy animals.

(a) Transmission experiments in bulls were carried out twice; on the first occasion with the fresh material obtained from Deosiri area and on the second occasion with material from Patakatchār. Five c.c. of a mixture of pneumonic lung emulsion and pleuritic effusion were inoculated subcutaneously to two healthy bull calves. Also about 5 c.c. of the emulsion was administered intranasally to one of the bull calves in addition to inoculation.

REACTION

There was a rise of temperature on the ninth and tenth day, ranging from 104.8° to 105.8° F., followed by a gradual fall to the normal in the course of a week. Dullness, dry muffle, inappetence, occasional cough and a little watery discharge from nose were observed. Slight involvement of the lung, as manifested by percussion, was evident on the tenth day, but later improvement was noticed synchronizing with the fall in temperature to the normal. At first the swelling at the seat of inoculation was hot, painful and oedematous. Later it increased in size and extended further involving the neighbouring tissues and was hard and painful with no indication of abscess formation. The process was characteristic in that the earlier affected part remained hard and the freshly affected one oedematous. One calf died on the 18th day, and the other on the 20th day.

Post mortem lesions were not prominent in the lungs, while the lesions at the seat of the inoculation were extensive—hard swelling extending over the entire shoulder and adjoining parts, the cut surface was reddish-yellow in colour, hard and firm in consistency; no exudate or pus could be noticed except in the periphery where the swelling was oedematous with pronounced serous infiltration of the subcutaneous and intramuscular connective tissue. The absence of lung lesions in the experimental animals was worthy of note.

The gross involvement of the connective tissue with serous infiltration and the tendency towards a chronic productive inflammation suggest the similarity of the pathological process due to the infective agent in the lung as well as

in the muscle. This indicates the specificity of the infective agent and also the possibility of experimental reproduction. In an experimental study of the histopathological changes brought about by intramuscular injection of calves with the virus of contagious pleuropneumonia, Boynton [1912] observes that the muscle lesions correspond with the lung lesions in practically every respect. The main identical features are the specific action on the connective tissue elements, sero-fibrinous exudation, thrombus formation and a tendency towards a chronic productive inflammation.

(b) A healthy goat was inoculated subcutaneously with 5 c.c. lung emulsion and pleuritic effusion. The goat was under observation for one month. There was slight local swelling with a little oedema for three days, and subsequently it disappeared. Temperature did not show any marked variation, nor there was any difference in appetite. The goat appeared normal and healthy and was discontinued after a month.

(c) Fresh material consisting of lung emulsion and pleuritic effusion was sprayed into the nostrils of two goats. They did not show any sign of illness during the period of observation extending up to three weeks.

(d) At Patahari two goats were kept intimately in contact with two sick calves in the same shed, feeding and drinking water being common. One calf died on the third day and the other ten days later. The goats kept under observation for three weeks remained normal.

The experimental reproduction of the condition in goats was unsuccessful. That goats were not susceptible to natural infection has been ascertained in all the outbreaks where investigation was undertaken. Hence, the infection appears to possess specific pathogenicity to bovines.

In this connection it will be of interest to refer for comparative study to contagious pleuropneumonia of goat occurring in Madras, the etiological agent of which has been designated as *Borrelomyces peripneumoniae capri* [Longley, 1940]. In regard to experimental transmission, it is stated that cattle do not appear to be susceptible to inoculations of massive particulate inocula consisting of pneumonic lung, along with the effusion of affected goats. In the field conditions also, the disease was known to affect goats only [Visvanathan, 1937]. Similar experience has been reported in East Africa too. Mettam [1929] states that 'the specificity of caprine contagious pleuropneumonia may be proved by the impossibility of infecting other animals than goats with pathological material'. Conversely, goats were found to be resistant or insusceptible to inoculations with pleuropneumonia material of the bovine origin in Assam. Hence, it seems evident that the causal agents of bovine and caprine pleuropneumonia, though belonging to the same group, capable of manifesting a pathological condition apparently similar, are different possessing specific species infectivity.

LABORATORY FINDINGS

As a routine, microscopical examination of smears of affected parts, exudates, effusions, etc. was carried out. Preliminary cultural test was also undertaken locally. No organism of any significance could be found. Coliform and bipolar organisms (*Pasteurella*?) and Cocci were observed. Heart blood cultures were usually sterile. It would appear necessary to refer to the isolation of *Pasteurella* organisms in these cases. Shirlaw [1939] refers to the striking similarity between the pulmonary lesions of contagious bovine pleuropneumonia and the more subacute lesions in haemorrhagic septicaemia. The usually rapid course, so characteristic of haemorrhagic septicaemia in Assam, is conspicuously absent in the outbreaks of bovine pleuropneumonia. Even the isolation of bipolar organisms from the lesions of the lung and pleura would generally be deemed as secondary or terminal invader.

Requisite material and full information were sent to the Imperial Veterinary Research Institute, Mukteswar, for detailed research. It was reported that the etiological agent of bovine Pleuropneumonia, as it occurs in Assam, has been isolated and that "it (causal) organism)-passes with ease through Berkefeld 'V' filter and is readily cultivable on serum agar. It has been maintained by passage in hill bulls. * * *

There is a probability that this organism belongs to the same group as that causing Pleuropneumonia Contagiosa, i.e. *Borrelomyces peripneumoniae*".

Further, fresh material from outbreaks in different districts of Assam, as far apart as possible, was called for by the I.V.R.I. Hence suitable material was sent from Majuly area, Sibsagar district. The affected locality is situated nearly 300 miles north-east of Deosiri area. As a result of the laboratory tests, it was reported that this strain was found immunologically identical with the original Assam virus obtained from Deosiri area.

TREATMENT AND CONTROL

Treatment was attempted in animals in the early stage of the disease with Novarsenobillon—'N. A. B.' (M. & B.). Of course, advanced cases and those showing pronounced lung involvement were avoided. The dosage was 0.3 gm. for calves and 1.5 gm. for adults in 5 to 10 c.c. of distilled water intravenously, as was tried in Gold Coast Colony [Stewart]. It is further stated that 'N. A. B.' had given 'marvellous results' in cases of contagious bovine pleuropneumonia. Fifteen cases were treated, and they were under observation for a month. Ten of them recovered. In the recovered cases the abatement of symptoms was gradual in the course of five to eight days, and subsequently they appeared bright, feeding normally. Cases that did not respond to the treatment died in the course of 7 to 17 days. Previous attempts to treat cases with formalin, iodine, etc. did not give satisfactory results. From the experimental treatment with 'N. A. B.' it appears that the results are promising.

As regards control, restriction on the sale and movement of cattle from the infected areas was recommended. Isolation of sick cattle and segregation of newly purchased animals, particularly from suspected localities, were advised.

With regard to vaccination, preliminary field trials with contagious bovine pleuropneumonia vaccine prepared at the Imperial Veterinary Research Institute is now in progress in Assam. The product used is a culture-virus-vaccine tested by tail-tip inoculation (Willems' method). On completion of the preliminary trial, large scale immunization is contemplated.

DISCUSSION

It would appear that in India contagious bovine pleuropneumonia has been in existence only in the province of Assam. The disease has a great bearing upon the cattle wealth of the province. Mortality figures rank almost next to those of Rinderpest. Since intensive investigation has been carried out and the causal organism has been isolated, measures of control by way of vaccination will soon be undertaken.

It is fortunate that the disease has not shown evidence of spreading to the neighbouring province of Bengal, lying immediately west of Goalpara district along the course of the Brahmaputra. In the past, as even at the present, large numbers of cattle have been imported into Assam from the neighbouring provinces and States. The absence of exportation of cattle, appears to be the reason for the disease not having spread outside.

Finally, it would be of interest to refer to the primary source of infection in Assam, as indicated by observations in the field. As already mentioned, an attempt was made to trace the source of infection in all the outbreaks. Sufficient evidence was forthcoming to show that the disease had spread from some neighbouring villages where the disease prevailed earlier, or due to purchase or movement of cattle from the infected area. It is significant that the occurrence of the disease has been observed in villages and *khutis* on either bank of the Brahmaputra in the *charlands* on the bed of the river and to a less extent in some localities situated near its major tributaries. In fact, the existence of the disease in Assam is usually confined to the districts-lying on either side of the river, from Lakhimpur in the north, Sibsagar, Darrang and Kamrup along its course to Goalpara on the west. It may be mentioned that the incidence of the disease has been known since 1913-14 and perhaps even earlier. It is remarkable that other parts of the province in the southern region including the Surma valley have been free from the including. This might be due to the hill ranges lying south of the course of the river, restricting the movement of cattle. The occurrence of the disease in the riverain tracts of Lakhimpur district—the district in the north-eastern corner of Assam or even of India—suggests the source of infection from the neighbouring country, probably China. There are indications that the infection has subsequently spread to localities down the course of the river due to movement or transportation of cattle.

SUMMARY AND CONCLUSIONS

Details are given of investigation of bovine contagious pleuropneumonia in Assam and of the occurrence of the disease as a specific epizootic with a tendency to spread in a slow and insidious manner. Full particulars relating to the source of infection, nature of outbreak and localities affected are given.

Symptoms, course, *post mortem* lesions, means of control and treatment are described. Infection is generally confined to cattle. Mortality is high, viz., 60 to 70 per cent.

Buffaloes contract the infection only in the later stage of the outbreak and that too rarely. Goats and sheep appear to be resistant to natural infection.

Successful transmission experiments with fresh lung exudate have been made in healthy bulls at Gauhati. Experimental reproduction in goats was unsuccessful.

The causal organism of the disease—*Borrelomyces peripneumoniae*—has been isolated by the Imperial Veterinary Research Institute, Mukteswar, from material sent from natural cases occurring in Assam. From field observations and laboratory findings, there is substantial evidence that the disease, as it occurs in Assam, is the classical contagious bovine pleuropneumonia occurring in other parts of the world.

In India, this disease appears to exist only in Assam.

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VETERINARY PROPAGANDA

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The word Propaganda was derived from "*congregatis de propagandafide*"—denoting a Committee at Rome charged with the management of Roman catholic Mission. According to the Dictionary, propaganda means "any action, plan, etc., for the spread of opinions and principles especially to effect change or reform". Here, the emphasis should be on the words "to effect change or reform", thereby differing from "Advertisement", which simply means "announcement for sale".

Propaganda presupposes the existence of two things viz., the idea or knowledge that is to 'change or reform' somebody, and the people that have got to be reformed. It is the channel through which knowledge flows to where it is most needed. The aim of propaganda is to effect a change for the better i.e., a substitution of wrong and inefficient practices by right and efficient ones.

The aim of Veterinary Propaganda is to teach the Ryot better Veterinary and Animal Husbandry methods, and to persuade him to adopt these as well. Every year, every day, our Scientists are discovering new and better scientific methods in the various Research Stations. The *Summum Bonum* of knowledge should be the welfare and better living of all humanity. This cannot be achieved by the mere discovery of improved scientific methods, unless such discoveries are adapted to practical utilitarian ends in actual life. In other words, what is discovered in laboratories should successfully and practically be exploited in the field to yield better results. The fruits of hard Research and toil should reach the common man and improve his outlook and prosperity. It is here that propaganda helps in acquainting the villager of what the Scientists have done and are doing for him. It is the *liaison* service. It interprets and explains the high flown technical language of pure science to the common man in his own language. This interpretation is the crux of propaganda work. It is no easy affair. For, in the words of the Agricultural Enquiry Committee set up by the Government of Northern Ireland *—"any farmer of average intellect can glean most of the secrets of good crop-husbandry by simple observation, but this is not true of Animal Husbandry, where only one of its many aspects is open to inspection by all i.e., the use of fodder crops by animals" The ryot wishes to be shown results before he could be convinced and before he could be persuaded to take to new methods of treatment, breeding, feeding etc. He will not easily be swayed by words as he is very conservative and cautious where his avocation is concerned.

*—*Veterinary Record*: Vol. 50 No. 30 Page 258.

Veterinary Propaganda to be effective should be graphic and wherever possible coupled with practical demonstrations. And more than anything it should be very simple, so that the commonest villager could understand it easily. It should also be modified to suit different localities. For example, in urban areas special emphasis should be laid on Dairying, Meat inspection etc., whereas in rural areas the importance should be on breeding, feeding, pasturage, sheep and goats etc. Propaganda intended for the villager should be through the medium of simple language and it should be catching, preferably through pictures, films, models etc., rather than through leaflets, captions etc. And in this we can very well be guided by modern methods of commercial publicity. It should be possible to convey through a single picture, information contained in a whole paragraph of written matter, and the former has the additional advantage of being less taxing to the observer's intellect. Most important of all, one should bear in mind that all propaganda material intended for the rural parts should be in the medium of the local language.

In this connection, one cannot but feel sorry to find that matters relating to Animal Husbandry are sadly lacking in the text books of our schools. But for some stray references, here and there, to the export and import trade in animal products, the subject has not received the attention it deserves. Lessons on the following would not only be instructive but interesting to our youngsters if included in their text books:—the important local breeds of cattle, the chief place occupied by livestock and their products in the country's economy, the service our cows, sheep, goats and poultry are rendering us by converting vegetable matter of low food value into highly nutritious animal food etc.

AIDS TO VETERINARY PROPAGANDA

That propaganda is not only very essential, but is one of the chief means of uplifting the village, is beyond controversy. And now, let us examine some of the aids to Veterinary Propaganda.

The first and foremost propaganda is service—hard, earnest, sympathetic and sincere service—rendered to the villager in his village. This educates the ryot better in modern scientific methods and creates more confidence in his mind than any number of exhibitions, talks etc., could do. These latter however, are adjuncts to the field-worker and that very important, valuable, and indispensable ones. The following are some of the accessories that would help the Veterinary Surgeon a long way in spreading modern methods in rural areas.

1. Descriptive pictures (posters) about the contagious, parasitic and certain non-contagious diseases of animals, their prevention, treatment etc.
2. Models (in wood etc.) depicting some of the above and specimens.
3. Short leaflets on the above in the vernaculars in easy style and not strict translations of English scientific writings.

4. Posters and leaflets on the importance of the various important breeds of cattle, sheep, goats and poultry.

5. Posters and leaflets on the importance of the various animal products like milk, meat and eggs; and also other manufactured articles like dairy articles, leather goods, glue, bone-meal, woollen goods etc.

6. Magic lantern slides and films on the above subjects (to be exhibited by the agency of Touring Motor Vans).

7. Radio talks under the "Rural Programme"

8. Simple descriptive articles on the above subjects in Rural Journals viz., Vyavasayi, Kooturavu etc.

9. Practical demonstrations.

(a) As many Rural Units as possible where scientific breeding, feeding and Animal Management is carried on. (Latest methods like Artificial Insemination to be also shown).

(b) Inclusion of separate sections with reference to sheep and goats in the above units wherever necessary.

(c) Arrangements for short visits of groups of Animal Breeders and those interested in Animal Husbandry to institutions like the Hosur Cattle Farm, Veterinary College and Serum Institute.

(d) Mobile Veterinary Dispensaries in Motor Vans, well equipped with propaganda material to tour in the interior areas. (These may be separate units or combined with item 6 above).

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THE Indian Veterinary Journal

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Editorial

E and F.

NOW that great attention is directed to Animal Husbandry and a great fillip is given to the improvement of livestock, it deems necessary to sound a note of warning about the policy to be adopted and pursued in Animal Husbandry Operations. In our anxiety to achieve our object of improved stock in as short a time as possible, it is very likely that certain fundamentals are ignored and even overlooked in the initial stages. This might lead to disastrous results later on. Already we notice a tendency to import wholesale numbers of high yielding cows, like Scindhis, into what may be called "deficit" areas with a view to cope up with the increasing demand for milk and overcome an apparent shortage of high yielding cows in the "imported area." As a measure of emergency, this may be justified, because it helps to tide over the immediate necessity. But if this were made a policy and if this transfer of high-yielding strains of approved breeds of animals is done with a view to supplant or mix up with the existing stock, then it is not a step in the right direction. Nay, it is even fraught with dangerous sequelæ. Of course, from a genetical point of view, it is quite correct to improve a breed by grading in that way. But then genetics alone will not help us in improving the livestock of a locality.

Other factors are equally, if not even more, important. It should be remembered here that the various breeds of cattle that are found in the different tracts although poor in milk yield, have very great potentialities. They are descended from good stock. They have got good stamina.

They can survive long periods of drought and will carry on in places where any "outsider" would simply have faded away. What is more, they can recoup in surprisingly short period. Still another noteworthy feature is their disease resisting powers. In short, the existing stock is only the 'Survival of the Fittest'. These animals have got qualities inherited over years of sojourn in a particular area and they cannot be lightly treated. This adoption to Environment is a very great factor and should be taken note of in all attempts at improving the livestock. We see this in human-beings as well as in animals. A typical example is the Ongole breed of cattle. It thrives very well in its native habitat of Nellore and Guntur. Transferred to other areas, it deteriorates rather rapidly in spite of good attention and management.

Equally important in the breeding of animals is another factor *viz.* Feeding. It is a very vital factor indeed. However high the capacity of an animal may be, it will dwindle to nothing if it is not fed and looked after properly. In fact, lack of *good feeding* has been the main cause for the poor low level of our livestock. This has been very well illustrated in the Sahiwal breed of cattle. To quote from the *Journal of Animal Husbandry and Dairying*, "within the last 20 years, simply by proper feeding and management, they have shown an increase of milk yield from 5.5 lbs. to 17 lbs per day. In this herd, daily average yields as high as 27 lbs have been recorded. Moreover, the average butter-fat content of the milk produced by this herd is 4.6. These figures compare favourably with English breeds". This is a clear proof of how good feeding and management alone can bring out the latent potentialities of the breed.

It is therefore very essential that the two factors—Environment and Feeding—are constantly kept in view in all Animal Breeding Operations and that no short term policy is adopted for the improvement of our livestock. Selection from the existing stock and not Importation from outside would be the right policy to adopt.

Clinical Articles

A CASE OF PYAEMIA DUE TO TRAUMATIC RETICULITIS

BY

H. K. LALL, B.Sc., M.R.C.V.S.,

Veterinary Investigation Officer, Punjab, Lahore.

