

cipal towns. I do not think that I ever found one in a Provincial Town. This is done only by occasional private vendors in towns. The flesh of country swine is eaten by all classes of people, except Mahomedans. In villages, especially in Hill tracts, wild pigs are a pest to farmers. At night they get into all sorts of fields and feed on them. These beasts are watched and hunted by the villagers at night and their flesh very deliciously partaken of by all classes of people. The country swine are not liked so much by the people owing to their dirty habits, as I pointed out in a previous place. The wild pig entirely subsists on grains and roots and stalks and hence, except Mahomedans, its flesh is liked by all.

The whole world is trying to model the health department, owing to widespread prevalence of tuberculosis and I think the people of India should place themselves on a level with their brethren. I do not like to say anything about the health department in South India, as I think it is worked on a sound basis. The following letter of Major Ronald Ross, C.B., of the Medical Service (retired) and Professor of Tropical Science in the University of Liverpool, in the *Times* of September 24th, 1910, will convince the people about the trouble they undergo.

About Sanitary Officers, he says "Probably the only class of British Officials in India who ever really penetrate into these mysteries of misery are the medical and especially the Sanitary Officers, a class to which I had the honour of belonging for many years. One has actually to see the interior of the houses in which each family is often compelled to live in a single small cell made of mud walls and with a mud floor containing small yards littered with rubbish and often crowded with cattle; possessing wells permeated by rain soaking through this filthy surface; and frequently jumbled together in inchoate masses called Towns and Cities."

Further, the learned, experienced doctor points out that "Town management and sanitation are difficult arts, requiring much training and thought; and it is not disrespectful to say that most of our greatest officials are extremely ignorant of them." "It is a commonplace," he continues, "with sanitary men in India and elsewhere, that they can often obtain no serious or intelligent hearing of their pleas..... To me it seems that the construction of a really efficient sanitary service for India and closer attention to the housing and town managing problems and to allied questions, would confer a much greater benefit on the Indian people than mere political adjustments and readjustments. For this, sanitarians have been crying for years, but they have always cried in the wilderness."

Tuberculous Beef and Pork, etc.

As I have already pointed out in previous chapters, we find that in England and in other places tuberculous beef and pork are known to be

a source of danger to the public, but the flesh of sheep and goat are not included. They say that the sheep, owing to the open-air life they lead, are safe from tuberculosis. In India, however, sheep and goat are liable to infection. The milk of the latter is used for Mahomedan children and the flesh is prescribed by Hindu Vidhians.

In Western countries, meat and milk producing animals are hand-fed. Cattle for beef, cows for milk, and pig for pork are kept together. There is every chance of infection being carried from one animal to another. This system of rearing animals together, being a source of infection, stringent measures are adopted to guard the Public Health by the health authorities. In India, though we are backward, we must try to stand on a level with others.

In India, poultry and swine, I think, are also a great source of danger, because their rearing, and up-keep have not been taken as a profession and they are very much neglected. Fowl, for instance, is a widely reared bird found in every flesh-eating house, mostly among Christians, Mahomedans and Hindus. Both rich and poor rear the birds; some for occasional use for table, some for eggs, and some for sale. These birds are mostly left to look after themselves. They are found everywhere in a house and live on anything they like.

Pigs or swine are very rare in Towns, but are found almost in every village in South India mostly on the Malabar coast (North and South Malabar). There I found respectable people, both Hindus and Christians rear the beast of which they take great care, feeding them by the hand. In other parts they are reared only by low caste people chiefly the Oddars. These men are Hindu Sudhras and their profession is house-building, and well-digging. These men cannot expect work every day in a village, so they are mostly employed by the Local Fund Contractors to repair Government roads. They move from place to place and take shelter under trees. They usually keep these beasts with them, I do not know why. Perhaps to eke out their livelihood when they are out of work. Each animal costs Rs. 8 to 10 and at each season a sow can litter 8 to 12 young ones. There is another class called Kuravars who also have a great fancy to rear these animals. They come under Hindu Sudras and their profession is making mats and baskets out of date leaves and stems. They are noted as highway robbers and usually their movements are watched by the Police. These people also move from place to place and supply baskets and mats to villagers. These beasts follow them wherever they go. Pig is an abomination to a Mahomedan. The very name of a pig which they call *súwar* (Hindi) and its very sight are obnoxious. Hence they are not allowed to be reared in Towns and other places where the Mahomedan population

predominates. Thus treated by the Mahomedans, the poor beasts perhaps find protection under the abovementioned migratory tribes such as the Oddars and the Kuravars who usually live a migratory life and sometimes live temporarily on the outskirts of villages and towns. Fowls and pigs in villages and towns are nature's scavengers. Therefore their use as food should be carefully avoided, unless examined minutely for tuberculous lesions after being dressed.

CHAPTER V.

My Experience.

I have travelled over a pretty good area in Southern India with a little of an observative eye, Bombay down to Ceylon and up to Ganjam in the east. On Government duty I have seen almost every district in the Madras Presidency. I have noticed the prevalence of tuberculosis, both in man and beasts, all over the Presidency. When I was in the Ananthapur District, at Dharmavaram Taluq, I went to work in a village called Gotlur. There I saw a sheep being dressed. The owner was the Village Munsiff and he told me that in his pen of sheep one by one suffer from cough and pine away, and that this was one of them. They are in the habit of killing those that are bad in health and make a feast of the flesh. I saw the animal had tubercular nodules in all the organs and the intestine was greatly affected. I warned the people about the danger of using the flesh, but I found my admonitions received little attention. I requested them to give me a piece of the intestines which I preserved in formalin solution and sent it to the Madras Veterinary College Museum for the use of students. I think the inspection of the slaughter-houses ought to be done with a little more care and observation, because almost all the enlightened classes, both Hindus and Mahomedans and Christians and Europeans, are flesh eaters. When I was in Bellary which is a Military Station, I just wanted to peep into the slaughter-houses, both sheep and goat, as well as the Beef slaughter-houses. In the former, a Municipal peon was attending to the dressing of carcasses, and some for want of hooks were being dressed on thaties (mat made of date stem) which was smeared with blood, etc. The entrails after being removed were kept on similar thaties. The flesh of sheep and goat had been sent away to market for sale. The internal organs were given off to women vendors that wait for the purpose of buying them. These women-vendors take charge of all the internal organs which include the lungs, the heart, the spleen, the stomach and intestines and keep them in a pot full of water. No examination whatsoever is made to see into the carcase nor the organs. The women that buy the internal organs only look to size and health of these organs. Two groups are made of these organs, one is the healthiest portion and the other I may

be diseased and diseased ones. The former are taken away by those who are sold in the market. The latter are taken by men and women that wait at the slaughter-house, who I was told, were meat vendors at the toddy and grog shops (Indian Bar houses). Such organs are cooked and sold to those that resort to the so-called bar houses. The poor unfortunates that harbour into the Indian "bar houses," after getting themselves boozed, eat such cooked meat. What guarantee is there that animals slaughtered at the Municipal slaughter-houses are free from tuberculosis? Then after finishing my look into these slaughter-houses I enquired about the beef slaughter-house which was a little distance away from this. As I approached the house, the smell was so bad that I could not bear it. The house was empty with full of flies and dung and blood. It was just being washed from dirt. I was told that animals had been slaughtered early in the morning and had been removed for sale. I could not stand there any further. I thought of bringing this state of affairs to the Collector which I did, and the Collector, Mr. R. H. Graham, I.C.S., was kind enough to take immediate steps and it was communicated to me. Anyhow, in this matter, I was a little bit beyond the jurisdiction of my duty. I sincerely request that serious steps should be taken to give to the public, meat as healthy as possible.

The Effects of Cooking on Tubercle Bacilli.

"Large numbers of experiments have been carried out to show the power of resistance of tubercle bacilli to heat, and the results show that it is moderate. Ten minutes at 75°C. is said by Jensen to be sufficient to destroy the vitality of tubercle bacilli; whilst experiments by Forester show that fifteen minutes at 65°C., ten minutes at 70°C., and one minute at 95°C., are sufficient.

Schmidt (Mulheim) found that, without exception, tubercle bacilli lost their virulence at the coagulation point of albumen.

• More to the point are the experiments of Woodhead for the Royal Commission given in Report I, 1895. Working on the hypothesis that the flesh of tuberculous animals were rarely, if ever, infective, unless soiled during dressing of the carcase, he artificially infected the flesh before experimenting. In some cases he injected tuberculous material into the interior of the meat substance, and in others he smeared slices of meat and formed them into "rolls." The latter experiment is of importance, as it is the custom for butchers to make such "rolls," and they frequently include minced lungs, omentum, etc., structures which are often highly virulent.

• Having subjected his samples to the ordinary processes of cooking, and noted the temperature at various depths below the surface, he took the central portions of them for feeding and inoculating animals.

The conclusions he came to were:—

(1) The centre of a 'joint,' weighing 6 lb. or over, never reached a higher temperature than 60°C. (140°F) during ordinary cooking.

(2) 'Rolls' of meat of more than 3 lb. or 4 lb. weight were not rendered sterile throughout, and therefore cooking could not be relied upon to render innocuous, "rolls" with smeared tuberculous centres.

(3) Ordinary cooking was sufficient to destroy any smeared tuberculous material on the outside of a 'joint' or 'roll.'

(4) The most reliable method of cooking is boiling than roasting in an oven, and the least reliable, roasting in front of a fire.

The Effects of Preservative on Tubercle Bacilli.

(1) Forester sprinkled pure cultures of tubercle bacilli with sterilized common salt and found them virulent *two months later*. (2) He found, also, that finely minced tuberculous organs, after lying in salt brine for eighteen days, retained their virulence. (3) That salting and subsequent smoking did not render tuberculous organs innocuous, unless these be smoked for three to five hours on three different occasions, or after smoking be kept in a dry room for one or two months." —(Arthur R. Littlejohn, M. B. C. S., M. B. C. V. S., D. PH., *The Veterinary Journal*, May 1909.)

CHAPTER VI.

Wet Nurses and Cow's Milk causes Consumption.

The system of rearing up children by wet nurses is not very much in vogue in India. Every mother seems to like her child and use her breast alone for feeding the infant. It is also known that mothers feed their young ones till 1 to 2 years, and I have seen in very many families, children of 3 and 4 being suckled by their mother. This is done when the new-comer does not have a rival and he alone is the sole proprietor of the mother. In cases where wet nurses are used she must be carefully examined by doctors, whether she is suffering from consumption or not. Where cow's milk is used, it must be carefully boiled. The best way of handling milk for children is to boil the milk. This is done by slowly boiling the milk for half an hour. There should not be a change of vessel. Milk should be bought in the vessel which ought to be carried direct to the fire. I have already pointed out that tubercle bacilli are killed at a temperature between 68° and 78°F. It is also

important to keep the vessel covered up when the milk is heated, and its subsequent use should be followed by carefully closing the vessel, because milk is a very good medium to develop all sorts of bacteria that are found in the polluted atmosphere.

Another important point we shall have to consider, especially in Towns, is inspection of milch cows. It must be healthy in condition. Free from cough. The animal must milk in all the teats and there should not be any abnormal condition of the udder, *viz.*, inflammation of teats, swellings on the udder or any nodules, and when the udder is manipulated with the hand and there should not be heat, pain and tenderness. The keeping of cows at home which is a wide practice in India and allowing them to feed upon the leaves which are thrown after being used as dishes are deplorable. Housing cows with the inmates is also dangerous.

Tuberculous Poison In Dung and Urine.