Introduction.—This condition is well known in all countries. It is caused by the presence of a foreign body in the reticulum, resulting in symptoms of indigestion and chronic tympanitis, sometimes accompanied by diarrhoea. The disease at this stage is usually not diagnosed. It is more often recognised later, when traumatic pericarditis results, mostly on post-mortem. The commonest foreign bodies are bits of wire or nails. Pointed foreign bodies give rise either to traumatic or suppurative inflammation. In deeply penetrating lesion or complete perforation, a circumscribed fibrous peritonitis results, around the lesion with the adhesion of reticulum to the diaphragm. From the reticulum, the foreign body may penetrate anywhere but usually, it pierces the diaphragm and reaches the pericardium giving rise to traumatic pericarditis. It may pierce the pleura, causing pleurisy and infection of the lungs, or it may come out of the body at about the ribs and give rise to an external abscess. A general pyaemic condition may result from the entry of organisms into the blood stream but such cases are not common.

Incidence.—Traumatic reticulitis occurs mostly in industrial towns, where bits of iron are scattered about or in places where there is stall feeding with fodder that has been baled with wire. It occurs quite commonly in this country as described to the writer by various Veterinary Assistant Surgeons from different parts of India. The incidence at the Government Cattle Farm, Hissar, is as in the Table below :—

Table I

Year	Young stock under 3 years	Cows	Bullocks	Bulls	Total
1933	3	7	2	...	12
1934	1	3	...	...	4
1935	2	4	3	...	9
1936	...	3	1	...	4
1937	1	...	...	...	1
1938	3	8	1	...	12
1939	2	28	4	...	34
1940	12	111	8	1	132
1941	6	60	7	1	74
1942	2	16	5	...	23

The average number of cattle at Hissar Farm during these years has been approximately as follows:—

Cows	...	2341
Bullocks	...	532
Bulls	...	31
Young Stock (under 3 years)	...	2726

During the famine years when all these animals had to be stalled, there was an enormous increase in incidence. In the years 1939-40 and 1940-41 all the bhoosa was received in bales. From the graph it is evident that incidence of pericarditis rose in years when the rainfall was deficient and when the animals had to be fed on baled bhoosa obtained from outside.

The cases in the later years subsided but continued to occur due to the reason that small pieces of wires from bhoosa got mixed up in the manure which was used in fields and these were again brought with the green fodder. The less the grazing (due to rain) the more green fodder has to be brought to the stalls to be fed and thus more cases result. In spite of all the vigilance possible, while dealing with such a large number of animals, quite a few bits of wires are found on occasions.

It is mentioned in various text books that traumatic reticulitis is more common in females than in males or neuters. The above table and the accompanying graph bear this out.

Age Incidence

Age Incidence in cows

Table II

Age in years	3	4	5	6	7	8	9	10	11	12	13	14	15
Number of cows affected	1	19	16	22	29	24	25	35	29	30	16	10	4

Average age of a cow 9.03 Standard of deviation 2.898
Coefficient of variation 32.09

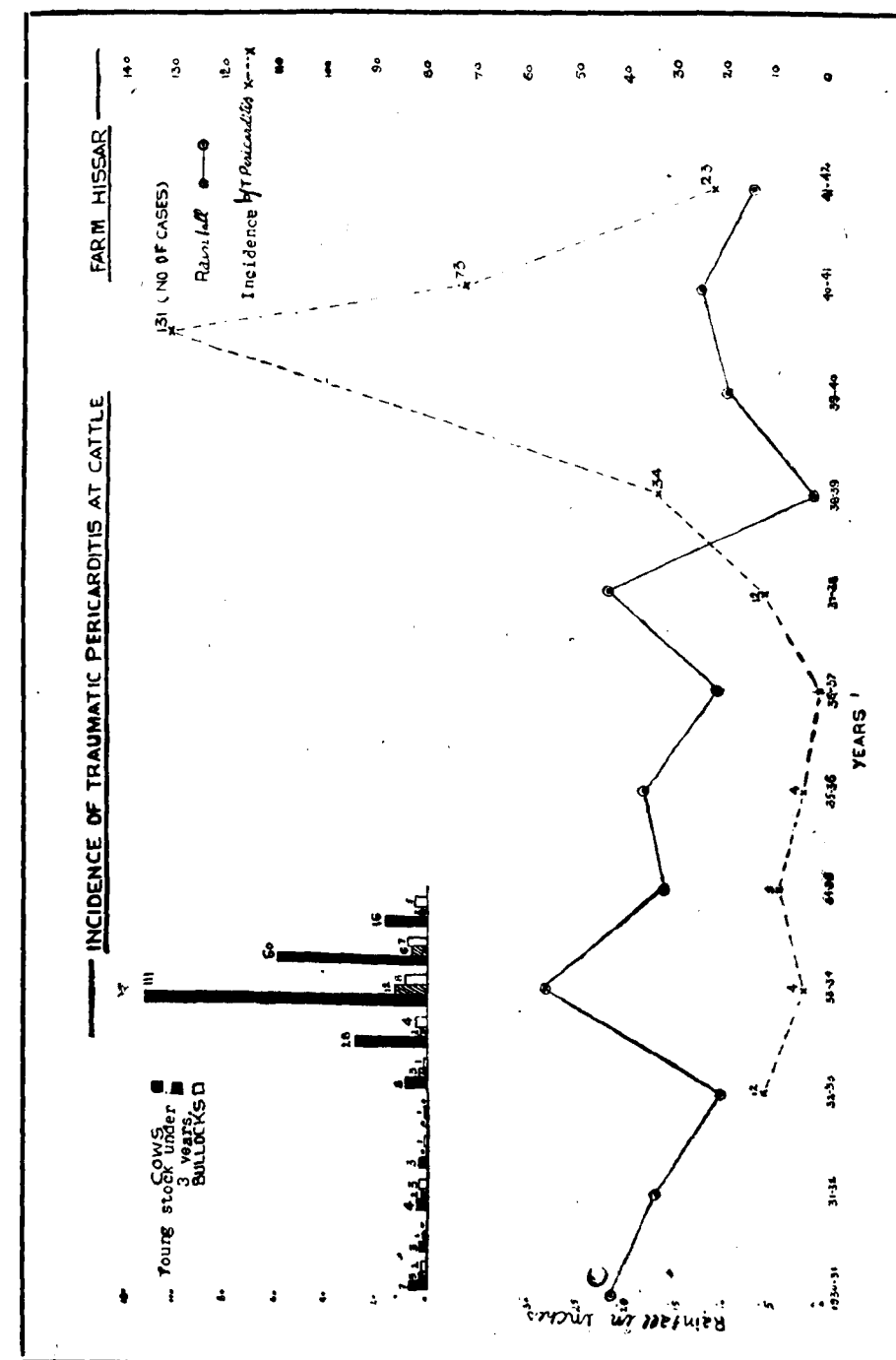
N. B.—In this table age of 19 more cows apart from those given in the Table I, and the Graph is included.

Age incidence in bullocks

Table III

Age in years	4	5	6	7	8	9	10	11	12	13	14	15
Number of bullocks affected	3	3	1	3	8	2	1	2	2	...	4	4

Average age of a bullock 9.33 Standard of deviation 3.620
Coefficient of variation 38.7



Subject.—Hissar cow, aged.

History.—The animal was off feed, but did not show any specific symptoms. The usual treatment for indigestion and debility was given, but without any results and the animal died in extremis.

Lesions on post-mortem.—Apart from general emaciation, the following organs showed lesions.

(1) *Spleen.*—On opening the carcase the first prominent organ to be seen was the spleen which was enlarged to about 4 times the normal size and was full of greenish coloured pus leaving very little healthy tissue. It weighed 7 lbs. as compared with 1½ to 2 lbs. in a normal animal. It was attached to the diaphragm on its parietal surface and to the reticulum on its visceral surface by fibrous tissue. On an incision being made into it pus poured out in large quantities.

(2) *Reticulum.*—As there were extensive adhesions of the spleen to the reticulum and the diaphragm suspicion arose that the trouble might have started in the second stomach. The reticulum was apparently normal but on closer examination, some hard masses were found which when cut, proved to be abscesses full of pus. When the fibrous tissue between the reticulum and spleen was carefully dissected a sinus was found lined by fibrous tissue, being the track of a wire which had penetrated further into the spleen.

(3) *Liver.*—The liver was enlarged and contained several purulent foci. It weighed 17 lbs as compared with 12 lbs in a normal animal.

(4) *Kidneys.*—Both the kidneys showed a dozen pyaemic foci about the size of a lentil.

(5) *Lungs.*—Both the lungs showed Broncho-pneumonia and on cutting into them, yellowish pus came out. Some portions were gangrenous and foul smelling. The left lung (Diaphragmatic surface) was attached to the diaphragm by fibrous adhesions.

(6) *Heart.*—There were no external lesions in the heart, but there were cauliflower-like growths on the tricuspid valve. The growth was extensive and attached to the edges of cusps. The left side was not affected.

(7) *Conclusions.*—It is obvious that pyaemia resulted from the spleen which was infected by the foreign body in reticulum. From the nature of lesions in the spleen and the fact that foreign body was found embedded in the surface of the spleen it would appear that gross primary lesions following on traumatic reticulitis were situated on this organ, lesions seen in the kidneys and the liver being the result of a pyaemic condition resulting from the invasion of blood stream by pyogenic organisms. The nature of lung lesions is rather difficult to explain. It might have resulted either from direct spread of infection of spleen through the diaphragm which was also involved or it may be sequelae to faulty drenching. The causal organisms were not studied.

GLANDERS IN THE ASS *

By

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Glanders, a specific contagious disease, occurs under natural conditions in equines (horse, ass and mule), in man, rarely in certain wild carnivora (lions, tigers, leopards, etc.) kept in the Zoological Gardens, probably as a result of feeding upon raw infected horse-flesh. Camels and goats are also susceptible, sheep less so, while cattle and swine are practically immune. The disease almost invariably takes an acute course in the ass, in which clinical lesions develop rapidly and death occurs within 8 to 20 days (Hunting, 1908; Minett, 1930). The object of this brief note is to record an acute case of glanders in the ass.

CASE REPORT

An emaciated donkey-mare, age about 5 years, was brought to the College Hospital on 24th July, 1945, with the history that about two weeks previously numerous small buds were noticed on the hind limb especially on the medial aspect of the thighs and they continued to appear on other parts of the body. She became dull and was partly off-feed. There was an offensive nasal discharge and on 22.7.45 she aborted. It was stated by the owner that another donkey-mare which was tethered with this animal, died from a similar disease about three weeks previously. On examination, the animal was dull and practically off-food. The temperature was 103.6° F and there was bilateral muco-purulent nasal discharge, with the dyspnoea well marked. Numerous buds varying in size from that of a pea to a pigeon's egg were present, some in chains while others in irregular forms on the hind limbs, abdomen, chest, sides of the neck and a few on the medial aspect of the near-fore limb. The hind legs were swollen and a few of the buds on the medial aspect of the hocks were ruptured, discharging pus of a characteristic oily nature. The mucous membrane of the nasal septum was congested and covered with a thick fibrinous deposit. The submaxillary lymph glands were swollen and hard in consistency. The animal reacted positively to I. D. P. mallein test. On 26.7.45 she was down, with dyspnoea well marked and was destroyed under *Glanders and Farcy Act*, as a clinical case of Glanders.

Post-mortem Examination.—The carcase was in poor condition. The mucous membrane of the nasal septum was acutely congested and was also covered with a thick fibrinous deposit, but there were no nodules or ulcers. Farcy buds of various sizes were present on the hind limbs, abdomen, chest,

* Reprinted from the *Punjab Veterinary Journal*.

sides of the neck, and medial aspect of the near-fore limb. A few of the mature buds were opened and these contained thick pus material. The submaxillary lymph glands were swollen and congested. A few isolated gun-shot sized nodules with slightly yellowish centre, each being surrounded by a large red zone of congestion, were present in each lung and the anterior lobe of the left lung showed pneumonic changes. The mucous membrane of the uterus was inflamed. Bacteriological and guinea-pig (male) inoculation examination of the lung nodules and pus material from the unopened buds were positive for *Pfeifferella mallei*.

Source of infection.—The history shows that the case under report evidently contracted Glanders from another ass which died from the same disease, about three weeks previously. The source of infection in the first case could not be traced out but it may be stated that the author's previous three years work on Glanders shows that the disease is fairly common among Tonga-ponies in Lahore.

Valuable suggestions were received from Mr. S. I. A. Shah, M.R.C.V.S., Professor of Pathology and Bacteriology, Punjab Veterinary College, Lahore.

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CAPRINE CONTAGIOUS PLEURO - PNEUMONIA

By

B. MADHAVA RAO, G.M.V.C.,

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History.—In the month of October 1944, the disease under report broke out in a herd of about 100 goats in Nizamabad District and the animals began dying in threes and fours at an interval of a week or ten days. This continued for 2 to 3 months during which period nearly half the stock had died. The owner then consulted the Veterinary Inspector, Nizamabad, who advised him to shift them to Nizamabad Veterinary Hospital. Accordingly the owner got his remaining 52 goats to this hospital on 7th December 1944.

On examination, 10 animals—8 adults and 2 kids—were found to be suffering from the disease. Out of these ten, 2 were actually in extremis.

Symptoms.—The chief symptoms noted were:—Dull and depressed, coat staring, rumination suspended, urine high coloured, bowels constipated, pulse rapid, breathing laboured, slight muco-purulent discharge from the

nose, unable or rather unwilling to move, a hard dry cough, temperature 103°—104°F. Mucous membrane normal or slightly icteric.

On percussion tenderness and pain over areas of chest, and auscultation showed patches of consolidation and presence of fluid.

Course.—The shepherd reported that almost all the affected animals died in the course of a week or 10 days at the most. According to him, not even one animal recovered from the disease. The mortality was therefore cent per cent or at least extremely high.

He further revealed that when the carcass was opened the parts of whole lung were found to be necrotic and in some there was plenty of effusion.

Blood smears and faeces proved negative for any bacterial or parasitic infections.

Treatment.—Immediately the sick were isolated from the healthy ones. The owner was advised to get M. & B. 693 tablets; but, due to their high cost and the difficulty in obtaining the same in large quantities, this was not done; instead, Sulphanilamide tablets were obtained and each adult goat was given 3 tablets to start with, followed by two subsequent doses of 2 tablets, (total 7 tablets on the first day). The kids were given half the above dose. Mild mustard plaster was applied to the chest. All the animals were placed in a well ventilated warm shed and a warm bedding was provided.

Unfortunately, the two animals which were in a very bad condition were slaughtered by the owner contrary to instructions and disposed off without my knowledge. The other 8 animals were showing signs of improvement and they were given each 2 tablets a time 3 times a day for the next two days. The kids were given half the above dose. On the fourth day all commenced rumination and started grazing. Further treatment was stopped at the owner's request as all the animals had made an uneventful recovery.

Again on 28th December, two more goats were brought to this dispensary from the same flock with the above mentioned symptoms.

They too were treated in the same way and both recovered. Pieces of lungs as desired by the Veterinary Investigation Officer could not be sent as the carcasses had been disposed off without my knowledge.

Conclusion.—Owing to contagious nature, and the pleuritic and pneumonic symptoms, the disease is diagnosed as Caprine Contagious Pleuro-Pneumonia. The disease is amenable to treatment if started early. Sulphanilamide is found effective. If the sick are isolated and treatment started forthwith, the future spread of the disease can be averted.

M. & B. 693 (DAGENAN) IN RINDERPEST

BY

F. C. BHUYAN, G.B.V.C.,
Veterinary Assistant Surgeon, Kamapur, Assam.

[Received for publication on 15-7-45].

During the last two months I have tried M. & B. 693 in 26 cases of Rinderpest—10 buffaloes and 16 cattle—with promising results. The mortality among untreated cases was about 85 to 90 per cent amongst buffaloes and 70 to 80 per cent amongst other cattle. But with this drug, 24 out of 26 cases of Rinderpest were cured.

The first case, a milch cow of mine, local breed, weight about 300 lbs., got an attack of rinderpest. It had diarrhoea (watery) mixed with blood and mucus and had severe lesions in the mouth. It had also lung complications. She was given M. & B. 693—15 tablets a day in 3 doses mixed with "Ghur" (jaggery) at an interval of every 4 hours. On the second day she looked much better: dung became semi-solid with no trace of blood; there was also an improvement in the condition of lungs. On the second day 15 more tablets in 3 doses were given; she began to care for the calf. On the third day the dung became semi-solid with improvement in all the other symptoms. She began to take grass and other food. Two more doses of M. & B. 693 were given; on the fourth day she became alright and no further treatment was given.

The calf aged 6 months belonging to the above cow also became affected with rinderpest. Unfortunately she was not treated with M. & B. 693 but was given an intravenous injection of Iodine 6 c.c. of a 2 per cent aqueous solution. Next day she had bloody diarrhoea and in spite of every efforts to save her she died on the 7th day.

The treatment adopted for the cow gave me an impetus to try the drug in other cases.

Ten buffaloes in the second stage of the disease with diarrhoea, dysentery and mouth lesions were treated with M. & B. 693. They were given 6 to 8 doses of the drug each dose consisting of 9 to 10 tablets mixed with jaggery. Sufficient quantities of drinking water were allowed to the animals. In most cases improvement was noticed from the second day and cure was effected on the 6th or 7th day—though weakness persisted in few cases for some days more, 9 out of 10 cases were thus cured.

Fourteen cattle, also in the second stage of the disease, were treated with the drug. 5 tablets for cows and 6 tablets for bullocks were given 3 times daily with jaggery. 13 out of the 14 cases were cured after 6 to 8 doses of the drug.

Two bull calves aged 1½ to 2 years in the initial stage of the disease were also treated. Three doses of 3 tablets a dose were given and both the cases got cured on the third day.

The above cases show that M. & B. 693 is a very effective drug for the treatment of Rinderpest in cattle and buffaloes and deserves a trial at the hands of the members of the profession.

Since sending the above article for publication, I have used M. & B. 693 in more cases of Rinderpest. 20 cattle and two buffaloes all in the second stage of the disease with best results. Out of 22 cases, 18 cattle and two buffaloes recovered.

A CASE OF TRAUMATIC PERICARDITIS IN OX

BY

S. C. MANGLIK, G.B.V.C.,

Veterinary Assistant Surgeon, Bikapur, U.P.

A Haryana bullock aged about 9 years was brought to the hospital on 2-7-45 with the history that its appetite was impaired for about a month and that it was gradually going down in condition. The bowels were loose and during the last week the animal had developed an oedema of the dewlap which was more prominent between the fore legs. On examination the temperature was found to be normal, the mucous membrane pale, and respirations shallow. The heart sounds were muffled and scarcely audible. The urine was normal while the dung was dark in colour. With a definite bad prognosis, the animal was treated with stimulants and chologogues for about a week when it died on 7th July 1945.

Post-mortem revealed lesions of traumatic pericarditis. The pericardial sac contained a thin putrid turbid fluid, while the myocardium was greatly thickened with a 4" long needle firmly embedded in it. The external surface of heart presented a dry furred appearance. Abdominal cavity contained about 4 gallons of pale watery fluid; all other organs were normal.

HÆMORRHAGIC SEPTICÆMIA OR MADAR POISONING?

BY

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Itinerant Veterinary Assistant Surgeon, Satkhira, Bengal.

From Bhavani Taluk in Coimbatore District, Madras Presidency, to a small village Kaliganj, Bengal, is a pretty long way, but the incident narrated by Mr. C. V. Padmanabhan in May 1945 issue of the *Indian Veterinary Journal* (Vol. XXI, No. 6, p.430) bears a strong family likeness to what is happening in these parts. How true is it that the worshippers of Satan think and act alike wherever they may be!

In the article referred to above, Mr. Padmanabhan gave an account of how the rustic criminals of a Taluka in Madras injected the juice of Madar (*Calotropis Gigenta* or Bengali *Akanda plant*) into the sensitive mucous membrane of throat of cattle and how it produced lesions akin to Hæmorrhagic Septicæmia and killed the animals. A similar thing happened in Bengal in my jurisdiction of the Satkhira Sub-division. Mr. Padmanabhan has warned his professional brethren to be on their guard when sporadic deaths of cattle from H. S. are reported. He has not, however, said whether there is any difference at all between a case of real H. S. and pseudo H. S. from Madar poisoning, presumably because, he has had no opportunity to examine an affected animal or its carcase. I am, however, more fortunate in that respect and had the opportunity of examining a poisoned animal before and after death. I, therefore, make bold to send to the *Journal* my experiences in this matter in the hope that others in the profession may derive some benefits from them.

A local black bullock and a local black cow were sent to me by the Officer-in charge of Kaliganj P. S., as suspected cases of poisoning. The cow died enroute and when it reached me was in a state of decomposition; the cause of death could not therefore be definitely established. The apparent symptoms indicated that the death was from H. S. It may be noted here that the incidence of H. S. had not been reported either from that village or from its neighbourhood.

As regards the bullock, it arrived in a very serious condition. The symptoms exhibited by it were similar to those found in cases of H. S. viz. dull and depressed appearance, painful, hot and hard swelling in the dewlap, throat and submaxillary space. These swellings were pretty large and did not pit on pressure. The pupils were dilated. Respiration and deglutition were difficult. Pulse was weak. The animal lay in a *state of recumbency* and totally refused food and drink. The symptoms were clearly those of H. S. excepting that the salivation and dripping from the nose were not very marked and what is far more important, there was no rise of temperature. In H. S. temperature is an important factor for diagnosis. [The text books however do not mention dilation of pupils.] The bullock died within a couple of hours.

The post-mortem examination revealed a punctured wound on the pharynx which might have been caused by a sharp pointed instrument about $\frac{1}{4}$ " in diameter. The swellings in the neck, when incised, revealed lesions of a purely inflammatory character with a distinct focal spot. The intestines were inflamed and congested. Haemorrhagic patches could be seen in intestinal mucous membrane and in the neighbourhood of throat (Pharynx).

The viscera were sent for chemical examination. The Chemical Examiner to the Government of Bengal detected *Calotropis Gigenta* (Madar) in the viscera as well as in the injured portion of the pharyngeal muscles.

From the above description it would be seen that there are important differences in the symptoms exhibited in cases of Madar poisoning, which help one in the differential diagnosis. The absence of temperature, the presence of wound in the throat (?), the absence of profuse salivation and above all the nature of the swelling in the throat are points of great interest found in cases of Madar Poisoning which help to differentiate from cases of H. S. In the latter the swelling is of the nature of an uniform sero-gelatinous infiltration, while in the former i.e., in cases of Madar Poisoning, the swelling is of an inflammatory character.

Acknowledgement.—My thanks are due to Mr. C. N. Chakravarty, M.B., Assistant Surgeon, Satkhira Hospital, for constant help and encouragement in writing out the paper and also for his help in the post-mortem examination.

CIBAZOL IN CANINE DISTEMPER

By

K. S. SHETTY, G.M.V.C.,

I/C Veterinary Hospital, Narayanaguda, Hyderabad-Dn.

Cibazol-Sulphathiazole is now so well known to the medical and veterinary profession that it does not need any introduction.

It is proposed in this article to record its use in cases of canine distemper which, as is well known, is one of the commonest troubles on diseases of dogs in this country.

Nearly 500 cases of canine distemper have been treated by me with this drug only. The following are a few cases of special interest for reason of their severity and the high doses of Cibazol which were used over a prolonged period:—

1, An Alsatian dog, age 11 months, temperature 105° F, with coryza and slight conjunctivitis. It was immediately put on Cibazol with an initial dose of four tablets, followed by two tablets every four hours for three days, (reaching a total of 30 tablets) during which period a gradual fall of temperature was noted. The dose of Cibazol was then reduced to two tablets three times a day, for five days, when the temperature came down to normal with considerable improvement in the general condition of the dog. A dose of 1 tablet, twice a day, was maintained for another four days, when the dog was discharged completely cured.

2. A Cocker Spaniel, age one year. The dose adopted, was initial 3 tablets, followed by two tablets six hourly for 2 days, the temperature falling down from 104° to 102.6°F. The treatment was continued with one tablet four times a day for another four days. The dog had an uneventful recovery,

3. A Dachshund puppy, age four months. The dose adopted was one tablet four times a day for three days, the temperature coming down to 102.8°F on the third day from the initial 105°F. Thereafter the dose was reduced to one tablet twice daily for four more days which brought about a complete recovery.

It will be of interest to note that high doses of Cibazol (35 gms. i.e., 70 tablets were adopted in highly bred dogs having virulent attack of the disease without any toxic effects of the drug, which are usually observed with other sulphonamides. But in mild cases and medium sized dogs the average maximum dose of Cibazol was found to be 15 gms. i.e. thirty tablets over a period of four to five days.

In simple pneumonias, the temperature reached normal in twenty-four to forty-eight hours, with an initial dose of four tablets followed by two tablets, six hourly.

It should however be noted that Cibazol appeared to have no influence in complications due to the involvement of the nervous system.

In conclusion, I may state:—

1. Cibazol is an extremely useful drug in canine distemper.
2. Cibazol has proved much more therapeutically effective and less toxic than Sulphanilamide or Sulphapyridine.
3. Cibazol treatment was well tolerated, even in high doses, and did not give rise to any complications in the present study.
4. Cibazol has cut down the duration of the treatment considerably. The average duration of the disease, in severe cases, was eight days.
5. Cibazol, therefore, is the drug of choice in the treatment of Canine Distemper.

My thanks are due to Messrs. Ciba (India) Ltd., Bombay, for a liberal supply of Cibazol tablets.

SOME INTERESTING OBSERVATIONS IN THE STUDY OF PROTOZOAL DISEASES

BY

MOHAMMAD RAHIM-UD-DIN, G.M.V.C., P.G., (Edin).

District Veterinary Officer, Vizagapatam.

The object of writing this note is to record only certain observations made by the author during the course of his routine work, hoping that they will be of some use to clinicians and research workers on various Protozoa.

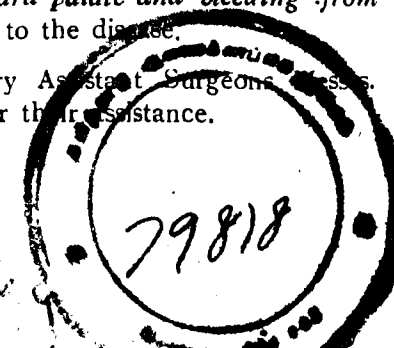
(1) *Trypanosomiasis in dogs*:—A middle-aged country bred dog was under treatment for Ascitis in the Veterinary Hospital, Bobbili. For curiosity sake, to study the condition of its blood, the blood smears from the auricular veins were stained with Leishman's stain and examined. Nothing so marked was seen except a heavy infection of Trypanosomes.

Another Canine patient, a few months after the above case, in the same hospital was under treatment for skin disease associated with Distemper. It was also country-bred dog of about a year old. The patient was greatly emaciated and sinking. The look of it made the author to remember an article recorded some time back in the *Indian Veterinary Journal* (Vol. XX, No. 4) on "Cutaneous Trypanosomiasis in Cattle" by Mr. S. Seshadri Iyenger, in the Tanjore Veterinary Hospital. Hence, smears were made of the fluid got from the skin lesions by squeezing and examined, after staining with the Leishman's. It was curious to see the Trypanosomes in disintegrated condition. Then the blood was examined: the wet smears showed living Trypanosomes and stained ones plenty of them dead.

Hence the author feels that Trypanosomes may also be responsible for setting up clinical symptoms simulating Ascitis and skin lesions similar to those associated with Distemper and mange.

(b) *Hepatozoon Canis*:—In the *Indian Veterinary Journal* for November 1942, the author published his observations such as Anemia, Debility, paralysis of the loins and the death in *Hepatozoon Canis*. Subsequently, he had an opportunity to examine a cross-bred spaniel pup of about 9 months old in the Vizagapatam Veterinary Hospital. In this patient, the most marked symptoms were extreme anemia, debility, necrosis and perforated condition of the hard palate and bleeding from the gums. Of course, the pup succumbed to the disease.

The author is grateful to Veterinary Assistant Surgeons, K. S. Prakas Rao and D. Abdul Haffiz., for their assistance.



RETAINED PLACENTA-USE OF SULFANILAMIDE IN CASES OF

By

M. MADHAVA RAO. G.M.V.C.

Veterinary Assistant Surgeon, Venkatagiri, Madras.

The object of this article is to record a few interesting clinical observations on the use of Sulphanilamide in cases of Retained Placenta including neglected cases. I have tried this drug among valuable cows of Ongole breed maintained by the Poor House, under the management of the Venkatagiri Samasthanam. It has also been tried on other animals brought for treatment. A few cases that have been treated at the Dispensary at Venkatagiri are noted below.

The first case was a she-buffalo, aged 9 years.

History and symptoms.—The animal had been previously attended to by the 'quacks' for Retained Placenta. The genitals were inflamed and the placental remnants were still hanging with very foul smelling discharges from the genitals. The animal was off-feed and the temperature was 104.2° F.

Treatment.—The genitals were douched with warm Cond's fluid and all the placental remnants were removed. Then, inserted with the hand 5 tablets of Sulfanilamide, well powdered, right into the os. Fomentation to the genitals were given to reduce the inflammation. A drench containing Pulv. Ergot and Mag. sulph in half a pint of water was given. This treatment was continued for about a week, without resorting to douche from the third day onwards. The animal was quite alright and the owner discontinued the treatment from the 6th day after the commencement of treatment in the dispensary.

II. **Subject.**—A she goat in good condition, aged about two years.

History.—The animal was said to have delivered kids two days prior to attending the dispensary. The remnants of placenta still retained.

Symptoms.—Muco-purulent discharge from the genitals. Temperature 102.8°. Animal off feed.

Treatment.—Removed the placenta and douched with warm condy's fluid throughly. Inserted into the os two tablets of Sulphanilamide well powdered by the right hand. Immediately gave mixture containing Carminative mixture 4 oz. Mag Sulph 1½ oz. Pulv. Ergot 10 grains. For the next three days, repeated the treatment omitting the douching and the animal got cured.

III and IV. Two more cows, aged 8 years, with retained placenta were similarly treated with success.

College News

MADRAS VETERINARY COLLEGE

The following candidates have passed the Supplementary Diploma Examination, held in October 1945 :—

1. S. Narayanan
2. M. A. Ramakrishnan
3. C. Sambasiva Rao
4. V. Venkatanarayanan.

Madras, }
11th October 1945. }

R. SWAMINATHAN, B.A., G.M.V.C.,
Principal.

BOMBAY VETERINARY COLLEGE

List of successful candidates at the Supplementary Diploma Examination, held in October, 1945 :—

New Curriculum

1. B. P. Hingorani
2. R. D. Patil.

Old Curriculum

1. S. R. Aralikatti
2. M. B. Tilak.

Bombay, }
8th October 1945. }

S. R. CHADHA, B.Sc., M.R.C.V.S.,
Principal.

BENGAL VETERINARY COLLEGE

In page 146 (Vol. XXII, No. 2, September 1945.) under the heading College News, Bengal Veterinary College Supplementary Diploma Examination Result for the session 1944-45 the name of the candidate in serial No. 7 is S. N. Kundu, and not S. N. Mundu.

Association News

THE BOMBAY VETERINARY MEDICAL ASSOCIATION

Minutes of the Meeting of the Managing Committee of the
Bombay Veterinary Medical Association held at Bombay
on 14th September 1945.

The meeting of the Managing Committee of the Bombay Veterinary Medical Association was held at the Veterinary College, Bombay, on 14th September 1945 at 5 p.m.

The following members were present:—

- | | |
|------------------------------|---------------------------------|
| (1) Rao Bahadur V. R. Phadke | (5) Mr. P. C. Bapat |
| | (President) |
| (2) Mr. S. R. Chadha | (6) Mr. K. R. Alur |
| (3) Mr. E. R. Kulkarni | (7) Mr. F. S. Khambatta |
| (4) Mr. D. B. Khole | (8) Mr. N. H. Laxmeshwar |
| | (9) Mr. K. B. Nair (Secretary). |

The President informed the Committee that the Hon. Secretary Mr. K. B. Nair had sent his resignation for the post held by him on grounds of ill health on 17th July 1945 and that he accepted the same and informed Mr. Nair accordingly. As a temporary measure he requested a member Mr. K. R. Alur to receive charge from Mr. K. B. Nair and hold the same till the next meeting of the Managing Committee. He now put up the question of resignation before the Committee, and recommended that it may be accepted. He also proposed that Mr. K. R. Alur should be nominated as Hon. Secretary in place of Mr. K. B. Nair. The Committee accepted the recommendations of the President unanimously. Mr. K. B. Nair, after presenting the records and registers took leave of the Committee and left the hall. In this connection the following resolution was moved by the President and was seconded by Mr. E. R. Kulkarni.

Resolution.—Resolved that the Managing Committee of the Bombay Veterinary Medical Association records with great appreciation the services rendered by Mr. K. B. Nair as Hon. Secretary of the Association.

Resolution.—Resolved that the Managing Committee of the Bombay Veterinary Medical Association records with great appreciation the services rendered by Mr. K. B. Nair as Hon. Secretary of the Association.

It was passed unanimously.

Minutes of the last Meeting

Minutes of the last urgent meeting of the local members held on 22-8-1945 were read and accepted.

Discussions on previous resolutions

Resolutions passed during the annual Conference and the subsequent meeting of the Managing Committee held on 22-3-45 were brought before the house for discussion and future line of action was decided upon. In connection with the resolution regarding the celebration of the Diamond Jubilee of the Bombay Veterinary College the following new decisions were taken:—

(a) To issue a manifesto regarding the celebration of the Diamond Jubilee and call for subscription from all the Graduates of this College serving in the Province and elsewhere. It was suggested that the Committee expected contributions to the extent of 10 per cent of their monthly salary.

(b) To request the Editor of the *Indian Veterinary Journal* to issue a special Diamond Jubilee Number of this College.

(c) To make arrangements to hold the sessions of the All-India Veterinary Conference at the same time.

(d) To obtain permission from the Principal, Veterinary College, Bombay, to celebrate the Diamond Jubilee of the College on its premises and to request him to co-operate with all his staff and students with the Bombay Veterinary Medical Association in celebrating the same.

(e) To approach various institutions and philanthropists interested in this College to help and join us in celebration.

Fresh Resolutions

"Resolved that the Animal Utilisation Officer, Sirdar Datar Singh may be approached to recommend to Government the appointment of a Veterinarian to assist him in connection with the management of Pinjrapoles and Gowshalas in this Province."

"Resolved that permission should be granted to read and discuss only those papers for which a synopsis with the subject is received a month in advance. In special circumstances, the President may permit a paper to be read at short notice, if satisfactory reasons are advanced."

"Resolved that the next meeting of the Committee should be held in Bombay on 12th October 1945 at 5 p.m."

Mr. D. B. Khole proposed a vote of thanks to the President and the meeting terminated.

Bombay, }
29th Sept. 1945. }

K. R. ALUR,
Secretary.

THE ALL-INDIA VETERINARY ASSOCIATION

THE INDIAN VETERINARY JOURNAL

Statement of Receipts and Payments for the year ending 30th June 1945, (Vol. XXI)

RECEIPTS			PAYMENTS		
	Rs.	A. P.		Rs.	A. P.
To Balance on 1-7-45	3982	15 10	By Paper, Printing and Blocks	2687	11 9
" Subscriptions including V.P. charges	5800	1 6	" Postages	1011	7 3
" Advertisements	1003	0 0	" Printing & Stationery	83	5 6
" Sale of reprints	24	0 0	" Books	10	2 0
" Interest	120	0 0	" Honorarium of the Editor	1000	0 0
			" Rent	480	0 0
			" Salary of the typist	670	0 0
			" Binding charges	9	8 0
			" Bank charges	4	12 0
			" Typewriter Repairs	10	8 0
			" Audit fee	25	0 0
			" BALANCE ON 30-6-45	4877	10 10
Total ...	10,930	1 4	Total ...	10,930	1 4

Examined and found correct

20, Thambu Chetty St.,
Madras, 12-11-45.

K. GOPALAKRISHNA RAO,
Registered Accountant, Auditor.

Notice of Drugs

VETERINARY MEDICAL NEWS

New product of Dr. A. Wander S.A., Berne-Switzerland.

"MEROXYL" (vermifuge dragees based on gentian violet).

Dr. A. Wander S.A., Berne (Switzerland), manufacturers of pharmaceutical, chemical and dietetic preparations since 80 years, announce the introduction of MEROXYL "Wander". "MEROXYL" is marketed in the form of dragees, based on gentian violet; among the substances used for combating intestinal parasites, gentian violet is one of the most important. The principal indication of MEROXYL is stated to be *oxyuriasis* (threadworms), but the dragees are also effective in *strongyloidosis* (roundworms). According to Prof. Hofmann, of the Veterinary Clinic in Berne (Switzerland), "Meroxyl" is used for small animals (cats, dogs etc.) in doses similar to those administered to human beings. As regards the treatment of oxyuriasis in large animals, the dosage must be calculated approximately in accordance with the human dosage. It may be added that the therapeutic margin of gentian violet ("Meroxyl") is a fairly wide one.