It will be appalling to hear that the dung and the urine of tuberculous cows contain the virus. In the *Veterinary News*, 30th July 1910, Mr. J. S. Lloyd points out: "It has been well established that animals housed in insanitary and tubercle-infected houses almost invariably become victims of the disease. It has been further established that infected animals sooner or later disseminate tubercle bacilli from one or other of the natural openings of the animals' bodies, it may be the coughing of infective sputa from the throat and lungs, infective faeces from the intestines, infective urine and discharges from the genitals, or infective milk from diseased udders. Such being the case, can we wonder that houses inhabited by such animals become hot-beds of the disease, and that tubercle-free animals brought for housing therein soon become affected?" We must consider here the use of dung of cattle for houses. This is a very old method which is practised in India and is it not dangerous to children who are allowed to crawl about in houses and play about on the dung smeared places? I think this is one of the causes of children being attacked by tuberculosis. How do we know that the dung what we use does not contain tubercle bacilli?

Experiments made with Infected Dung, Milk and Butter.

Dr. E. C. Schroeder of the Department of Agriculture, Washington read a paper on his investigations, showing, that about 40 per cent. of cattle, apparently healthy, and known to be tuberculous only because they had reacted with the tuberculin, intermittently passed tubercle bacilli with their faeces. When a number of such cattle were kept under continued observation, the percentage that expelled tubercle bacilli per

rectum was found to be double in about 18 months; and both the frequency with which bacilli occurred and the number found in individual animals also showed an increase. Among 12 cows, bacilli in the faeces were at first found in ten. The proof that the acid-fast bacilli, demonstrated by microscopic examination, actually were tubercle bacilli was established by (1) producing fatal generalised tuberculosis in guinea-pigs, inoculated with the faeces; (2) causing fatal generalised tuberculosis in hogs by feeding them with the faeces, and (3) causing fatal generalised tuberculosis in guinea-pigs by inoculating them with the milk soiled with small quantities of such faeces, and with butter made from such soiled milk. Pure cultures of tubercle bacilli, isolated from the infected guinea-pigs caused fatal tuberculosis in cattle on subcutaneous inoculation. Dr. Schroeder further observed that, with the rare exceptions, commercial milk could be shewn on examination to be contaminated with cows faeces, and he concluded that, considering the wide prevalence of tuberculosis among cattle, the presence of faecal material in milk was frequently associated with the presence of virulent tubercle bacilli. Cream and butter are also exposed to this danger. —(*Veterinary Medicine*, by Drs. Williams and Baldrey.)

Dampness of Soil, Insufficient Food and want of Ventilation causes Consumption.

Sir Allan Perry, P.C.M.O., of Ceylon, said that consumption was due generally to over-crowding, dampness of soil, insufficiency of food, and want of ventilation. In other words it meant want of pure air, for people who lived in pure air never got tuberculosis, unless they inherited a tendency to it. The danger is with the poor people who lived in the crowded tenements, where the window space is too small, and where there are no through currents of air or sunlight entering. The main cause of the disease is impure air, and where you have these conditions, the tubercle bacillus thrives. Everybody, we must remember, inhales the tubercle bacillus, but it is only those people who have a lowered vitality either from inheritance or from social surroundings, who develop the disease."—*Madras Mail*, October 14th, 1910.

The practice of early singing in Girls causes Consumption.

Singing is a great practice in India and liked by many and usually practised among the dancing girls. But to go to a dancing girl's house and hear her singing is not a polished character. So parents have taken a liking to teach their innocent daughters the science of singing and the art of playing on fiddles, harmonium and veena. In all the civilised countries to know singing and music playing are accomplish-

ments to a thorough-bred girl, but practised only by grown up girls if the health permits. The medical opinion is that singing in young girls shatters the respiratory centres if early practised. I think for a father, who after heavy mental work returns home, the best place would be to go and hear singing and music playing where he ought to go, but instead of sitting comfortably on an easy chair with half a dozen comrades and calling his little daughters to sing and play before them is, in my opinion, a very bad practice. Those who give training of singing and music playing to their girls should consider the strength of the respiratory organs. The amount of exercise in the open air should be very necessarily considered. It is astonishing to see little children to have grasped the difficult art of singing and playing the Indian music when they are eight and ten years. Further, children that are undergoing training of music and singing ought to be practised when they are grown up and in places where there is plenty of ventilation.

CHAPTER VII.

The moral necessity of having Consumptive Hospitals and Sanatoria.

I think that I have sufficiently laid down what I have to say about tuberculosis, and I beg the public would take this as a golden opportunity and help the "Edward Memorial Fund," and have in Southern India more than half a dozen consumptive hospitals and sanatoria for the treatment of sufferers (the number of whom I believe will be very great). Remember, also, that our beloved Government have promised to double the amount. What a blessing to South India! To lose this opportunity is a great shame. I find that some men and papers are for technical and industrial institutions. A sanatoria and an hospital to treat all sorts of lung diseases are, I may call, the threshold to all institutions. The concentrated way of clogging men, women and children in the technical and industrial institutions, as I have pointed out before, are the causes of this dreadful disease to poor humanity. You rob mankind from the hands of nature and clog them in your institutions in hundreds and thousands, the poor lungs from morning till 6 in the evening, or even later, are in the midst of dust and obnoxious gases, their tissue undergoing decomposition and deterioration. What would have been the fate of the workers if not for the Factory Act introduced by the Government? As I have hinted before, modern civilisation and a thirst to have hundreds of such industrial and technical institutions in larger cities, which feed amply the shareholders at the cost of poor humanity, are the causes of shortness of life and cause all sorts of contagious diseases, thereby killing many valuable

lives. Therefore, every philanthropist and lover of the poor must help the Edward Memorial Fund. It is the duty of every Indian to collect money on behalf of our late beloved Emperor, whose memory we are to perpetuate in a permanent and fitting manner. Everyone knows that he loved India and her people. Hindus and a set of Christians are believers in the prayer of departed souls. I have seen that every Hindu while engaged in conversation, if the name of a Sidder (who are Hindu devotees) be mentioned, will stand at once with veneration, take off the shoes and look up to heaven, with folded hands, realising that the departed spirit of the devotee is surely before him. A Hindu is perfectly right in his belief. Now, our late beloved Emperor, who actually loved us, is in our midst, and it is the departed spirit of our beloved Emperor that has suggested to have hospitals and sanatoria to relieve the sufferers from the jaws of the dreadful disease. This movement is not only found in India, but also throughout the United Kingdom. In Wales there is a keen interest in the proposal to establish a national sanatoria as a national memorial to the late King. The death rate has increased in some parts owing to recent rapid development of coal fields and tin plate industry. Up to this moment, nearly half the £300,000 required for the Welsh National Memorial to the late King has already been raised. The Memorial is to take the form of a crusade against consumption.