Further information on "Meroxyl" may be obtained by Veterinary Surgeons on request to Dr. A. Wander (India) Ltd., Post Box 1125, Bombay 1, the sole importers of WANDER medicaments in India.

Messrs. UNION DRUG CO. LTD., Calcutta take pleasure to announce the introduction of their latest therapeutic agent UREA SULPHAZIDE OINTMENT. The preparation presents the anti-bacterial properties of Sulphanilamide, Urea and Azo dye chemical compound in a non-irritating base. Clinical trials have confirmed that it is of exceptional value in infected wounds, ulcers, eczema etc. and has proved to be an advance in topical therapy.

Correspondence

The views expressed in letters addressed to the Editor represent the personal views of the writer and must not be taken as expressing the opinion or having received the approval of the A.I.V.A.

The Role of Poultry in General Agriculture

To

THE EDITOR,

Sir,

Livestock, including poultry, contribute to the well-being of Agriculture. In a vast Agricultural country like India, it is needless to say, that livestock form the mainstay of Agriculture and they, with their products, contribute to a very large extent to the national wealth.

Even in India, where poultry industry is much neglected, the value of total poultry amounts, according to Marketing Reports, to 7½ crores of Rupees of which the Madras Presidency accounts for nearly 1½ crores.

The term "Poultry" includes all domesticated birds such as Fowls, ducks, geese, turkeys, guinea-fowl and pigeons.

Poultry raising occupies an important place in well balanced agriculture. Western countries have realised this importance. As far back as 1925, poultry was raised in United States of America on 86 per cent of the farms and the poultry products were reported to be one of the best paying crops on many farms. Turning our attention to India, though it has been the original home of Poultry for centuries, it is an admitted fact that poultry farming is in a lethargic and neglected condition, judging from the few numbers of farms located at distances apart. This is partly attributable to certain caste prejudices, and sentiments arising from orthodoxy. Suffice it to say, that it is not the Poultry and its environments that are to be blamed, but ourselves. It may be pointed out here, that 90 per cent of the population in India, live in rural areas and earn their living from Agricultural pursuits. To them, poultry farming is a necessary feature of Agriculture, since poultry possesses a general adaptability to the land and conditions of Agricultural life. Poultry utilises enormous quantities of waste products including grains shed during harvesting, thrashing, winnowing and while storing in granary, as well as edibles, the value of which could be hardly utilised otherwise in as efficient a manner as in the production of eggs and poultry meat. In other words, our domestic fowl is an economical converter of waste products into one of utility. This being the case, this Industry to the Agriculturist, is ideally suited to be a small and useful sideline in Agriculture, particularly so with a large body of poor agriculturists who have small holdings. They should deem this as an adjunct to Agriculture. The first reason for this is that when scarcity of crops and fodder arise due to failure

of the monsoon, poultry industry comes to the rescue of the farmer as a profitable concern, by giving quick cash yields by the sale of eggs, meat, quilts etc. by thus supplementing his income, it acts as a feeder to his main occupation. He need not migrate to big cities as he usually does, in search of occupation.

A question, may well be asked why other side occupations, as dairying, large livestock breeding, wool industry, and other agricultural pursuits cannot be resorted to? The answer to the question is that an average Indian farmer is so poor that he cannot venture to undertake occupations involving much capital and expenditure. On the other hand, poultry farming has the advantage of a low or practically little investment, coupled with high returns. Hence rearing of poultry plays an important role in Agriculture. The maintenance cost of poultry is low as it secures a part of its living from the land e.g., green foods and insects which need not be paid for by the farmer; further the birds are docile and easy to manage,

Secondly, poultry farming, suits the farmer best, since he has the advantage of owning lands. He can even utilise to benefit, his hard hit arable and unproductive lands in poultry farming.

Thirdly, he has got much spare time at his disposal, during off season, which he can well utilise for looking after his poultry; otherwise he is apt to waste his time in village politics and factions which are common in the villages;

A fourth reason, is the ease with which a farmer can build up poultry business; poultry houses can be constructed at a very cheap cost with the locally available materials, since pucca big buildings are not needed. A good improved stock can be enlarged out of pedigree eggs obtained from poultry breeding centres run on scientific lines. The turnover is so rapid that a farmer of average intelligence with energy and ability, can build up a flock of one thousand birds in two years, starting with a negligible capital; of course, supplemented with the co-operation and useful service and information carried to his door through the Veterinary and Agricultural departments.

Fifthly, poultry farming enriches his depleted soil by providing a substantial farm yard manure, (duck manure is considered to be the next best to goat manure). Poultry, to some extent, rid the farmer from certain insect pests and worms, that may destroy his crop and thus help Agriculture.

Summarising the advantages of poultry keeping by the farmer, he, with a little attention, good accommodation and proper feeding; can make it a source of a perpetual and steady income to him.

The high potentiality behind poultry farming can well be appreciated from the observations of Mr. E. J. Bruen, Livestock Expert to the Government of Bombay, Poona, who has opined that a fowl lays to the extent of

nearly one hundred times its own body weight in eggs in a short space of 3 years and, regarding the low cost of its upkeep, Mr. R. W. Littlewood, Livestock Development Officer, Madras, has observed that a good hen when fed and kept properly will eat about annas five worth of food in a month and will lay eggs worth about annas eleven. By keeping 30 hens, one can earn about a profit of Rs. 11/- a month or Rs. 130/- a year with a little trouble.

To conclude, in these days of economic depression and unemployment which is hard, the Agriculturist, of small holding in particular, poultry farming, is a beneficial side industry to the uneducated and poor farmer.

With the attention to the control of poultry diseases, supply of improved and good layers and providing good marketing facilities for poultry and their products, "Poultry Farming" can still play a greater role to the Agricultural importance of this country.

Madras Veterinary College, }
4th September 1945. }

Yours faithfully,
R. VENKATARAMAN, G.M.V.C.

Euthanasia with Mag. Sulph Solution

Sir,

I shall be obliged if you would kindly publish this rare experience to elicit further opinion on the question "Is Saturated Solution of Mag. Sulph a safe drug for destroying ponies"?

On humanitarian grounds a jutka pony was brought for destruction on 23-8-45. I immediately gave intravenously four pints of Saturated Solution of Mag. Sulph. It did not kill the animal but only induced hard breathing. As the pony continued to struggle, I gave 4 oz. of Chloral Hydras dissolved in water intravenously. This only anaesthetised the animal. I had to repeat another 4 oz. of Chloral Hydras intravenously to finally destroy the pony.

Discussion.—The usual dose required to destroy a pony is only 1 to 1½ pints of Saturated Solution of Mag. Sulph. intravenously and it is rather extraordinary that even 4 pints should have failed; and raises the important question whether saturated Mag. Sulph. Solution can be considered a lethal drug for purposes of humane destruction of horses.

Wallis Hoare states that the lethal dose of Chloral Hydras for horses is 4 to 6 ounces per os. In this case 4 oz. intravenously after giving four pints of Saturated Solution of Mag. Sulph. only anaesthetised the pony and it required another four ounces of Chloral Hydras for its destruction. It would be helpful to welcome the experiences of other Veterinary Practitioners on this subject.

Mettupalayam, }
Coimbatore Dt. (Madras) }
14-9-45. }

Yours faithfully,
AMBRUSE,
Veterinary Assistant Surgeon

Extracts

(We publish below the report of the Veterinary Education Sub-committee, kindly sent to us for publication by the Imperial Council of Agricultural Research.)

VETERINARY EDUCATION IN INDIA

SIXTH ANIMAL HUSBANDRY WING MEETING

Report of the Veterinary Education Sub-Committee.

To

The Vice-Chairman, Imperial Council of Agricultural Research, New Delhi.

SIR,

The Sub-Committee was originally appointed on the 8th May, 1943, with the following terms of reference:—

"To undertake the detailed examination of the Curriculum for the various courses and to report thereon".

The constitution of the Committee at the time of its first appointment was as follows:—

Chairman.—Dr. F. C. Minett, D.Sc., M.R.C.V.S., Director, Imperial Veterinary Research Institute.

Members—

1. Mr. T. J. Egan, M.R.C.V.S., Director, Veterinary Services, United Provinces.
2. Mr. A. D. MacGregor, F.R.C.V.S., Veterinary Adviser to the Government of Bengal.
3. Mr. P. G. Malkani, B.A., B.Sc., M.R.C.V.S., Principal, Bihar Veterinary College.

After the first meeting at Mukteswar, Mr. A. D. MacGregor retired from service and in his place the Vice-Chairman appointed Mr. J. S. Garewal, M.R.C.V.S., Principal, Punjab Veterinary College, as a member of the Committee.

The Chairman appointed Mr. Malkani to act as Secretary of the Committee. Meetings have been held at Mukteswar (July 26-31, 1943), Lahore (October 1 and 2, 1943), Bombay (January 10 and 11, 1944), Madras (January 14 and 15, 1944), and Delhi (July 5 and 6, 1944). In addition, Mr. Malkani was deputed to Calcutta to meet Mr. MacGregor, who was unable to attend the first meeting, and obtain his views on the preliminary decisions reached at Mukteswar. At Lahore and Bombay the Principals of the Colleges were co-opted as members and at Madras the Committee was similarly reinforced by co-opting as members Mr. T. J. Hurley, M.R.C.V.S., Director of Veterinary Services, Madras, and Mr. K. S. Nayar, M.R.C.V.S., Principal, Madras Veterinary College. At the Delhi meeting, Mr. Z. R. Kothavalla, B.Ag., B.Sc., N.D.D., Director of Dairy Research and Mr. A. J. Macdonald, B.Sc., N.D.A., Officer-in-charge, Poultry Research Section, Izatnagar, were co-opted as members to discuss to certain points relating to Animal Husbandry training and more especially Dairying and Poultry. In this way we have ensured that the deliberations and ultimate findings were both comprehensive and conclusive.

We desire to record our warm appreciation of the hospitable welcome and valuable cooperation accorded us at the institutions visited.

A. A Three-Years Course in Veterinary Science

At the meeting of the Veterinary Education Committee held in November 1942, it appeared to the Committee that the following two courses would meet the situation:

- (a) For veterinary assistant surgeons, a three-years course with matriculation as the educational standard.
- (b) For the higher course either (i) a five-years course based on matriculation or (ii) a four-years course based on I.Sc. (medical group) standard.

The Committee at that time pointed out that until such time as the provinces in which the Colleges had the three-years course consider it practicable to raise the initial salary level, education may proceed on the existing lines, but recommended that these provinces should institute as soon as possible the higher degree course in place of the present three-years course. According to our terms of reference we have gone into a detailed examination of a suitable curriculum for this course and also for a supplementary two-years post-graduate course which may be taken by three-year men. Curricula for these two courses are shown in Appendices I and II. The formulation of these curricula has been made with some hesitation and we have made the attempt not because we would advocate such a modified three-years course but solely because the Education Committee requested us to do so. Thus, it was pointed out to us that difficulties would arise in the provinces if they had to recruit candidates from other provinces to fill higher posts to the denial of their own people, and it would be natural for them to desire to have their own students trained for the higher four or five years degree course. It is also doubtful whether for some years after the war Indians trained abroad will be available. Difficulties are also apprehended about running the two-years post-graduate course at the college for the three-years diplomates. We trust that our attempts to patch up a course which most of us feel ought to be condemned for removal will not be used by local Governments as a handle for delaying the introduction of the much better degree course. Herein lies a danger that the primary object of the Sub-Committee may be defeated, viz., that of getting uniformity at all colleges with the least possible delay. We suggest that the Central Government may be asked to recommend to Provincial Governments the raising of the salary level for degree course graduates to that current in the Punjab, so that such a course may be adopted in all these three colleges without delay.

Finally, we would like to quote a passage from Dr. K. V. Krishnan's presidential address on Medical Education at the Section of Medical and Veterinary Sciences of the 31st Indian Science Congress (1944):

"In India we have a dual standard of medical education. There are medical schools turning out licentiates who are men of a lower standard and medical colleges producing university graduates who are men of a higher standard. The lower standard of medical qualification had to be instituted in India as in many other countries chiefly for economic reasons and as an interim expediency in the evolution of medical education. Now, with the exception of India and Russia, there is no other country in the world which retains this dual standard. Russia is fast trying to abolish the lower standard and develop the

higher and she has gone a good way in achieving this object. India too has unanimously resolved that the lower standard of education should be abolished. Provinces like Madras and U. P., have already given effect to this resolution and the other provinces, but for the war, would have followed their good example by now."

B. University or Degree Course in Veterinary Science

We have been pleased to find that it was everywhere recognised that the hallmark of the University served as a passport of culture and character which commanded universal regard and recognition and that the status of the profession would be enhanced by entering the portals of a University. It was keenly felt that through affiliation to Universities and thereby entering into the comity of other professions, the veterinary profession would make rapid strides. Both the Madras and Punjab Veterinary Colleges have been affiliated; in the Punjab a Degree Course is now taking the place of the L.V.P. diploma course, while in Madras both a Degree and a Diploma course are being run. At Madras we were told that the object of making the degree and diploma course, concurrent had been to enable the best students—predicted to number some 25 per cent—to take the degree course and so qualify for better posts. In practice, however, this aim has not been achieved, since almost every student takes up the degree course. We feel that the aim of Madras would be better achieved by having a single University course and sending the best students for post-graduate courses. The representatives of Madras finally agreed to the desirability of having a single course for a degree, as it is a hardship for students to take two sets of examinations and is unnecessarily taxing the staff. They, however, desire to have more experience of the present working of the two courses before committing themselves. At Bombay, steps have already been taken for securing affiliation to the University and a draft copy of the curriculum had already been printed for correction before its final submission to the Syndicate. We unanimously decided that the recommendations of this Sub-Committee should as far as possible be followed in correcting the draft syllabus of the Bombay University so that the degree course may be started on right lines and require no early changes. The Principal of the Bombay Veterinary College agreed to incorporate the recommendations of this Committee when received.

(1) **Title of the Degree.**—We find that in Madras and the Punjab the degree has been called a B.V.Sc. At Bombay, however, it was pointed out that it was better from the point of view of the students' prospects to call the degree B.Sc. with an indication in another way, that the degree is one in veterinary science. There is some force in this argument, so although the change may not be of great consequence, we may recommend that the degree should be called B.Sc. (Veterinary Science).

(2) **Length of the course.**—The length should be five years based on matriculation or perhaps preferably four years based on inter-science (medical group). In the latter case, exemption would be claimed from those subjects in the First or Pre-veterinary year in which the student had already passed (See also page 5). We find that at Lahore the degree course is 4½ years based on matriculation and as this has only recently been accepted by the University, it may be allowed to remain for the present. But we recommend that the authorities should take steps gradually to bring it up to the length recommended by us.

(3) **Curriculum for the degree course.**—In the course of our deliberations we have heard many criticisms of the curriculum at present in vogue in the various colleges. Although the Sub committee is unable to take a unanimous view, it has seemed to most of us that the whole lay-out of the curricula at the different colleges is somewhat disjointed and unsystematic and there is lack of uniformity. The subjects are not always arranged in such a way that the student is taken from one to the other in logical sequence. The number of lectures and practical hours allotted to the various subjects appeared to be lacking in proportion. There seemed to be little inducement or opportunity for students to think for themselves or to cultivate their own common sense. There is reason for thinking that the provision of a suitable and uniform training envisaged in the recommendations of the Animal Husbandry Wing meeting of 1933 had not been accomplished. The diversity of training would account for the fact that at some colleges in particular the graduate material being thrown on to the market in India is variable in its equipment. The Curricula have not been so orientated as properly to prepare the graduates for the future growing fields of the veterinary profession, whose problems to-day are becoming of state, national and even international importance. We have made an effort to remove defects by reorganising the curriculum, so as to apportion the proper number of hours to each subject, and we recommend a reduction in what appears to be an unnecessarily large number of examinations. We have kept it in mind that the curriculum should be such as to enable the veterinary surgeon to play his rightful part as 'physician of the farm and guarantor of the nation's food supply' and so render efficient public health service. We have also kept in mind that the qualifications of future graduates should be such as would be acceptable to those farming international conventions in respect of soundness of animals, their transport, and the trade in livestock and livestock products. We have also realised that the curriculum should be so arranged as to allow development of specialists in veterinary physiology, biochemistry, pathology, etc. We have also kept in view the necessity for meeting changing economic and social conditions, an example of which is the greatly increased value now being placed on poultry. In the modified curriculum, as recommended by us (Appendix III) we believe we have achieved a better integration and orientation of subjects to meet present needs and at the same time left the curriculum sufficiently malleable for probable requirements in the future.

From Appendix III, it will be seen that the first year has been kept as a science year, and we suggest it should be designated a pre-veterinary year, corresponding to the pre-medical. The subjects of this year would be better taught in science colleges attached to the University and its curriculum should conform as far as possible to that of the inter-science (medical group) of the particular University. We hope that in due course it will be unnecessary for veterinary colleges to run the pre-veterinary year, just as many medical colleges are now dropping the pre-medical year. By dropping the pre-veterinary year many laboratories and staff will be released for the more important veterinary subjects.

(a) **Anatomy.**—Most of us feel quite sure that in the existing curricula too much time is being taken up by this subject. In spite of this, it has not been possible to arrange for completion of the subject in one year and it has therefore been spread over two years with a single examination. But we have cut down the number of hours to be allotted to the subject, not least because we feel that all attempts at memorising such things as names of muscles and ligaments and their attachments are thoroughly bad discipline for the student.

In view of the importance of bovine animals in India, we recommend that the ox rather than the horse should become the type for main study, while the horse, sheep and dog should be studied from the comparative aspect and not fully dissected. In view of the growing importance of the poultry, the domestic fowl should be thoroughly studied.

(b) **Physiology, Biochemistry and Pharmacology.**—Since pharmacology is really a branch of physiology, we have grouped it with applied physiology and biochemistry. Hitherto, the course in physiology has been too short to give a proper basis for the building of a true knowledge of animals in health and a subsequent appreciation of the abnormal. We have accordingly spread the subjects over two years but with a single examination in the whole subject.

(c) **Animal husbandry.**—Since this broad subject falls rather naturally into three if not four parts, we have spread the work over four years. This will ensure prolonged and continuous contact with animals in health. We feel strongly that in view of the re-orientation of the functions of the veterinary profession, students cannot have too much of this training. It may also be noted that in a recommendation regarding admission of students the advisability has been pointed out of giving preference to those who come from rural areas and have some experience of farm life.

(d) **Materia Medica, Pharmacy, Toxicology and Clinical Medicine.**—In the existing curricula of different colleges training in these subjects is very disjointed, arbitrarily divided and unnecessarily prolonged. Thus materia medica and pharmacy are taught as one subject, therapeutics as another, while clinical medicine is taught with preventive medicine. To avoid this unnecessary waste of time and duplication, we have grouped materia medica, pharmacy, therapeutics and clinical medicine as one subject spread over two years with one examination. This we consider the most logical method and it incidentally reduces the number of examinations.

(e) **Preventive Medicine.**—This becomes a separate subject with its own examination, since the present demand is for a graduate well-versed in preventive medicine.

(f) **Surgery.**—This subject has been distributed over the last two years. Surgery, part I (general surgery) should be taught in the fourth year and surgery, part II (which should include operative surgery, obstetrics and soundness) should be taught in the fifth year, at the end of which there will be one examination covering both general and operative surgery.

(g) **Meat and Milk.**—It was decided that meat inspection should be taught with pathology, and milk hygiene with animal husbandry, part III.

(h) **Jurisprudence.**—This subject appears to have escaped the notice of previous committees and we find that at some of the colleges it is not being taught. We consider its inclusion essential, because it will surely lead to improved *esprit de corps* among veterinarians and will enable them to render efficient professional service in court-of-law. The examination will be combined with that of Surgery.

(4) **Syllabus for the degree course.**—A model syllabus for the B.Sc. course in veterinary science is appended (Appendix VI). In preparing this syllabus, most of us have thought it best that the work should be taken in hand

by independent specialists and not by those who happen to be teachers of the particular subjects. We now recommend that this composite syllabus should serve as a guide for all colleges.

(5) **General.**—(a) *Exemptions.*—Exemptions from the first year course may be granted to students who have passed the I.Sc. (medical group) of the provincial University. But we find that in some provinces the I.Sc. (medical group) does not provide training or examination in organic chemistry. We therefore, suggest that in the Punjab and Madras, the present rules of exemption from the first year of the degree course may remain in force until such time as the University Board effects uniformity in the I.Sc. (medical group) course in all Universities. In order to expedite matters in this direction it is suggested that the Imperial Council of Agricultural Research should draw the attention of the Inter-University Board to the need for this uniformity.

(b) *Allotment of minimum number of hours.*—As stated above, the number of hours now devoted to lectures, demonstrations and practical work is not always properly distributed with the result that in most colleges the men are busy the whole time writing notes or doing practical work in the laboratory and have little time for independent mental development and an original search for knowledge. There is at present too much lecturing and instruction and too little education in the real sense. Students should be encouraged to observe naturally-occurring phenomena themselves, to cultivate the habit of recording them and be taught to seek for knowledge instead of being overloaded with facts while at the same time remaining uneducated in the real sense. We have tried to keep a reasonable balance of time for essential subjects so that there is enough leisure for students to spend profitable hours in libraries and museums.

(c) *Extramural training (vacation pupilage).*—We have so arranged the curriculum and allotted the hours that the necessary requirements in the different subjects may be imparted to the students during college terms. But it is recognised that class teaching during college terms cannot be so effective as the training the student receives when he actually shares in the work he is being taught. It is this sharing which makes him thoroughly familiar with the technique. It is for this purpose that vacation pupilage at college farms and with private practitioners is insisted upon in England and has been strongly recommended by the Leveday Committee on Veterinary Education. The Veterinary Education Committee which met in November 1942 recommended that extra-mural courses in animal husbandry, clinical practice, meat inspection and milk hygiene should be insisted upon in the various colleges. There has been opposition from some teachers to the provision of extra-mural training on the ground that the students should not be deprived of their vacations, while some even considered this pupilage superfluous. This criticism was withdrawn when the importance of the training was pointed out and we now give the unanimous opinion of the Committee that such extra-mural training should be provided. Students should have not less than one month's vacation in a year and the rest of the vacation period should be distributed according to local conditions at the farm, hospital, laboratory and slaughter house.

(d) *Farm pupilage.*—In the past the functions of veterinarians have been considered to be the treatment of diseased animals, administration of prophylactics and adoption of measures to prevent spread of diseases. Of late, however, the veterinary profession is more and more concerned with the maintenance of animals in health. For this purpose training has to be on a comprehensive

scale and provision made for acquiring wide experience of animals under normal conditions. Although the subject of animal husbandry has been spread over four years and many practical hours are allotted for work at a college farm, the foundations of the training required cannot be truly laid by work during terms but only by a period spent in actual participation in the work on a general farm, where day-to-day contact with stock and with the methods adopted for its care will prove of great benefit. Experience has shown that mere sporadic visits to the farm during college hours are not of great value to students, as they are not in a position to observe and compare the operations carried out over a period of time. We, therefore, emphasize the recommendation made in the last sub-section and consider that a minimum of 3 months on a farm should be insisted upon. The best results will only accrue from residence upon a farm, so that every advantage should be taken of the vacation to obtain farm experience at all times of the year. To provide facilities for the study of animal husbandry in colleges, we strongly recommend that each college should be provided with a small mixed farm (dairy and poultry), to be fully utilised for teaching purposes and where students may have the opportunity of carrying out much of the work themselves and of seeing any research work in animal husbandry that may be going on.

(e) *Slaughter house pupilage.*—In the revised curriculum provision has been made for students to witness practical demonstrations in flaying of hides and skins, meat inspection and milk hygiene during college terms. For reasons stated under sub-section (c), we consider this insufficient and in view of the increasing importance of veterinarians in the campaign for ensuring safe meat and milk to the public,—work which is being taken up by the veterinary profession in all advanced countries—, students should learn this task well and this they can do if, as in the case of farm pupilage, they spend some time during the vacation at a slaughter house. We are aware that there will be some difficulties in this but we hope that as meat and milk inspection work comes increasingly under veterinary control, these difficulties will disappear.

We suggest the following arrangements for extra-mural training as a guide.

Extra-mural training for the B.Sc. course.

In 5 years degree course—

After II year—

One month on farm.
One month in hospital.

After III year—

Two months on farm.
One month in laboratory.

After IV year—

One month in hospital or camp.
One month in slaughter house.

It will be seen that this extra-mural training supplementing the college training will initiate the future veterinarian to rural life, to practical methods of animal husbandry, to correct methods of professional practice and of meat and milk inspection.

(f) *Clinical training.*—We feel that at most colleges too little attention is being given to clinical training. The Royal College of Veterinary Surgeons require a period of not less than six months with a veterinary practitioner before a student is allowed to sit for final examination, and this is also strongly recommended by the Loveday Committee on Veterinary Education. We have not found provision for such extra-mural training made by some of the colleges. We have also found that at some colleges the clinical material is not adequate. It is essential that the clinical professor should have an adequately staffed hospital, and where clinical material is inadequate it should be possible for veterinary dispensaries within five miles of colleges to be utilised. Further, as already indicated under farm pupilage, the teaching of clinical subjects during college periods cannot be so effective as when the student personally shares in the work by being attached to a practitioner or by residing at a hospital. In that way he can methodically take notes throughout the case, he becomes practised in the handling of clients and in outlining lines of treatment. We are aware that in India there is no private practice but in place of this in each province there are hospitals run by the veterinary department, and we recommend it as compulsory that students should stay at a hospital for a period before they are allowed to sit for the final examination. We also suggest that instead of one month's stay in a busy hospital the practice of camping in company with the professor for a month near a big hospital should be introduced, so that the students may have the dual advantage of field work and expert guidance from the professor.

Some study of camels and elephants should be included in places where these species abound.

(g) *Admission of students from other provinces or states.*—The Education Committee in November 1942 hoped that fees for students from other provinces should not be prohibitive. Most members of the Sub-committee would prefer that if possible all financial discrimination should be removed. In the various schools a proportional number of seats should be available for students from other provinces. Students should be physically robust and a goodly number should hail from country side.

(6) *Grouping of subjects.*—The Veterinary Education Sub-committee which met in November 1942, recommended that subjects should preferably be placed in large groups, each under a responsible professor. This would be of especial advantage in connection with research work to be undertaken by the staff, a matter which is to be encouraged. The main criticism we have encountered towards this proposal has been that, although the main idea behind the grouping system is to get better co-operation and team spirit, co-operation might actually become worse under the grouping system. It was also pointed out that grouping would be difficult unless the grade of officers within the group were different. We feel that this difficulty is easily overcome if the head of the group is a professor and other members of the group of slightly lower grades. As it is so highly desirable to obtain co-ordination in teaching and research to combat the tendency to work in water-tight compartments, most of us strongly recommend the following grouping, to serve as an ideal to be achieved by the different colleges, if they desire to do so.

GROUPS				
I	II	III	IV	V
mistry-	Animal Husbandry, Part I. (Animal Management, etc.)	Physiology, Parts I and II.	Pathology, etc.	Materia Medica, etc.
sics -		Animal Husbandry, Parts II, III and IV.	Parasitology.	Medicine.
ogy -	Anatomy, Parts I and II.	Milk Hygiene.	Meat Inspection.	Jurisprudence.
lish -				
	Surgery			

(7) *Examination.*—Under the present arrangements most of us there are many examinations, no doubt owing to the artificial separation of subjects. he proposed alterations the number of examinations has been reduced as far possible.

Under this heading we would like to emphasise the importance of a proper ice of examiners. Examiners can do a great deal to alter the present stereod outlook of veterinary graduates and the teachers will be bound to follow lead. Incidentally, we would support the system that senior teachers in a ject should become internal examiners.

C. Post-Graduate Courses

As regards post-graduate courses, other than a possible two-years course three-year men, which should be made available to degree students, we mment the following :—

(i) Two years Course of advanced training at the Imperial Veterinary Research Institute for occasional students studying for higher University degrees or for the Associateship of the Institute.

(ii) A Course totalling about one year in veterinary science and animal husbandry at the Imperial Veterinary Research Institute and certain extension centres, based on the remodelled present veterinary and animal husbandry courses of the Institute.

(iii) The Special Poultry Course at the Imperial Veterinary Research Institute now extending over four months.

(iv) One year Refresher Course available for the mass of the students of Provincial Colleges in the following subjects :—

- Applied Physiology and Biochemistry.
- Animal Husbandry.
- Pathology, and Bacteriology, Immunology and Preventive Medicine.

D. Higher University Degrees

We recommend that after the necessary affiliation Universities should be approached by the authorities to institute higher degrees, such as M.Sc., Ph.D., D.Sc. These might be taken in particular groups of subjects of which one is the

main. Four examples of grouped subjects are :—biochemistry and nutrition, histology and embryology, bacteriology, and preventive medicine, bacteriology and milk hygiene. The curricula and syllabuses for these should be drawn up in consultation with a permanent Central Veterinary Board of the Imperial Council of Agricultural Research, so that there may be uniformity in all the Universities. The Education Committee of the Council might become a Standing Committee and assume the functions of the Board indicated. We would like to point out that after affiliation to the Universities it will be necessary for the purpose of maintaining uniformity in veterinary education to secure a seat for the President of the Central Veterinary Education Committee on the Inter-University Board.

E Facilities for Diploma Course students to switch over to a University course

As soon as the degree course is established, there would probably be a demand from some of the students doing the existing three-years course to switch over to the degree course. We think that this question should be taken up by Universities after they have granted affiliation to the colleges. For guidance of colleges we would suggest that during the first year of the inauguration of the five years course, Universities might be asked to give the following concessions to diploma course students :

- (i) Students who have passed the final year of the diploma course may be permitted to join the fourth year of the five years course ;
- (ii) Students who have passed the second year of the three years course should be placed in the third year of the five years course ;
- (iii) Students who have passed the first year of the three years course should be placed in the second year of the five years course.

F. Course for Stockmen

While recommending without any reservations the abolition of the three-years course, we have fully appreciated the necessity for the quick production of junior service field workers, or stockmen. The post-war reconstruction period will obviously be an excellent opportunity for progress of this kind. The course for stockmen should not be more than of one year and since it is essential that the training shall be on thoroughly practical lines, it should be conducted at Government farms. Candidates for the course must have a certain educational standing, say middle standard, and at the end of the course there should be an examination, and the examiners should be men who are well-versed in livestock work. A carefully-selected instructor would be necessary for taking charge of the course. A model curriculum is shown in Appendix IV.

The work of stockmen should be clearly defined so that they do not attempt to undertake the duties of veterinary assistant surgeons. They should be made to understand simple remedies and first-aid and should be instructed to seek assistance of veterinary assistant surgeons where more is required. We would also emphasise our view that a mistake has sometimes been made in the past in confusing the duties of stockmen with those of compounders.

G. Course for Compounders

Compounders should be regarded as a separate body of men to stockmen. The training of one year's duration might be at the colleges but some portion of it, say 3 months, which is common to both, might be taken at the farm. A model curriculum is shown in Appendix V.

H. Ancillary Problems

In drawing up the curricula and considering the syllabuses and allotment of time to the different subjects, we strongly feel that recommendations on these matters alone may lose some value if problems closely related with them, such as adequacy of staffing with suitable terms of salary and service, adequate equipment, library and museum facilities, the number of admissions to colleges, the regulation of examinations, etc., are not thoroughly reviewed. It will be obvious that, if the curriculum recommended is to be administered effectively, the teaching staff should be competent and organised for effective service. The staff is naturally the most important factor in education and should be composed of people who are competent, can maintain discipline and who have a strong taste for imparting knowledge in the proper way to classes. The Royal Commission on Agriculture in India rightly pointed out that the future of veterinary education in the country largely depends on the attention paid to the staffing of the veterinary colleges. The Loveday Committee on Veterinary Education remarked that in Great Britain "Schools are overcrowded, teaching staffs are inadequate and in some instances poorly paid". This applies with greater force in India. In this country there is also great divergence in the methods of examination at the different colleges. The Veterinary Education Committee in November 1942 recommended that, with a view to securing the requisite standard of examination, examiners should be selected from among those who are engaged in the pursuit of the particular subject. We strongly endorse that and think further that for the effective co-ordination of veterinary education throughout India, it will be necessary, as indicated, for the Imperial Council of Agricultural Research to constitute a Central Veterinary Board on the same lines as the Central Medical Board. With regard to registration the Sub-committee draws attention to the recommendation of the Veterinary Education Committee made in their Report of November 1942, that the attention of Provincial Governments should be drawn to the urgent need of passing a Provincial Veterinary Surgeon's Registration Act. This would automatically lead to the formation of a Provincial and later a Central Veterinary Council. Obviously, however, a full enquiry into these and relevant questions, as has been done by the Loveday Committee on Veterinary Education in Great Britain, would be outside our present terms of reference. We are, therefore, content to draw the attention of the Imperial Council of Agricultural Research to the urgent need of tackling these problems so that the objects may be achieved.

In conclusion, we would like to point out that since 1917 a number of efforts have been made to improve veterinary education in India, for instance by (i) the Board of Agriculture in Poona in 1917, (ii) the meeting of veterinary officers in Lahore in 1919, (iii) the meeting of principals of colleges at Bombay in 1922, (iv) the meeting of veterinary officers in Calcutta in 1923, (v) the Royal Commission on Agriculture in India in 1926-28, (vi) the Veterinary Education Sub-committee of the Animal Husbandry Wing meeting in 1933, (vii) the Animal Husbandry Wing meeting in 1936, (viii) the Animal Husbandry Wing meeting of 1942.

We regret to note that the history of these efforts has been similar. There have been optimistic resolutions, presentation of difficulties from the provinces and final shelving, so that the object of providing a suitable and uniform training envisaged in resolutions from these meetings has been unaccomplished. We desire to point to the reason which in our opinion makes the "fervent resolution of past meetings the frustrated things of the present" and feel that, so

long as this reason exists, there will be little or no progress. In our opinion the reason for this frustration is the absence of a sustained effort to have the recommendations implemented. The necessary vigilance and sustained action will be ensured if a Central Veterinary Board is constituted by the Imperial Council of Agricultural Research to keep a continuous watch on the state of veterinary education in India.

I. Summary of Recommendations

1. The whole lay-out of the veterinary education in India tends to be disjointed and unsystematic.
2. One-year courses for stockmen and for compounders may be instituted to maintain a supply of these subordinate types of field worker.
3. All the colleges should be affiliated to Universities without delay.
4. The curricula and syllabuses should be brought into uniformity. Details are given of our proposals in this respect and also for the examinations.
5. Recommendations have been made about the quality of students that should be admitted.
6. Recommendations have also been made as to exemptions from the first year of the degree course.
7. Extra-mural training should be insisted upon and details are given of the arrangements for this during vacations.
8. In order to ensure co-ordination in teaching and research a system for broad grouping of subjects is put forward.
9. Universities should institute higher degrees which are open to veterinary graduates.
10. A list of advanced post-graduate courses is enclosed.
11. It is considered that the Imperial Council of Agricultural Research should constitute a Central Veterinary Board to keep a constant watch on the progress of veterinary education. A standing Education Committee of the Council might serve this purpose.
12. The President of the Central Veterinary Board should be represented on the Inter-University Board.
13. The suggestion is made that the terms of reference of the present Committee be extended so that it may examine important ancillary problems connected with the revised curricula.

We have the honour to be,

Sir,

Your most obedient servants,

F. C. MINETT.

T. J. EGAN.

P. G. MALKANI.

The Chairman of the Sub-Committee wishes to bring to notice of the Vice-Chairman, Imperial Council of Agricultural Research, the efficient way in which Mr. Malkani our Secretary has laboured on behalf of the Sub-Committee.

ADDENDUM BY THE CHAIRMAN

The Sub-committee was asked by the Veterinary Education Committee of the Animal Husbandry Wing 1942 to prepare draft curricula for a five-years Degree Course and a three years Diploma Course in veterinary science. This has been done. The Sub-committee has also put up proposals regarding post-graduate instruction, a Stockmen's and a Compounders' course, and lastly it has put forward views on various questions concerning veterinary education.