Ayurvedic Medical Science.

There are people who may believe that such diseases can successfully be treated by the Indian *Vythiyans*. I do not like to argue the efficacy of the Ayurveda or the Unani Medical Science. But I beg to point out, with great regret—and that every one knows,—that the 2nd Princess, the sister of the Maharajah of Mysore and the beloved wife of Colonel Dasu Raja Urs, succumbed to this dreadful disease. Where were the Ayurveda Raja Vythiyans? Had there been a successful treatment by our Ayurvedic Physicians, surely they might have had the pleasure of being sent for by the State to exhibit their Raja Ayurvedic knowledge and heaven alone could mention the reward that they would have got from the State.

Unani Medical Science.

Every one knows that Hyderabad (Deccan) is one of the largest Mahomedan States in India, and the administration of the palace is of purely Oriental style. Did we not hear, with great regret . . . of Hyderabad had succumbed to this disease? What more do we want to know about the greatness of the Unani Medical Science? This, too, has not been able to wrench the Royal patient from succumbing to the disease. Unani has failed in the highest possible place.

People! Do not be sleepy and blind to the researches and efficient treatment of scientific men. You will be benefited, your wife and children also benefited, and your neighbour will be benefited. Let us have consumptive hospitals and sanatoria built in various places in Southern India as pointed out by Surgeon-General P. H. Benson, Surgeon-General with the Government of Madras.

Consumption to be treated with Food and Air and by Specialists alone.

In the Congress of the Royal Institute of Public Health, which was held on 20th July 1910, J. S. Lloyd, Chief Veterinary Inspector for the City of Sheffield, points out about the treatment of consumptive calves. "The open-air treatment of human consumptives has been proved to be of considerable benefit to patients, and its bracing qualities must unquestionably be of at least equal, if not greater, benefit to young animals, by building up healthy bodies and increasing the natural disease-resisting powers of healthy animals.

To give an idea of nursing a consumptive patient, I beg to give what is found in the nurses' Diary of Burroughs, Wellcome and Co., 1909-10, for the guidance of nurses:—

Phthisis.

The diet as to quality and quantity, and as to time, frequency and method of administration, must necessarily vary widely according to the stage of the disease and the condition of the appetite and of the digestion.

Allowed:—All soups, broths, meat essences and juices, perfected Wyeth Beef Juice; eggs, preferably raw; fish; poultry; game; meat, scraped, pounded, or minced, when necessary; all vegetables in moderate quantities; all fruits; milk koumiss, cream, tea, coffee, cocoa, chocolate; alkaline mineral waters; beer, wine, or spirit (as required for each case); 'Kepler' Malt Extract; 'Kepler' solution.

Forbidden:—Veal, pork, hard or salt meat, re-cooked foods, and pickles.

General Directions:—The method of feeding in phthisis is as important as the quantity and quality of the food. All food should be appetisingly cooked and daintily served, and its consumption encouraged, unless there is temporary indication of digestive disturbance. The greatest variation possible, even in the matter of serving milk, should be introduced.

(a) On waking, milk, hot or warm, gradually increasing in quantity till ten or twelve ounces are taken. It may contain a little sodium phosphate to help the bowels, or

sodium bicarbonate or sodium citrate to render it more easy of digestion.

- (b) If preferred, it may be given as a morning stimulant, a breakfast-cupful of tea made with milk instead of water.
- (c) Breakfast, one hour later, should be substantial, and is better taken in bed before washing and dressing.
- (d) One hour and a half after breakfast (so as not to spoil the appetite for luncheon), one raw egg, or two, if possible, broken into a glass and swallowed whole, with pepper and salt, or beaten up with a little milk; or raw meat, alone or in sandwich or Perfected Wyeth Beef Juice.
- (e) Mid-day, a substantial meal with (when indicated) beer, red wine, or spirit.
- (f) One hour and a half after luncheon, milk or raw eggs, or raw meat.
- (g) In the afternoon, tea made with milk, or milk, with raw eggs, raw meat, and abundant bread and butter.
- (h) At 7 or 7-30 a substantial meal.
- (i) At bedtime, milk, and if possible a raw egg in it, or with it.

NOTE.—The three substantial meals of the day may suitably be followed by a dose of "Kepler" Solution proportionate to the age and condition of the patient.

CHAPTER VIII.

The Expected Treatment In Consumptive Hospitals and In Sanatoria.

Suppose we imagine that everything went on well, and we have in Southern India hospitals and sanatoria here and there, then we shall find thorough up-to-date hospitals and sanatoria with half a dozen European specialists on lung diseases, with a dozen or more of special trained nurses, ministering to and caring for hundreds of Indian children whose body emaciated to skeleton (but their beautiful faces giving impression of greatness to teach and to help future humanity) by the dreadful disease having attacked the bowels of the innocent ones. Some may have imbibed the virus by the aid of a careless mother or a father, who may have given with their own hands containing the poison of tuberculosis in cow's milk. It is this ministering of the deadly poison, which was found in the milk of a consumptive cow, by the mother, who brought forth her loving pet a few months back at the cost of her own life that has haunted my imagination, and made me to write this about the disease. We will find that such children are weighed

and nourished by the skilful specialists and nurses and the children will be enabled to live. What a sad thing now to see your own beloved little ones who are in the jaws of the giant and consumed by the virus, and their poor delicate bodies, pining away to death day by day, by the dreadful scourge; and what a pleasure it will be to see that your dear ones whose death you expected every day are ministered to and cared for by the best of men and women in the hospital and sanatoria.

We shall also see beautiful boys, girls, young men and young women, some mothers with bright and glistening eyes with sharp crescent-like eyebrows and long piercing rays like eyelashes, undergoing special treatment. It looks awkward to describe the beauty of women, but the beauty described here is a symptom usually found and described in Medical books of tuberculous patients. In *Moore's Family Medicine*, mention is made of Sir W. Jenner's description of a tuberculous patient thus: "Thin skin, clear complexion, the surface veins distinct, eyes bright, pupils large, eyelashes long, hair silken, face oval and of bones small, shaft thin limbs straight." To outward appearance some of them will look as healthy as possible, but the disease, like a snake under grass, works on the system, slowly and steadily waiting for the moment; and when the vitality of the system lowers, then the destructive virus develops, the body is rapidly emaciated and the anxiety of the parents grows worse and medical treatment, both European and Native, is tried, and to the utter disappointment of the parents or husbands and wives, the patient grows worse and lastly the poor sufferers are no more in the world. Such patients will find comfort and pleasure both to themselves and to their guardians, and most delightfully and consciously realize benefit to themselves from the God-sent Institution, which will be a blessing for ever and bless the late beloved Emperor and the people and the Government that brought the Institutions to existence.

Young men who on account of a slight cough of a chronic nature and with a weak chest get horrified in imagination, that the disease had taken hold of them and after having been tossed up and down by the medical men for their inquisitive impatient queries regarding the imaginary disease which they had supposed themselves to be suffering from, would in a moment by submitting themselves to the specialists be convinced of their hypochondria (mental disease.) I may mention here that Eugen Sandow, the strongest and healthiest man in the world, says in his book on "Health and Strength" that at first when he was a lad he was threatened with being consumptive and that to fight the disease had steadily adhered to physical exercise and gradually developed his muscles and his chest. There is no doubt that in India such

hypochondriacs may be found among men and women, and we may presume that if mind's action were to affect the system, surely there would have been many a death owing to imaginary dread, and that if the graves where they are buried were to be given a mouth, the graveyards will sound the trumpet.

I may point out here as I have already explained that the disease is common in India among the wealthy and the middle class Natives and Eurasians and Mahomedans. I think young women in India suffer the most, owing to their delicate constitution and for want of out-door exercises and the habit of tight jacket wearing by Hindu woman and of corset and tight-lacing by Eurasian girls, which practices impede the lungs from expanding and helping the natural way of breathing and the diabolical practice of early marriage on account of which when the system is in a pure delicate state the poor girl who is under her teens undergoes the horrible ordeal of confinement. Oh ! what a nervous shock to the poor little girl. Grown up, educated, healthy and wealthy women dread the pangs of confinement ; but who is there to plead for these innocent girls, who by a compulsory system of early marriage, becoming mothers, when their limbs are weak, undergo a dreadful shock of nervous depression. The disease, in a latent state in the body, is thus easily developed as may be proved if one were to go to the "Women and Children's Hospital" in Madras, and enquire of the percentage of deaths in the hospital. What a horror ! Will not our benevolent Government or the social reformers take it into their hand to protect the innocent girls.

I may point out here also that young men who exercise conjugal rights when in their teens, are also subject to nervous depression by their abused marriage bed. If there is at all that anything saps the human constitution, it is, I believe, an early confinement in a girl and an abused marriage bed in young fellows.

Consumption is a disease which will be latent in the body for months and years and a good number of deaths are accountable to the above assigned causes.

Disinfection of Consumptive Houses.

This is very important to people that do not possess a house in towns for themselves, must be very careful in occupying old or rented houses. Some of the so-called haunted houses, in my opinion, are occupied by germs of contagious diseases. Perhaps 90% of such houses are under the influence of infectious disease germs and 10% perhaps under the influence of evil spirits.

It is very necessary to enquire of the neighbours before entering a house. The best way of disinfecting a tuberculous house is first to

burn off everything that are found in the house and then sprinkle well all over the place a good disinfectant *without rousing the dust*. Secondly, see that the disinfectant has been sprinkled evenly well, especially on the walls, corners, doors, windows, and bars of windows. Then the cleaners may be allowed to scrape off parts that are found necessary, *viz.*, the ground walls where discharges from the nose and lungs are usually spat. Doors, threshold of doors, windows, bars, etc. avoiding as much as possible the dust. Then sprinkle again the disinfectant all over the place and the house may be white-washed.

I beg to state that the greatest of charities to frail humanity is feeding the needy. If at all one thinks that he must feed the poor and appease his hunger, it is in consumption. Medicinal treatment is secondary. A dry dustless air and nourishing diet are the main treatments. No other disease the human frame is subjected to, demands so much fresh air and timely diet as consumption. These are the nature's medicine demanded by right. In this disease the Creator and the creature take part to effect a cure. Fresh air is God's and nutritious diet is man's. God does not require an application to be sent to despatch air. He is ever ready. But man wants hundreds and thousands of application and entreaties to stretch his hand of help to the poor wretch who suffers from a steady but a slow and ever-consuming consumption. Christ, there is no doubt, is divine. Nobody in this world ever taught that unless one makes self-sacrifices for the sake of others one cannot have salvation. He points out that no man in this world can boast of loving his father and his mother unless he fulfils the will of his heavenly father. What is the will of the heavenly Father ? Christ taught to the world that in the last days of judgment He shall appear and divide the wicked from the righteous, and thus He will address the righteous: "Come, my beloved sons and daughters and inherit and enjoy the bliss of Heaven, because ye have fed Me when I was hungry, clothed when I was naked, and consoled Me when I was in trouble." Then the righteous will answer: "My Lord, when didst thou come to us hungry, naked and in trouble." Then the Lord will answer: "Whatever thou had'st done for the poor, the needy, and the troubled, thou had'st done for me."