After the Report had been prepared, the Sub-committee was requested by the Imperial Council of Agricultural Research in May 1944 to consider the wider question of animal husbandry training in India, in particular to consider a suggestion made by the Animal Husbandry Commissioner that in the early years of under-graduate training in animal husbandry and veterinary science there should be common classes, while in the later years students should specialise in one or other branch viz. animal husbandry, veterinary science, dairying, poultry. This matter was considered at a meeting held in Delhi on July 6, 1944, attended by members of the sub-committee (except Mr. J. S. Garewal who was unable) and to which Messrs. Z. R. Kothavalla (Bangalore) and A. J. Macdonald (Izatnagar) were co-opted. The Animal Husbandry Commissioner, who was also present during part of the time, explained his view that, while the Veterinary Colleges were turning out specialised Veterinary Surgeons and the Agricultural Colleges pure Agriculture men, there was no College to supply the proper needs of the Livestock Industry on its production side. Most of those present were favourably impressed by the possibilities of holding common classes during say the first 3 years followed by one or two years specialisation at the present Veterinary Colleges or perhaps in the case of Dairy and Poultry at other suitable institutions. There would clearly be some difficulties and there was some doubt of whether general animal husbandry should be separated from veterinary science. Clearly also, these are important questions of educational policy which should be examined by a Committee more representative than the present Sub-committee. The matter will, therefore, in the first instance be brought before the Veterinary Education Committee of the forthcoming Animal Husbandry Wing.

APPENDIX I

Curriculum for three-years course

First year.—Elementary inorganic and organic chemistry and physics (E).
Biology (E).
Animal Husbandry, Part I (E).
Anatomy, Part I.
General Physiology—Introduction.
Second year.—Anatomy, Part II; including Histology (E).
Animal Husbandry, Part II (Hygiene, Nutrition, Genetics) (E).
Physiology—Applied (E).
Elementary Pathology, Bacteriology and Parasitology (E).
Materia Medica, Pharmacy, Toxicology, Pharmacology (E).
Third year.—Medicine (clinical and preventive) and jurisprudence (E).
Surgery (Obstetrics and Soundness) (E).
Meat and Milk Inspection (E).

Extra-mural training

There should be facilities for adequate extra-mural training at each of the three colleges providing the three years course as follows:—

First year.—Animal Management, Nutrition. Two months of the vacation at the farm and breeding.

Second year.—Milk production and handling. One month of the vacation at a farm.
Clinical Medicine. One month of the vacation at a busy hospital.

Third year.—Meat Inspection. One month at a slaughter house. One
Clinical and preventive Medicine. month at a busy hospital or preferably in camp.

(E) denotes Examination.

APPENDIX II

Curriculum for the two years post-graduate course
(For three-years course diplomates)

First year.—Applied Physiology, Biochemistry and Pharmacology (E).
Pathology, Bacteriology and Immunology (E).
Second year.—Animal Husbandry, Part III (Nutrition and Genetics) (E).
Preventive Medicine (E).
Surgery (E).
Meat and Milk Examination (E).
(E) denotes Examination.

APPENDIX III

Curriculum recommended for a B.Sc. course in veterinary science

Year	Subject	Lecture hours	Practical hours
I (pre-vet- rinary)	Inorganic and organic Chemistry and Physics (E).*	90	120
	Biology, (Botany & Zoology) (E) ...	90	120
	English (E)	90	90
		270	330
II	Anatomy, Part I (Including Histology and Embryology).	100	140
	Physiology, Part I (General Physiology, and Biochemistry).	110	90
	Animal Husbandry, Part I (Animal Management & Shoeing) (E) in two Parts:— (i) Animal Management. (ii) Shoeing.	90	60
		300	290
III	Anatomy, Part II (E)	60	110
	Physiology, Part II. (Applied Physiology, Biochemistry and Pharmacology) (E)...	100	60
	Animal Husbandry, Part II. (Hygiene)	75	45
	Parasitology (E)	40	50
	Materia Medica and Pharmacy, Part I ...	45	45
		320	310
IV	Animal Husbandry, Part III (Nutrition and milk Hygiene) (E) in two Parts:— (i) Nutrition (ii) Milk Hygiene	60 30	60 30
	Materia Medica, Part II (Toxicology and Clinical Medicine) (E).	90	90
	Pathology, Bacteriology and Immunology (E).	120	120
	Meat Inspection (E)	30	30
	Surgery, Part I (General Surgery) ...	60	60
		390	390
V	Animal Husbandry, Part IV (Genetics and Animal Breeding) (E).	60	60
	Medicine (Preventive) (E).	120	150 (30 for post-mortems)
	Surgery, Part II (Operative Surgery, Obstetrics and Soundness) (E).	120	120
	Jurisprudence (E) with Surgery ...	30	...
		330	330

* (E) denotes Examination.

APPENDIX IV

Model syllabus for one-year Stockmen's course

Animal Management

1. Elementary knowledge of anatomy and physiology of the skeleton, circulatory, digestive, respiratory and reproductive systems, including udder, of farm stock.
2. Handling of animals.
Methods of approach in house and field. Use of halters, head ropes, nose rings, leg ropes.
Casting and securing.
'Points' of horses, cattle, etc.
Body measurements.
3. General care of animals in health and disease.
Housing, feeding, watering, grooming, exercise. Care during transport. Special care of young animals before and at weaning, pregnant animals, cows in milk and freshly calved, stallions, bulls, sheep for wool.
Appearance in health—the normal skin, visible mucous membranes, temperature, pulse, respirations, dung, urine.
Common signs of ill-health.
4. Identification.
Branding, tattooing, ear-punching, leg-banding.
5. Ageing.
6. Dipping and foot-baths.
Objects. Common dips.
7. Warble dressing.

Breeding

1. Breeds.
Common breeds of horses, cattle, buffaloes, sheep, goats and poultry found in India with particular reference to breeds of the Province or area. Their description and distinguishing marks.
2. Age of puberty in cattle, sheep and goats. Oestrus, its signs, season, duration and recurrence. Service. Gestation, its signs, and duration. Parturition, normal and abnormal. Removal of placenta. Hatching and rearing of chicks.
3. Livestock improvement.
Advantages compared with present position.
General characteristics of good breeding stock.
Selection and grading.
Breeding for milk, draught, general utility (cattle), wool, milk or meat (sheep and goats), eggs.
Progeny testing. Keeping of breeding records. Registration of improved stock (pedigree stock). Breeding societies.
Points in practice: selection of breed for area, allocation of bulls or other male stock, selection of females, branding and registration, inspection of stock for breeding, culling of unfit, castration of unfit, avoidance of stray mating.

Feeding

1. Nutritional elements—water, proteins, carbohydrates, fats, minerals, vitamins. The balanced diet.
2. Maintenance and production rations. Examples for common use with bulls, working bullocks, cows in calf and in milk, sheep, goats, poultry. Times of feeding and watering.
3. Common fodder and cereal crops of area—planting and harvesting—identification of plants. Maintenance and improvement of pastures.
4. Crop preservation—drying, silage-making.

Production of milk, wool, eggs

Milk.—Yields, lactation periods, clean milk production, milking and milk-recording. Composition of milk. Fat-testing.

Wool.—Shearing-seasons, methods, care of fleece (washing, etc.), wool-grading and recording.

Eggs.—Collection and disposal, hatching.

Elementary knowledge of the common infectious and non-infectious diseases, their causes, symptoms and treatment.

Measures to be adopted at outbreaks of disease

1. Isolation of sick animals.
2. Cleaning and disinfection of premises, etc.
3. Disposal of carcasses.
4. Collection of specimens for laboratory examination.

Medicines

Elementary knowledge of a few common drugs used in veterinary medicine, including their actions and uses on horses and other animals.

Surgical

1. Temperature-taking.
2. Sepsis and asepsis; sterilisation of instruments. Dressing of wounds, bandaging.
3. Castration (Burdizzo method).

General

1. Modern methods of propaganda. Duties of stockmen in propaganda work in villages and fairs.
2. Submission of returns, report-writing, departmental rules.

APPENDIX V

Model syllabus for one-year Compounder's course

Animal Management

1. Elementary knowledge of anatomy and physiology of the skeleton, circulatory, digestive, respiratory and reproductive systems, including udder, of farm stock.
2. Handling of animals.
Methods of approach in house and field. Use of halters, head ropes, nose rings, leg ropes.
Casting and securing.
'Points' of horses, cattle, etc.
Body measurements.
3. General care of animals in health and disease.
Housing, feeding, watering, grooming exercise.
Appearance in health—the normal skin, visible mucous membranes, temperature, pulse, respirations, dung, urine.
Common signs of ill-health.
4. Ageing.
5. Dipping and foot-baths.
Objects. Common dips.

Common diseases of farm stock

Non-infectious diseases, their causes, symptoms and treatment. Gastritis, indigestion, chekoing, tympanites, impaction and constipation, diarrhoea, dysentery.

Pharyngitis, coughing, pneumonia.

Metritis, retained placenta. Mastitis, teat injuries.

Yolk-galls, wounds, fractures, dislocations and sprains, broken horn, foot-rot.

Infectious disease and their control.

Anthrax, black-quarter, haemorrhagic septicaemia, tuberculosis, Johne's disease, contagious abortion, navel ill, tetanus.

Rinderpest, foot-and-mouth disease, cow-sheep-and goat-pox, fowl-pox, Ranikhet disease.

Red-water, surra.

Diseases due to ecto-and endo-parasites

Ticks, lice, mange parasites, blow-flies, nasal bots.

Helminths, flukes

Application of preventive and curative measures

Measures to be adopted at the outbreaks of disease

Isolation of sick animals.

Cleaning and disinfection of premises, etc.

Disposal of carcasses.

Collection of specimens for laboratory examination.

Surgical

Temperature-taking.

Sepsis and asepsis; sterilisation of instruments. Dressing of wounds, bandaging.

Castration (Burdizzo method).

Materia medica and therapeutics

Weights and measures used in dispensing—British, metric and domestic.

Common drugs used in veterinary medicine; their actions, uses and dosage for horses, cattle, sheep and goats.

Common indigenous medicines.

Dispensing of mixtures and infusions, powders, pills, electuaries, ointments, liniments, lotions plasters, etc.

Common poisons and their antidotes.

Prescription-writing.

Administration of medicines.

Drenching, probang and stomach tube.

Sera and vaccine—nature, production, uses.

Duties of compounders—care of the dispensary, drugs, instruments and appliances, accuracy in reading prescriptions and dispensing, departmental rules for poisons.

Note.—In this course the main emphasis will be laid on *Materia medica* and *Therapeutics*, uses of Antiseptics and treatment of Minor Ailments. The part dealing with Diseases will be touched on lightly and given merely for general information.

MINORITY REPORT

By J. S. Garewal, I. V. S.

I attended the Veterinary Education sub-committee meetings at Lahore, Bombay and Madras and expressed my views on different points mentioned in the report.

I regret I do not agree with the remarks that the whole layout of the Veterinary education in India tends to be disjointed and unsystematic. It is certainly not so in the case of Punjab. I feel it is quite the other way so far as the Punjab Veterinary College is concerned and this has been the opinion of all those who have been visiting this Institution for many many years. In fact this place has got its reputation well established all over India and abroad. I feel that the subjects are very well arranged. The Syllabus approved by the Punjab University for the B.V.Sc. Course could be very favourably compared with any other College in India or Great Britain. The opportunities available for Clinic at this institution surpass all other places that I know of at present. We have often over 300 cases in the College Hospital in a day and this fact alone has surprised many visitors to this Institution.

In my opinion the layout of the Veterinary education in Madras Veterinary College and Bombay Veterinary College is also very good and certainly not disjointed and unsystematic. I have always been very much impressed whenever I visited these colleges.

I am not against the affiliation of any veterinary college to a University but feel that we do require a college or two where students could have a Diploma in three years if they wish. In the medical profession there are colleges where students get Diploma and am not quite sure if all the Veterinary Colleges in India should have a degree course.

The curriculum at this college for the B.V.Sc. degree was prepared fully keeping in view the role which the graduates from this college shall have to play in the near future so far as the control of contagious diseases in Livestock is concerned apart from their activities in work relating to improvement in Livestock (Breeding), and their working as Physicians of the Farm animals and guarantor of the nation food supply. I have no doubt that all these points were fully kept in view in Madras College and are being kept in view in Bombay. The Syllabuses for the degree course at this college were prepared after great consideration and they have been approved by the University of the Punjab. I have no doubt same was done in Madras for the B.V.Sc. course. I regret I can not agree with the number of hours fixed by other members of this sub-committee for teaching different subjects and also their grouping and leaving out examination for some subjects. I do not see how it is possible to teach Chemistry, Physics and Biology in 90 hours lectures and 120 hours Practical for the B.V.Sc. examination when it takes two years in all Indian Universities before students could appear for their Intermediate Examination (F.Sc. Medical or non-Medical group). We are to teach these subjects in one year and up to the F.Sc. standard as decided in our meetings. In the Punjab Veterinary College we have for Physics and Chemistry 150 hours lectures and 150 hours practical work and same for Biology.

(a) *Anatomy*.—In the report it is proposed to give 100 lecture hours to Anatomy Part I (including Histology and Embryology) and 60 lecture hours to Part II and to introduce ox as type in colleges where it is not so at present.

The subject of Anatomy is a very big one and undoubtedly very important. One must know Anatomy well to be a good surgeon. Leaving aside Histology I strongly feel that the number of hours for lectures and practicals in this important subject of Veterinary science should not be less than 225 hours for lectures and 300 hours for practicals spread over two years as at present in the Punjab Veterinary College. I see no reason as to why the Professor of Anatomy must teach Histology as well if a better arrangement could be made by appointing an Assistant Professor in Physiology Section as in K. E. Medical College Lahore and perhaps many other Medical Colleges in India and abroad.

I agree with the recommendation that ox should be taken as the type and this is being done for some years at this college but am of the opinion that each student should dissect the horse as well and other animals if possible. Special attention should be paid to Dog and Poultry.

(b) *Physiology, Biochemistry and Pharmacology*.—I am in favour of having Experimental Physiology, Histology, Biochemistry, Embryology and Physiology in one group and not Pharmacology as recommended by other members of the sub-committee. The department of Physiology at this college includes subjects mentioned above and Pharmacology section is entirely separate. I understand that the work is being done on same basis in the K. E. Medical College, Lahore and perhaps also in many other Medical Colleges in India and abroad.

I regret I do not agree with the views that there should be a single examination for Physiology, Biochemistry and Pharmacology. In my opinion the

present system of having separate examination for Physiology and Pharmacology should continue.

(c) *Animal Husbandry*.—This subject is undoubtedly an important one but I see no reason as to why it should be spread over 4 years. The main thing to my mind is to have a proper course for two years with at least three months training at a Government Cattle Breeding Farm. Advantage should also be taken by sending students to different Horse Shows and Cattle Fairs held in the homes of different breeds of cattle found in the Province such as Haryana, Dhanni, Dajil, Montgomery, etc., in the Punjab. Visits to Poultry Farms are essential. Students should also be taken to different Dairies as often as possible to show how Butter, Cheese, etc., are prepared and how milk should be kept.

I am not in favour of mixing the subject of Shoeing with Animal Husbandry which might be kept separate as at present in this college.

(d) *Materia Medica, Pharmacy, Toxicology and Clinical Medicine*.—I am in favour of having Pharmacology, Materia Medica, Therapeutics, Pharmacy and Toxicology in one group as at present in this college instead of Materia Medica, Pharmacy, Toxicology and Clinical Medicine as recommended by other members of the sub-committee. There is no waste of time or duplication in this system which has been followed for years at this institution and proved very useful.

I am not in favour of one examination only for Materia Medica, Pharmacy, Toxicology, and Clinical Medicine as recommended by other members of the sub-committee but am of the opinion that we should have two examinations as at present.

(e) *Parasitology*.—The number of hours recommended for lectures and practicals viz. 40 and 50 may be increased atleast to 75 and 60 to give sufficient time to the teacher to deal with this subject properly and not in a hurry.

(f) *Pathology, Bacteriology and Immunology*.—The number of lectures proposed is 120. In my opinion we should have 150 hours for lectures.

In the report sent to me by the Chairman of the Veterinary Education Sub-Committee I have not received syllabuses for different subjects for the B.V.Sc. course which I would have liked very much to see nor I have received the syllabuses for 3 years course for colleges like Patna and Bengal and so am not in a position to express my opinion about them. In the meetings held in Lahore, Bombay and Madras syllabuses of these colleges were examined and number of hours, etc., for different subjects for the degree course were fixed but later on, I find that this was changed. In my opinion Professors teaching different subjects for some years in Veterinary Colleges are the right persons to prepare syllabuses for the subjects they teach in view of the experience that they have gained year after year. It was in view of this that the committee recommended that examiners in future should be out of Professors teaching the particular subject. I would like all the syllabuses relating to different subjects to be taught for the Degree and the Diploma Courses to be looked into by the Veterinary Education Committee or Sub-Committee appointed for this purpose before any recommendation is made to follow them in different colleges in this country. I strongly feel that the persons asked to write syllabuses for Veterinary Physiology, Biochemistry, Veterinary Pharmacology, Veterinary Parasitology etc. should be veterinarians and must be at least M.R.C.V.S.

so that they can see to our requirements from veterinary point of view which is very essential. In fact syllabuses for all the subjects to be taught in the 2nd, 3rd, 4th and the Final year Class should in my opinion be written by veterinarians and same applies regarding the Diploma Course. I have no objection to the syllabuses for Chemistry and Physics, Biology and English to be written by experts in these subjects.

(g) *Extra-mural training for the B.Sc. Course.*—I do not think it will be of much use in sending students for one month on Farm after second year as proposed in the report and two months on Farm after the third year when they have not completed the course in Animal Husbandry which they are to undergo in the 4th year class according to Appendix III.

In my opinion it would be much better to send students to a Government Cattle Breeding Farm like the one at Hissar after they have undergone full course in Animal Husbandry so that they could apply the knowledge imparted to them as is done at the Punjab Veterinary College, where according to the rules all B.V.Sc. students must spend full three months at the Government Cattle Farm, Hissar before they could appear for their final examination. This is apart from the visits that they pay to this and several other Farms, Cattle Fairs and Shows while studying this subject in the 3rd Year Class.

Regarding one month in the Hospital after second year proposed by other members, I am definitely of the opinion that the much longer period should be spent at the Hospital if students are to gain practical knowledge and experience sufficient for them to be of any use. We have clinics for two hours every morning at the College hospital which is attended by the 2nd, 3rd and the 4th years students all the year round and every student is on duty for half the vacations viz. for one and a half month each year. This arrangement is undoubtedly excellent. There is a Gazetted officer-in-charge of Buffalo Ward, Cattle Ward, Equine Ward which comprises the outdoor section. There are two Class I Gazetted officers in the Indoor section and one Gazetted officer Class II apart from the Assistant Hospital Surgeon. In the Contagious Ward we have two Gazetted officers with two Veterinary Assistant Surgeons. In the S.P.C.A. (Society for the Prevention of Cruelty to Animals), there is a Gazetted officer of P.V.S. (retired) as incharge. There is a Gazetted officer incharge of the Dog Ward. There are often more than 300 cases a day in the College Hospital as mentioned above. I do not know of any other place outside the College where any one could learn so much as here and if by one month in hospital after the 2nd year is meant outside the college then I am against this proposal for neither so much material would be available anywhere outside the college hospital nor so much experienced staff to educate our young men properly and explain to them different things.