Choking

BY

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Veterinary Assistant, Central Provinces.

TRANSLATED FROM URDU.

Subject.—A filly, the property of Jagannath, was brought to the Veterinary Hospital for treatment showing the following symptoms:—

The neck was protruded and fixed, the mouth open and discharging a salivary mixture.

I came to the conclusion that the animal was suffering from choking. It was, however, necessary to locate the site of the obstruction; as no symptoms were visible on the cervicle region, it struck me that it might be situated in the Thoracic. In order to make certain, I decided to drench the animal with a mixture of oil and water; instructing the compounder to pour the mixture into the mouth, I placed myself on the left side in order to ascertain if the drench passed down beyond the pharynx; as it was, however, at once returned by the mouth, I came to the conclusion that the pharynx was stopped; moreover, some grass was returned with the mixture, leaving little doubt in mind as to where the obstruction was located. I at once fixed the balling iron in position and instructed the compounder to hold it in position; this being done I passed my hand as far back as possible, and by careful manipulation with the fingers succeeded in removing a ball made up of blades of grass, the size of an onion.

The animal made a speedy recovery, and is now in perfect health.



Dourine in a dog or Canine Syphilis,

BY

MR. S. M. ZAHURUDEEN,

Veterinary Assistant & Superintendent, Slaughter Houses, Burhanpur, C. P.

On the 3rd of September 1910, a black, English, aged dog belonging to Ashraf Ali, a Peerzada of Bahadarpur, was brought to the local dispensary for treatment.

History of the case.—The owner of the animal declared that the Patient was favourite with him. So he was taking a proper care of it. During the week under description the animal was more than ordinarily absent from home. The reason why he was so, will be clear enough from the following:—It would not be out of place if I show that the present season (Kunar and Katik) of the Indian year is the breeding time of all canine animals. It appears from the above fact that the absence of the dog was due to the insistence of his natural lust, so perhaps he came in contact with the spoiled country bitches. The owner says when the dog came back he was seen with drooped head and ears. Moreover he looked idle and sluggish so much so that he refused to take the diet. He was always licking the effected part, under such condition the owner took special care of it and did not allow it to go out. In course of 3 or 4 days in the same condition there appeared some pimples over the generative organs including perineum. For a few days these pimples had been considered quite ordinary and so the patient was under the course treatment of the jungli herbs. But during all this time the case was growing from bad to worse so much so that the tiny pimples took their shape in ulcers and the pus began to discharge. The organ came out of the sheath and was very much inflamed. The patient began to appear lame with his hind legs. On seeing such a condition the owner grew anxious and he brought the patient to me for treatment.

I examined the patient carefully and was of two opinions about those pimples. Either they are melanotic or syphilitic. The inflammation of the surrounding Lymphatic glands and vessels, the condition of ulcers, the discharge through them and the general appearance of the case distinguished it from the melanotic. I treated it accordingly in the following manner:—

• (Tincture Iodine) was painted on the inflamed portions.

Washing Solution:—

Hydrargyri Perchlorid, 1 to 1,000.

Ulcer dressing ointment:—

Unguentum Hydrargyri grs. 2 times in a day.

Medicine for internal use:—

Liquor Arsenicalis B. P. m. vii.

Potassi Iodide gr. v.

Potassi Chloras gr. ix.

Aqua Menth. Pip gr. iii.

To be taken 3 times in a day.

The owner was advised to keep the patient in a clear and well ventilated room and that to put a cradle round his neck in order to check the licking of the effected part. He was instructed to keep up the time of giving medicine and using them. The laxative diet was proposed by me. He was asked to bring the patient every now and then because we have no room for treating in-door patients in the dispensary.

The treatment continued for 25 days and the dog was cured. The said animal at present is quite well.

**Guinea-worm of a dog.**

BY

MR. N. R. KULKARNI,

Veterinary Graduate, Sholapur.

A black and white half bred fox terrier dog was admitted in this dispensary, as an out-patient on the 16th of July 1910, with a small swelling on the inside of the right thigh.

History and Symptoms.—The animal was lively two days previous to his admittance into the dispensary. The owner noticed that there was some swelling on the inside of the right thigh and sent the animal to the dispensary for treatment. The part was examined and found to be hot and soft. Hair was clipped and when the swelling was opened a sanguinous discharge came out. The wound was dressed with Boro-Iodoform. This wound healed in a week's time. On the third day the animal showed lameness in the left hind leg. The leg was examined and found that there was some pain in the fetlock joint. The part was rubbed with Belladonna liniment. This was continued for two days but instead of the pain being lessened it got increased and the part was greatly inflamed and lameness increased. On the sixth day from the beginning a small pustule was seen at a place about an inch from the fetlock.

Diagnosis.—The animal was secured and placed on the table. On careful examination of the part it was found that there was great pain and something hard and thready substance under the skin. I suspected it for a guinea-worm.

Treatment.—The hair being removed, the part was washed with salt water and boric lotion. The pustule was opened and reddish discharge came out. The swelling was gently pressed and the opening washed when a milky white speck was seen in the wound. Again the swelling was pressed with greater force and one of the extremities of the worm was seen protruding through the wound. The extremity was caught hold of and the worm was gently and slowly pulled out. The worm measured more than one ft. in length and about 1/12th of an inch in diameter. The part was washed with boric lotion and dusted with boric acid and bandaged.

On the fourth day of this operation the right foreleg got swollen at the fetlock and the animal was licking the part constantly on account of which the part was very red. Belladonna ointment was applied and

the part was bandaged. Out of curiosity and thinking that there may be another guinea-worm, I opened the swelling under antiseptic precaution at a spot about 2 inches above the fetlock where the part was very soft. The incision was enlarged towards the joint and the edges of the wounds held apart. When the incision was deepened and extremity of the worm seen at about 1 inch from the joint. The extremity was held and the worm pulled out. When it was about 1 ft. out, it gave way though it was gently pulled. This rupture must have been due to the resistance of the worm being coiled up round the bone. The part was squeezed and milky white discharge oozed out. The part was washed antiseptically. The wound was dressed with boric acid and bandaged as before. At the time when the first worm was removed, the dog was given much relief; but at the second time, this was not the case. There was some pain. For three succeeding days the part was pressed and discharged of the same sort came out. The wound was daily dressed as before. The dog was discharged cured on the 22nd day from the date of its admittance. After about three months the animal was examined but no signs of the worm were seen.