In Colleges where number of cases brought is not so big, necessary measures as considered advisable by Directors of different Provinces may be taken to ensure thorough training in the Hospital work.

In the recommendations it is proposed by other members to send the students for one month in Laboratory after the III year whereas the subjects of Pathology, Bacteriology according to Appendix III are to be taught in the 4th year. In my opinion it would be much better to send them after they have undergone necessary training in these subjects and perhaps it would still be better if they were to spend three months in the Laboratory after they have undergone full training in Pathology, Bacteriology, Parasitology. Medicine and all other subjects so far as Lecture etc. are concerned and they have been

at the Farm for 3 months as in the case of students at the Punjab Veterinary College undergoing training for the B.V.Sc. course. The advantages of following this are obvious as students once having undergone full training in different subjects and also having spent full 3 months at a Farm should be able to apply knowledge imparted to them and thus should be in a position to have full benefit of the Laboratory training in a well equipped laboratory like the one at Lahore College where a very large number of patients come daily and thus sufficient material is available for this particular type of work which to my mind is very essential failing which the Laboratory training will not be of much use to students.

Instead of sending students after 4th year to a slaughter house for one month I feel that better training could be given in this subject by extending the period to 9 months when this subject is being taught and taking students to different slaughter houses atleast twice a week for two to three hours. The Professor must accompany the students for demonstrations etc. along with his assistant.

(b) *Facilities for Diploma Course students to switch over to University Course.*—I regret I do not agree with the recommendation made by other members that students who have passed the final year of the Diploma Course may be permitted to join the 4th year of the five years degree course which would mean that Diploma holders who are not even matriculates are not only to be exempted from admission but also from the B.V.Sc. First Second and Third Professional Examinations. I regret very much I could not recommend such a thing to any University. The syllabus followed for Diploma in some Veterinary Colleges in India does not compare favourably with the course now being followed for the B.V.Sc. degree course in different subjects and as such I do not think it right that we should make such a recommendation.

Let people with Diploma appear for degree course examinations in case they fulfill conditions so far as the admission is concerned. Necessary arrangements may be made for courses in Biochemistry, Experimental Physiology etc. after comparing the old and the new Syllabuses in each subject. This to my mind is necessary and am very doubtful if any University would exempt men with Diploma from degree examinations.

I regret I could not recommend students who have passed 2nd year of the 3 years diploma course to be admitted in the 3rd year of the 5 years degree course nor I could recommend the students who have passed the First year of the 3 years diploma course to be placed in the second year of the degree course.

(i) *Ancillary problems.*—I am glad to say that the remarks that Veterinary schools are overcrowded, teaching staff inadequate do not apply so far as the Punjab Veterinary College is concerned where we have got eight Class I Gazetted officers (Professor) and 10 P.V.S. II Gazetted officers apart from Clinical Assistants, Demonstrators and Assistant Hospital Surgeon. I do not think it would be right to say under these conditions that efforts made in the past as a result of meetings held at different places in the previous years have been in vain so far as the Punjab is concerned.

I feel that the Veterinary Education sub-committee should visit different Veterinary Colleges in India and submit definite recommendations so far as staff etc. are concerned which the Government of India may please forward to Provincial Government for their consideration and necessary action. In my opinion this course may be followed at an early date if no objection. I do

not think that we should wait till different colleges are affiliated to the University as this may take some time. The object is to have proper staff in every College for training men in Veterinary Science and this could not be rightly done till we have Professors with Assistant Professors for different subjects. If this proposal of mine is approved then the Veterinary Education Sub-Committee may be asked to visit Bengal, Bihar and other Veterinary Colleges where more staff is urgently needed for teaching and research work.

J. S. GAREWAL,

I. V. S.,

Principal, Punjab Veterinary College, Lahore.

THE SECOND BULDANA DISTRICT CATTLE SHOW

25th to 27th January 1945.

Efforts at Improving Livestock in Berar

First Day 25th January 1945:—

The Second Buldana District Cattle Show was held at Malkapur in the Buldana District with great enthusiasm in the spacious pendal erected for the purpose decorated with festoons and electric coloured bulbs etc. The whole show presented a scene of a modern industrial town. Eminent gentlemen, prominent officials, and thousands of peasants from the district and beyond, graced the occasion with their presence to witness the function, which is, a visible manifestation of the renaissance of the much neglected livestock industry, the importance of which as the greatest National asset, was brought to the fore by the Royal Commission on Agriculture in 1926. The function was held between 25th and 27th January, 1945.

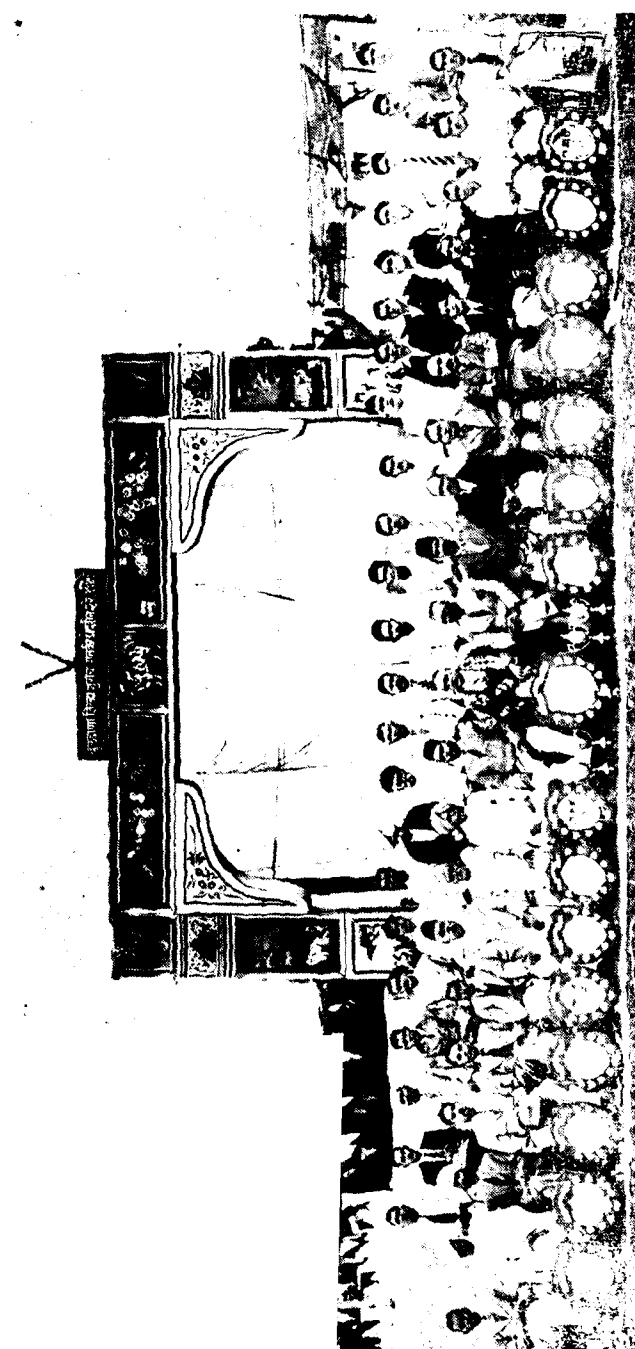
A large number of the finest type of livestock and Agricultural products, which can rival the best on this sub-continent, was displayed at the Show. Departments which minister to the advancement of Science and development of the rural fabric of the country, i.e. Veterinary, Animal Husbandry, Co-operative, Village Uplift, Agriculture, Rural Industries, Public Health and National War Front, were fully represented.

Milking competition designed to stimulate the rearing of heavy milking stock to produce more milk, the nectar of Nation's life and Chhakada races to interest the Agriculturists in rearing good bullocks in an Agricultural country like India, where bullock-power and not machine-power serves the needs of 90 per cent of the population, were the other prominent features of the Show.

Mr. G. V. Saoji, the Chairman of the Reception Committee in a brief speech welcomed the guests and the gathering.

Mr. Azizuddin Khan, Secretary of the District Livestock Association read an instructive report of the previous show. He dwelt at length on the activities of the Association and the incessant efforts made to disseminate the ideals and aims thereof amongst the peasants which he aptly immortalised in a beautiful Urdu poem composed for the occasion.

THE SECOND BULDANA DISTRICT CATTLE SHOW, (Central Provinces)



Group Photo of Officials and Non-Officials taken before the Prize Distribution Ceremony.



COW (Khamgaon Breed)



COW'S STALL (Khamgaon Breed)



PAIR OF BULLOCKS (Khamgaon Breed)



STUD BULL (Khamgaon Breed)

* THE SECOND BULDANA DISTRICT CATTLE SHOW *

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Mr. Azizuddin Khan said:—

"Mr. Chairman, Ladies and Gentlemen,

It was only as recently as December 1943 that the District Livestock Improvement Association, Buldana, took the very important and wholesome decision to recognize the value of the cattle wealth that we possess. And thus it was that under the able guidance of the then Deputy Commissioner, Mr. K.N. Subramanian, I. C. S., the first Cattle Show combined with an agricultural Show came to be held at Khamgaon from the 7th to the 9th of December 1943. You will no doubt be interested, therefore, to know all about that show, and other allied matters.

At the outset thanks are due to Messrs. H. B. Shahi and P.S. Sundram of the Veterinary Department for their initiative and effort. I also take this opportunity to thank on behalf of the association the public of this district who with their co-operation, made the show the success that it was. The extent of their co-operation will be gauged from the following details.

(1) Donors 21. (2) Life Members—30, (3) Ordinary Members 93.

Besides, we are also exceedingly grateful to the Agricultural Association, Khamgaon, the Veterinary Department, the District Council, Buldana, and the Cattle Show Committee, Khamgaon, for their generous contribution. As a result of these contributions, the association had a balance of Rs. 3368-6-0 after meeting all the expenses of the Show. In addition to this, the Reception Committee had also collected Rs. 5,460-7-0, out of which a sum of Rs. 2,702-12-0 was spent, leaving a balance of Rs. 2,757-11-0, which was donated to the Association.

The total number of exhibits at the last show was 165 as compared to 231 in the present show.

As for the sportive side of the show, the usual Chhakda races provided the necessary excitement and merriment. It is gratifying to note that about 59 Chhakdas took part in the races of the present show as against 25 in the previous show. It would be more pleasing to see if the Chhakda races are run without the use of sticks.

It is no exaggeration when I say that the present show has been a distinct improvement over its predecessor. I have no doubt that with increasing co-operation, enthusiasm and a growing realization of the utility of such shows this District Cattle and Agricultural Show will go from strength to strength in the years to come. When I think how becomingly we might have honoured our cattle on the day of their festival, viz. the Pola, my fancy makes me express my feelings in the following lines.

San the Poleka Bailoke Nummyashke
Liye
Hamne Bhula Farza Apna Apasme
Zaga Key
Sundram Sahab Ke Ham Sab Abhari
Hai Aj
Raisaheb ki Rayse Ham Hai
Rasteper Lage
Khush Hai H m Pola Manaya Hai,
Hamne Aj
Hai Khuda Tu Sabka Malik Rakhata
Hai Sabhi Laj.

In conclusion I tender my heartfelt thanks on behalf of the association, whose Secretary I am proud to be, to all the departments institution bodies, cattle owners, cultivators, and the public at large for their enthusiasm and willing co-operation in making this Show a great-success."

Letters and telegrams received from gentlemen who could not attend the show owing to previous engagements or otherwise were read out.

M. G. V. Saoji then requested Rao Sahib Morey, Deputy Commissioner, Buldana to open the Show. Amidst loud cheers he rose and read the inaugural address and declared the show open.

In declaring it open Rai Sahib Morey Said :—

" President of the Reception Committee of the Cattle and Agricultural District Show, Ladies and gentlemen,

I thank you for having given me the opportunity to open the second combined Cattle and Agricultural District Show this morning. The assemblage of men and women from the various taluqs of the district is a happy sign of what the exhibition is going to present for the succeeding two days. A beginning was made last year at Khamgaon by putting up a similar Show with a view to popularize the idea and to educate the people about the scientific ways of good farming and animal husbandry. I am glad to find that the people were responsive and showed keen interest in the movement. This enthusiasm and keenness of the people encouraged the District Livestock Improvement Association to arrange for this second show with a view to give greater impetus to the movement. This function is designated as a " Show " but I think the word connotes much more than what it denotes. Such occasions are best suited to impart practical training to the agriculturists to improve their farming and cattle breed, and I hope the assemblage will not be misguided by the mere word " Show ".

His Excellency Lord Linlithgow, the ex-Viceroy and Governor General of India, was the first to bring home the necessity to improve the Indian Agriculture and Livestock. During His regime His Excellency had advised the agriculturist that their real wealth lay in good livestock and not Rupees. Our country depends mostly upon agriculture and what steam power is to the farming in foreign countries, is good bullock power to agriculture in India. We must, therefore, try to improve cattle breed by paying more attention to the quality rather than to the quantity.

In this district there was in existence good breed known as "Khamgaon Breed". But it is disappearing gradually and the day is not far off, when it may totally disappear, unless and until immediate steps are taken by the public and the Government to revive this breed. It is doubtful if the individual efforts would be of much use. It is, therefore, necessary to tackle this problem on a co-operative basis. I know there are many people in this assemblage who are enthusiastic and who could take up this work and put their money and mind to make it a complete success. I, therefore, call upon our District Livestock Association to make real efforts to unite all such people on a co-operative basis and get the association registered under the Co-operative Societies Act for revival and recognition of Khamgaon Breed. The Hissar type of breed was tried to be introduced with a view to improve the working and milking capacity of the local breed, but the climatic conditions discouraged the use of Hissar breed. We have therefore, to depend entirely on the local breed known as Khamgaon breed.

In these days of war there is a great demand for all kinds of livestock and their products. There is also an equal demand for agricultural produce particularly the food-grains. This is, therefore, the most opportune time for the agriculturists to improve their live stock and their farming. The officers of the Veterinary and Agriculture departments are always ready to advise and guide the agriculturists, who will, I hope, take the full advantage and avail of the present opportunity.

The Veterinary Department of the province has devised sufficient plans for an all-round improvement in Live Stock. Out of the several cattle epizootics, rinderpest, is the most fatal malady which sweeps the cattle from one corner of the province to the other like a bon-fire. But it is pleasing to note that the Civil Veterinary Department could, to a good extent put a stop to such virulent type of disease by introducing goat-virus vaccination. This disease is mostly imported from the adjoining provinces, when cattle are brought here for sale. With a view to check importation of this disease, quarantine stations are being proposed to be started at village Dasarkhed in Malkapur taluq which adjoins East Khandesh border, and at Deolgaon Raja and Lonar, which adjoin the Dominions of His Exalted Highness the Nizam. We must thank the Veterinary Department for these measures, and I hope people will co-operate with the department to make these quarantine stations a success.

I am also glad to mention here that the District Council, Buldana, has also come forward to open Cheap Plan Veterinary Dispensary at Motala shortly with a view to make veterinary help available to the villagers in the interior.

Ladies and gentlemen, I will not try your patience further as you must now be anxious to have a look at the various beautifully stationed and decorated exhibits in this show. But before I declare this show open, I must thank the public who have splendidly responded to the present investment drive and to those who have contributed money and devoted energy to the present Show. I declare the Exhibition open".

On the second day (26th Jan.) between 2 and 4 p.m., for the benefit of the ladies, the show was thrown open, thus offering an opportunity to these mothers of the rising generation to assimilate the ideals of the show and in turn infuse the same in the nursery of their homes. A special demonstration by Mr. Deo, the village Uplift Organiser was held for the preservation and canning fruits and juices etc, throwing side light on this important aspect of the domestic science.

On the third day (27th Jan.) Till 2 p.m. selection of the best exhibits was done by the judging committee.

Rao Sahib Morey, Deputy Commissioner, then delivered his Presidential address.

"Ladies and gentlemen, You are aware that the Prize distribution ceremony and the concluding speech were to have been done by M. I. Rahim, Esquire, I.C.S., Commissioner, Berar Division, Amraoti; but he had to go to Bombay under the Provincial Government's directions to attend the Indian Central Cotton Committee meeting and the work which he has to do in Bombay on behalf of the province is of such an important nature that he could not possibly leave it, and come to Malkapur to preside

over to day's function. He has expressed regret at his inability to be here to day amongst us. I have, therefore, to preside over this Show and distribute prizes on behalf of the Commissioner.

On the opening day of this Show, I had laid much stress on the need for improving the present cattle breed and farming. I am sure this three days' Show must have given you a good deal of practical training and knowledge. The demonstrations of the various activities, such as milking competition, Chhakda and plough races, competition in different livestock and agricultural produce, so also the different activities of village uplift Co-operative, Veterinary and Agricultural Departments, National War Front, and the Public Health and industrial Organizations must have undoubtedly made good and deep impressions on your minds. I hope you all will not forget them here as you leave this place, but I request you to carry them on in your respective villages and try to implement them by putting into actual practice.

I am glad that the public have realized the importance regarding the Khamgaon Breed as mentioned in my opening speech, and I will forward the resolution passed with regard to the opening of a Government Cattle Breeding Centre for Khamgaon Breed and Berari buffaloes to the Government for taking early steps.

I do realize the need for opening the more cheap plan veterinary dispensaries and will forward the resolution to the Officer incharge, District Council, Buldana, and the President, Municipal Committee, Nandura with my recommendations, and I am sure that the Officer-in-charge, District Council, who has almost opened one dispensary will do his best to give effect to this resolution, as he has already got sanction to open one such dispensary at Motala.

I heartily congratulate the landlords and others who took part in different competitions and received the prizes. The other competitors who took part in the Show, but were not lucky enough to get prizes, also deserve my warm appreciation. They should not feel shy, because they could not win any prize. The real charm is, I believe, in the competition irrespective of the success. I hope they will try again next year, and will not lose heart.