As a specimen, one of the worms had been sent to the Principal, Veterinary College, Bombay.

Severe laceration of a horse's tongue.

A roan C. B. entire was admitted into this dispensary as an outpatient on the 13th of April 1910.

History.—On the 13th of April 1910, about 4 o'clock early morning, the syce went to the horse for grooming it. As there was no bridle at hand the syce used a new rope nearly about $\frac{1}{4}$ of an inch in diameter as a bridle and knotted the two ends under the tail of the horse in order that the horse may not bite the syce. As the horse was not accustomed to this rope-bridle, it tried to remove it, upon which the syce tightened the knot under the jaw. This became very much inconvenient to the horse and it struggled more and more till the grooming was over when the syce removed the rope-bridle and went to his work. In the morning when the horse was to be harnessed the syce saw that the horse was uneasy and there had been much bleeding. The horse did not allow to open its mouth, so the animal was sent to the dispensary.

Symptoms.—Uneasiness, bleeding from the mouth and the tongue was hanging out of the mouth on the left side.

Diagnosis.—On hearing the history and looking at the symptoms, I thought that the tongue must have been partly cut. A twitch was applied, mouth was opened and the tongue examined and it was found

that it had been lacerated across the whole surface and about half of the organ was cut through.

Treatment.—It was decided that unless the organ was amputated there would be no cure. The animal was therefore cast and chloroform given and the tongue was washed with borax lotion and amputated with ecraseur. After the operation the mouth was washed with Pot. chloras lotion. Daily the mouth was washed with borax lotion. Rice congee was given. The case was discharged cured on the 1st of May 1910, that is on the 15th day from the admission.



Piroplasmosis in India.

BY

MAJOR F. S. H. BALDREY, F.R.C.V.S., D.V.H., C.V.D.

CAPTAIN PATTON in his Progress Note of the King Institute for the 9 months ending 31st December 1909, remarks that Bovine Piroplasmosis has not been seriously studied in India. He notes that Captain Christopher has observed two species of *piroplasma*, viz., *Bigeminum* and a species allied to *T. mutans*. The impression given is that no one has seen these forms before that. He also says that *P. bigeminum* is a very fatal infection.

The following remarks collated from various reports made by officers of the Veterinary Departments in India may throw some light upon the cryptic utterances of Captain Patton, and clearly show that Piroplasmosis has received a very considerable amount of attention.

Col. Hallen, Inspector-General, Civil Veterinary Department, described the clinical features of Hæmoglobinuria as far back as 1871.(1).

Col. Queripel (2) in 1896, '97, '98 and '99 urges the necessity for an enquiry into the presence of Tick Fever in India and precautions were taken for the prevention of tick infected animals being imported into India from Texas Fever Countries. The same officer wrote an extensive résumé of the subject in the Agricultural Ledger 1897(3).

Col. Gunn (4) describes fully the distribution of Tick Fever, the methods of prevention, treatment, etc., then adopted.

Col. Raymond (5) first drew attention to the fact of the presence of indigenous *Piroplasma* in Bovines in India in 1898 and furnished a report to the Bengal Government describing the parasite and its similarity to Texas Fever in Queensland and other places.

Krishnaswamiengar (6) describes the appearance of Hæmaturia in cattle and the native methods of treatment.

Col. Lingard (7) in 1903 describes the disease as being due to *P. bigeminum*. He states that it is communicable by subcutaneous inoculation, but not by giving large quantities of infected blood per os. The symptoms are usually less severe in young animals and that animals which have been young are subsequently immune for some years. This immunity is absent in the presence of intervening disease, which may be followed by a severe attack of Texas Fever.

may result. The presence of the protozoan could be demonstrated microscopically. It produces a powerful toxin in the blood which the author demonstrated by its action on small animals. Observations on ticks revealed the presence of the organism in the stomach cavity of these insects.

Jethaji, Superintendent, Civil Veterinary Department, C. P.(8) records the prevalence of Bilious Fever in horses and dogs in these provinces, but that the mortality is low.

The Report of the Inspector-General, Civil Veterinary Department for 1904-05, mentions tick plague, *Pyrosoma bigeminum*, as a common and probably severe disease amongst cattle.

Stockman (9) verifies the presence of *P. bigeminum* in cattle in 1902.

Olive Webb (10) compares horse sickness with Bilious Fever in India, and thinks that the ordinary Bilious Fever in which the *P. bigeminum* is demonstrable differs from the more acute form in which intestinal and pulmonary complications arise. This latter is due to a blood protozoan and no doubt relates to the *P. tropicus* described by Lingard, also mentioned by Williams and Pallin, and by myself in this article.

Lingard (11) comments upon the presence of *P. bigeminum* in cattle as well as a second form which was more virulent than the former.

Olive Webb (12) describes the disease as occurring amongst foxes in Hyderabad in 1905. Symptoms are described and the high rate of mortality noticed (100%). The disease was neither typical in symptoms or in bacteriology to malignant jaundice. There were hepatic symptoms and the parasites were ring forms, often showing a fine membrane joining two together. Parasites were in all cases difficult of demonstration and never seen after death. This coincides with the form known as *Tropicus* which is always difficult to demonstrate, and frequently not seen unless cases are examined frequently from the onset of the disease.

Lingard (13) has recorded that 50 per cent. of animals used in the laboratory at Muktesar show *Piroplasma* in one form or another. A similar report is made by the Inspector-General, C. V. D., in the year 1905-06.

Maxwell, Superintendent, C. V. D., U. P., (14) reports fatalities due to tick fever (*P. bigeminum*) during the year 1907.