Before we disperse I would like to thank non-officials, officials of the Revenue, Veterinary, Agriculture, Co-operative and other departments for their co-operation and enthusiasm in making this district show a success. The Live Stock present here also deserves our thanks. I would not be doing full justice to the services of the gentleman who has taken great pains and who has been pulling all the ropes behind the curtain without offering my special thanks. He has been very enthusiastic, persuasive and optimistic from the very beginning of this show. He is, you know, Mr. P. S. Sundaram, Assistant Director of Veterinary Services, Berar Division. Mr. G. V. Saoji, the President of the Reception Committee has also taken keen interest in the Show and deserves our thanks. He has devoted his full energy and contributed handsome donation towards this show. All the members of the Reception Committee have co-operated fully and deserve thanks. Mr. Bodas, Tahsildar, has assisted ungrudgingly to make this show a success and deserves thanks.

I shall now distribute the prizes.

Lectures on various subjects were delivered by the officers of all Departments who participated.

Prize distribution ceremony which was very impressive, took place at the hands of the Deputy Commissioner, in the absence of the Commissioner, Berar Division, who could not attend owing to unavoidable circumstances.

Prizes worth about Rs. 1300/- excluding 21 rolling trophies costing Rs. 2000/-, were awarded to winners.

All animals were given free concentrates and fodder.

Mr. N. R. Patil thanked the President, the guests, the members and the gathering in general: eulogised the services rendered by Mr. M. D. Bodas, Tahsildar Malkapur, Messrs G. J. Khond and M. D. Bhawe, Veterinary Assistant Surgeons Buldana and Malkapur respectively and other gentlemen in making the show a success.

Mr. P. S. Sundaram, Assistant Director of Veterinary Services, Berar Division, with full of joy at the grand success achieved by the show, spoke in glowing and passionate terms. With heart full of emotion conscious of the part, such gatherings are contributing towards the regeneration of the economic life of the country, which is bound to occupy an honoured place in the community of the Nations, exhorted the people to emulate the practices and precepts advocated by the various speakers.

Mr. G. V. Saoji was at home to a select number of guests and the function came to a close in the evening amidst scenes of enthusiasm.

CATTLE AND AGRICULTURAL EXHIBITION AT AMRAOTI

Efforts to Improve Livestock Wealth

Friday the 16th March 1945:—

The District Livestock Improvement Association Amraoti for the first time since its inception four years ago held this Exhibition in the capital of Berar in a tastefully decorated pandal, in the centre of which stood a towering staff bearing on its flag the portrait of a bull, the proud progenitor of his species exhibited below.

Separate stalls were allocated for departments such as Veterinary, Animal Husbandry, Village Uplift, Agriculture, Textile, Co-operative, Public Health, National War Front, Technical and Cottage Industries, which added collectively to the Show immense attraction. Perhaps never before in her chequered history had this capital of Berar been so lavishly entertained to feast her eyes on so varied a scene. Tens of thousands of Livestock enthusiasts of either sex hailed from every strata of the society defying dust and sun.

A select number of best exhibits which may serve as specimens for the people while improving their stocks, was displayed.

These exhibits were a reminder to those who paused and pondered that these were the relics and descendants of those flocks and herds which were tended by the Staff of the semitic and reared by the Flute of the Aryan and in

the fullness of the time served as a sheet anchor to the flourishing industry whether in desert wastes or in fertile valleys. It was the proud privilege of this dumb creation that the self same Staff and the Flute ultimately became symbolised as promulgators of law to a large section of Mankind. Mr. G. L. Watson, I. C. S., the Deputy Commissioner, Amraoti, was received at the gate by the office bearers and introduced to the members of the Reception Committee. In a suitable song sung by a batch of girls, the congregation was welcomed.

Mr. N. J. Deshmukh Chairman of the Reception Committee delivered his speech and requested the Deputy Commissioner to declare the Exhibition open. In the Course of his speech he said :—

“ Mr. Watson, Ladies and Gentlemen,

It gives me a great pleasure in according you all, most cordial and hearty welcome to the capital city of Berar, to witness the fourth Amraoti Cattle and Agricultural Exhibition, which is an unique of its kind in Berar to-day.

We are very fortunate indeed in getting the consent of our popular and sympathetic Deputy Commissioner Mr. Watson, who is also the President of our District Livestock Improvement Association, to perform the Opening Ceremony of this Exhibition and to deliver his inaugural address. I should thank him for his readiness in accepting this invitation inspite of the unwholesome weather and the arduous duties.

Under his fostering care, with the assistance of his Vice-President Mr. Sundram, the Assistant Director of Veterinary Services Berar, the District Livestock Improvement Association is doing its best for the welfare of us all—Agriculturists—rather I will say, every one of us. Because the activities of this Association deal with the nutritive food production, one of which is milk, which is essential for the growth of the babies who are the future nation.

Chandur Taluq was fortunate enough in getting the advantage of the Exhibition for the last 3 years and it is due to repeated demand from us, that this Exhibition is being held to-day at Amraoti proper, in order the people of this area may also take full advantage of these shows and be benefited.

You are all aware that we have always been proud of our Khamgaon Cattle, but, this breed is dwindling away and one is unable to procure a suitable breeding bull for his herd even on payment of high premium. Therefore, some of us had to go in for Gaolao'breed, though, this breed may not be suitable to all the Tahasils of Amraoti District.

In order to overcome the great dearth of getting suitable breeding bulls, the Government has established one breeding Farm at Bod with nomadic type of cattle and God alone knows still how many more years will be required before evolving suitable breed of bulls from that far-off centre, to supply the needs of Berar.

Therefore, if some positive good is to be done to the Agriculturists for the improvement of their cattle, the Government should make provision immediately and establish, if not revive a breeding farm with Khamgaon type of cattle as it was originally started at Borgaon Government Farm.

We should be indeed very grateful to Mr. H. B. Shahi, the Director of Veterinary Services who has done to us immense good. It will be too many to mention all the benefits under his Directorship, but I wish to mention a few important ones. (1) The control of cattle epizootics specially Rinderpest and establishment of Quarantine stations in Berar. (2) Restriction on the export of cattle from Central Provinces and Berar. (3) Restriction of slaughter of animals. (4) The most important of all, the restriction of movement of the buffaloes even between the districts of Berar to preserve the Berari Buffaloes which are considered as one of the best milk yielders in India.

I am sure that with his dynamic power and with the assistance of his alert and able divisional Officer, as both happen to have taken up this noble profession for serving the cause of poor dumb cattle in its true sense, the welfare of Livestock in our Province, why not the Agriculturists as a whole, is bound to flourish unabated.

Now gentlemen, I do not want to tax your patience more and request Mr. Watson to deliver his inaugural speech.”

Mr. Watson, rose and delivered his inaugural speech and dwelt at length on the efforts made by the Association to popularize the improvement of Livestock work through the medium of exhibitions like these.

Realising that he might not be in a position to see all that has been exhibited, owing to the impending visit of the Prince, M. I. Rahim Esquire I.C.S., Commissioner, Berar accompanied by Mr. Syed Raoffsha, M.L.A. paid a visit on the very first day and went round the exhibition evincing great pleasure in all what he saw.

Saturday 17th March

Milk yield test to assess the qualitative and quantitative capacity of the local breed was contested. As a subsidiary industry exceptionally large herds are maintained in and around Amroati with its basis on primitive economy. Scientific methods of production and consumption were demonstrated at the Animal Husbandry stall to eager crowds. Shankarpat races were as usual attractive.

Judging of exhibits was conducted by a panel of persons assisted by official expert Mr. K. B. Pillai.

Mr. T. Y. Deo, Village Uplift Organiser, held a demonstration exclusively for the benefit of the women on preservation and canning of fruits and other allied articles of food, which go to make the kitchen wholesome and the table delicious.

Sunday 18th March

Practical demonstrations and educative discussions were held at all the stalls. More emphasis was laid for growing more food and vegetables especially in rural areas where the latter are practically non-existent.

Thought-provoking and comprehensive speeches were delivered on various subjects by the officers of the Nation building departments.

Mr. Tatwavadi, Secretary, District Livestock Improvement Association, read out his interesting report of the previous show and the work done during that year.

Three more trophies donated by Mrs. Lilavati Narayan Rao Deshmukh, Assistant Director of Veterinary Services, Berar Division and Seth Laxminiwas Ramlalji Jagirdar of Balgaon were added to the 17 existing ones. Mr. M. I. Rahim, I.C.S. Commissioner Berar in a brief speech remarked that during his long association with Berar, he found that the care and affection bestowed by the people on their animals were beyond description, and some of the best breeders of the best cattle were found in Berar. He further observed that the environs of Berar were congenial, promising still further progress and concluded by paying tributes to the yeoman's service rendered by Messrs. H. B. Shahi the Director and Mr. P. S. Sundram the Assistant Director to the cause of the livestock improvement in Berar.

A large number of trophies and prizes worth about Rs. 3200 were awarded at the hands of the Commissioner, Berar.

Distinguished among the many visitors were Nawab Mirza Yar Jung Bahadur, Agent to H. E. H. the Nizam of Hyderabad and Mr. H. B. Shahi Director of Veterinary Services.

National war front organisation held cinema shows demonstrating the best breeds in India and depicting the usefulness of animal products

Pawada singing performance added its colourful grace to the occasion under the direction of Rai Sahib D. V. Sidhore.

Mr. N. J. Deshmukh the Chairman of the Reception Committee thanked all who contributed liberally either in money or in material to make the exhibition a success. Glowing tributes were paid to the members of the Veterinary profession and the officers of the Revenue Deptt. for the services rendered. Special thanks were paid to Mr. R. D. Joshi, Tahsildar, Amraoti for his help.

Light refreshments were served by the Reception Committee. And late in the evening the function came to a close.

THE THIRD MORSI TALUK CATTLE SHOW

11th to 12th February 1945

Enthusiastic Response by Public

11th February 1945 :—

The Third Morsi Taluq Cattle Show took place on 11th and 12th instant. This Taluq Show is an annual feature at the fair on the historic spot of Salbardi which derives its inspiration from the epic age. Every year thousands of people who congregate there from the wilds of the Satpura and the plains of the Wardha and the Purna, to pay homage to the sacred spot are thus offered an opportunity to have a glimpse at their benefactors the Gaolao Livestock the pride of the Wardha Valley.

Equally, to their fortune they find every year in the person of that indefatigable Mr. P. S. Sundram, the Assistant Director of Veterinary Services, Berar, a champion for the cause of development and propagation on regional basis of this Livestock wealth of the country. The message which he had been delivering with his usual captivating manners and persuasive eloquence had been relayed through these human transmitters to every cottage in every hamlet far and near.

Exclusively a large number of Gaolao exhibits were displayed. Berari buffaloes, famous for their milk yielding capacity and Rhode Island Red poultry—though an emigrant breed—which is noted for its brawn were the other conspicuous ones at the Show. As a cottage industry, the poultry has become the friend of the poor in these days of stress and struggle for existence. The scope and extent of the Livestock industry so far attained—can better be appreciated by a cursory glance at the balance sheet. We in Berar, owe all this to an efficient and experienced leadership assisted by a band of silent and selfless workers who have been striving ceaselessly in the field of Veterinary Science, for the consummation of a set ideal. One muses within himself as how best to redeem this debt of gratitude.

Chakda races which are the amusement and entertainment of the unwary, where as usual held to demonstrate the muscular powers of the Gaolao stock on which the peasantry wholly depends.

12-2-45. Distinguished visitors amongst others, included M. I. Rahim, Esquire I.C.S. Commissioner, Berar, Major Cope of Royal grenadiers and the Deputy Commissioner, Betul. They were taken round the Show by Mr. P. S. Sundram, Assistant Director of Veterinary Services, Berar, who explained every aspect of this movement. They evinced keen interest in all what they saw and appreciated the efforts aimed at contributing solidly towards the rural economy of the Country.

Selection of the best exhibits was done by the Judging Committee. Lectures on Nation building activities were delivered by the officials of the Departments and others concerned.

Prize distribution ceremony took place at the hands of our popular Commissioner, Berar, M. I. Rahim, Esquire, I.C.S. whose sympathy and encouragement gave further impetus to this Livestock improvement movement in Berar.

Large number of prizes including rolling trophies worth about Rs. 500 were given away to winners.

Mr. R. C. Patil (Gadegaonkar) thanked the President, the Officials and the gathering in general in making the Show a success. He eulogised the services rendered by Mr. Katiyar, Veterinary Assistant Surgeon, Morsi.

Mr. Rambilas Seth of Udkher was "At home" to a number of picked guests, to meet the Commissioner, Berar, and Major Cope of the grenadiers.

The National War Front held a cinema Show, one demonstrating the famous breeds of livestock that inhabit this Country and the other depicting the part, they have been playing either in life or in death, all through the ages for the advancement of civilization and culture.

The function came to a close late in the evening amidst scenes of enthusiasm.

NEED FOR IMPROVING LIVESTOCK WEALTH

Conference and Exhibition at Pusad

23rd to 25th February 1945

Friday 23rd February 1945 :—

Friday 23rd February '45 :—This annual exhibition, the third of its kind was held at Pusad under the auspices of the District Livestock Improvement association in a specially erected specious pendal, profusely decorated with festoons and flags. Thousands of people wearing a festive mood visited the

place from dawn to dusk. A notable spectacle that revealed itself even to a casual observer was the predominant number of innocent and inquisitive children and keen and graceful ladies, a healthy sign which augurs well for the future of the livestock industry. Undisputedly, the knowledge acquired during the impressionable age in the "University of Childhood" at the feet of the "Mother Professors" through the medium of the exhibitions like these, permeates the very vitals of the generation and in its onward surge finds itself transmuted into a movement for the economic stability, unassailed by competitive currents in the commercial world.

A large variety of livestock exhibits was displayed, prominent among them being the improved breeds of cattle. Undoubtedly—peasantry's main source of power for his agriculture is bullock. In a way the scope is thus restricted. But as an industry it holds a potential which if scientifically and commercially exploited adds immensely to the wealth of the country. The topography of the Yeotmal District, which perhaps contains the largest cattle population offers a most congenial field for raising of a single suitable breed.

Departments, such as Veterinary, Agriculture, Co-operative National War Front, Public Health, Red Cross, Technical Training were installed at the Show for educating the people in Nation building activities. They found a fertile soil there to propagate and propound their ideas and ideals.

Milk-Competition and Chakada races, as usual added graceful colour to the Show.

After observing the formalities in receiving Mr. G. D. Magub, I.C.S. the Deputy Commissioner, Yeotmal and the introduction of the Reception Committee members to him, by Mr. V. P. Naik the Chairman, the "Nightingale" of the garden of Pusad welcomed the guests and the congregation in a melodious and sonorous song befitting the occasion.

Mr. V. P. Naik, Chairman, Reception Committee in a suitable speech welcomed the gathering. He alluded to the part, the District Livestock improvement Association has been playing under the worthy Presidentship of Mr. G. D. Magub, I.C.S. for the development of livestock and laid stress on scientific breeding and agricultural farming with suitable State aid. He then requested the Deputy Commissioner to declare the Show open.

Mr. G. D. Magub, I.C.S. rose and delivered his inaugural speech in which he exhorted the people to give practical shape to the aims and objects for which these shows stand and become exemplars to those who are less fortunate.

He then declared the Show open.

On Saturday the 24th—Ploughing competition which attracted a large number of Agriculturists was successfully demonstrated.

A Judging Committee of officials and non-officials selected the best exhibits for award of prizes.

On Sunday the 25th—Practical demonstration and instructive discourses were held in all the stalls which were thronged to the full with inquisitive people.

In the afternoon, in an exquisitely decorated "Shamiana" the elite of the town assembled to witness the final phases of the function. A welcome song by a group of little girls, to the accompaniment of thrilling music produced a salubrious atmosphere.

A letter received from Mr. H. B. Shahi, Director of Veterinary Services, was read out.

It needs no emphasis, that under his inspiring guidance, his resolute Lieutenant Mr. P. S. Sundram, Assistant Director of Veterinary Services, Berar, nourished and nurtured with fostering care this livestock improvement movement in Berar exciting unstinted admiration for all that has been achieved in so short a time.

Surely, the fruit of this toil and sweat is destined to be treasured as a precious heritage by the posterity with grateful remembrance.

Very instructive lectures were delivered on various subjects by the officers and other concerned.

Mr. W. W. Joshi the Secretary of the District Livestock Improvement Association read an illuminating report of the previous Show in which he referred to the efforts made and progress shown during the last three years.

Mr. M. I. Rahim I.C.S. the Commissioner Berar, the friend and philosopher of this Livestock movement in Berar in a short speech addressed his grateful thanks to the congregation for their patience. Though delayed consequent on a mishap to his car in which he was racing with time for fulfilment of sincere and ardent desire to take active part in the function, he came at the nick of the time to the relief of all.

He observed that the development of the livestock is materially contributing to the prosperity of the country and during the post-war period it will surely be called upon to play a vital part in the rehabilitation of the war torn world. Finally he paid a handsome tribute to the untiring energy of Mr. P.S. Sundaram, Assistant Director of Veterinary Services, and humorously remarked that his very name spells guarantee of efficiency and success to the Livestock improvement work in Berar.

A large number of prizes including trophies worth about Rs. 3200/- were awarded to the winners at the hands of the Commissioner, Berar, who performed the ceremony in his characteristic playful mood.

Mr. V. P. Naik thanked the President, the guests, the members and the gathering in general which included a large number of ladies and frolicsome children in making the Show a success. Special tributes were paid to the rank and file of the Veterinary Department in recognition of the services rendered. Messrs M. D. Raje and Gurwantrao Deshmukh served as pillars of strength.

Mr. V. P. Naik was "At home" to large number of guests, to meet the Commissioner Berar and like a proverbial benign host moved amongst the guests. The function came to a close late in the evening leaving happy memories in its train.

(The above four extracts are from *Hindustan Herald*)

Obituary

Mrs. M. S. SASTRY

We deeply regret to record the sad demise of Mrs. M. S. Sastry, the beloved wife of Mr. M. S. Sastry, G.B.V.C., the General Secretary of the All-India Veterinary Association, on 3rd August 1945, at the comparatively early age of 53, leaving behind her husband, one son and three daughters. We convey our sincere and heartfelt condolences to the members of the bereaved family, especially to Mr. M. S. Sastry who, in his retired life, would very keenly miss his life long partner.

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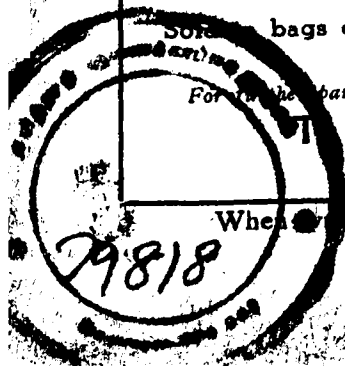
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