The Annual Report of the Inspector-General, C. V. D., for 1907-08,

records the prevalence of Canine Piroplasmosis, its fatal nature amongst imported dogs and its comparative harmlessness to native animals. In the same report it is said of Cattle Red Water, that the disease causes severe loss, but that Indian cattle have acquired considerable immunity or tolerance, and carry the parasite for a long time showing little ill effects.

Pease and Gunn (15) give a résumé of the knowledge then known of this disease and Christopher's researches into the life-history of Canine Piroplasmosis through the tick, *Rhipicephalus Sanguineus*. Their description of the outbreak amongst the Madras Hunt Hounds is very full and traces the cause of the disease to infection produced by bites from the above named tick.

Baldrey (16) records cases of Piroplasmosis amongst cattle. It is of a mild type but occasions debility, and only loss when complications of other diseases arise. A like disease amongst horses and dogs is also mentioned.

Evans (17) has confirmed the diagnosis of *Piroplasma* in dogs and ponies by microscopical examination.

Oliver (18) comments upon the mortality produced by Red Water in Cattle and the difficulty a Superintendent experiences in investigating it.

Hewlett (19) reports an outbreak of Piroplasmosis at the Vaccine Depot at Belgaum.

Jolliffe (20) has written a detailed account of Equine Piroplasmosis in its various forms and complications. He remarks on the fact that this disease appears even when no ticks can be demonstrated as having bitten animals, and suggests the possibility of diptera being concerned in the dissemination. The presence of various *Piroplasma* forms in the blood of animals affected during the outbreak commented upon was demonstrated by Dr. Lingard and myself.

Baldrey (21) records cases of *Piroplasma canis* at the Punjab Veterinary College in 1905.

Gaiger (15) refers to this disease in Lahore in 1908.

Pallin (22) describes Biliary Fever in horses.

Baldrey and Mitchell (23) describe a method for the better diagnosis and examination of Piroplasmic infected blood in the fresh living state. This method stains the living organism and facilitates observations upon its development.

Williams (24) has noted the occurrence of Bilious Fever in horses in India and observes that it is more prevalent amongst Australian

horses. Arab and Country Breeds are rarely infected. The forms described by Pallin (22) are mentioned, and these consist of granular, and the circular form with a small red stained chromatic spot in the centre. The course and treatment are described and stress laid upon the complications of which pneumonia is the most formidable, as Jolliffe (20) also thinks. He concludes that one attack confers some immunity.

Rassie (25) considers that Equine Piroplasmosis may remain latent and is subject to recurrence, as in cattle. The exposure of animals to the fierce sun of the tropics is often a factor in the appearance of the disease, and its determination may depend upon intercurrent complications. The infection is widely distributed and is the cause of much of the unexplainable debility which occurs amongst animals exposed to the rigorous conditions of a campaign, etc.

Lingard (26) writes fully on Piroplasmosis in cattle at Bareilly. He states that the acquired resistance of bovines may disappear in the presence of some other malady. In the course of many examinations of blood the author found the following animals infected with spontaneous *Piroplasma*:—bovines, buffaloes, equines, elephants, camels, goats, sheep, dogs, cats, monkeys, deer, fowls, guinea-pigs and lizards.

A cycle is described in the mosquito and in the tick.

The same author (27) gives an account of the forms of *Piroplasma* affecting various animals; they are typical forms which he calls *Piroplasma tropicus*.

At the instance of the Inspector-General, C. V. D., ticks were collected and subsequently sent to Mr. Warburton of Cambridge for identification; in his pamphlet (28) on the subject he describes the varieties of ticks received and concludes that the commonest Indian cattle tick is the *Hyalomma Egyptium*; moreover, this tick is very ubiquitous and found frequently on horses, goats, camels and dogs in all parts of the country. He describes *Boophilus australis* as the Indian form of the Texas Fever Tick.

The following ticks are described, as being of economic importance:—

<i>Argas persicus</i> .	<i>Rhipicephalus hemaphysaloides</i> .
<i>Boophilus australis</i> .	<i>Hemaphysalis hispanosa</i> .
<i>Rhipicephalus sanguineus</i> .	<i>Hyalomma egyptium</i> .

Ware (32) mentions the prevalence of *Piroplasma* in C. P., and remarks upon its non-virulence except in the presence of intercurrent disease, and its increasing the mortality in rinderpest outbreaks.

Axe(33) writing in 1906 describes equine Bilirubin Fever in India and remarks that he has seen the protozoan as far back as 1894 in the blood of horses. He describes the chronic asthenia and anaemia resulting from the disease and the constant presence of the parasite (*Piroplasma*).

Remarks.—Outbreaks of an obscure form of *Piroplasma* have been somewhat numerous this year, 1910, amongst Cavalry and Artillery horses. The symptoms are not quite typical of Bilious Fever and approach more to those of an acute or chronic form of Influenza. I did not see any of these cases, but am much indebted to Captain Conder and Lieutenants Mellard and Rees-Mogg for specimens of blood smears sent by them from Mhow and Meerut. Examination of these films revealed forms of *Piroplasma*. The numbers were few and the blood did not show any material signs of change. There was some poikilocytosis, and a slight apparent excess in the number of eosinophiles. With regard to the numbers of parasites present, this cannot be considered of great moment as they vary so rapidly during the course of the disease, and it may have been that smears were made at a time when parasites were few. Some of the slides showed a fair number of organisms free in the plasma, but in no case did they appear sufficient to cause a severe infection. From this one would gather that the parasite is an extremely virulent one. It, therefore, resembles both in form and symptoms East Coast Fever. It will be seen that they simulate the form described by Lingard as the *P. tropicus*. Many show the central situation of the chromatin spot. Pear-shaped organisms in the corpuscle are rare but occasionally seen free in the plasma. The central situation of the chromatin spot coincides with the description given by Williams in the article above quoted. Simulate the marginal points of Theiler and accentuate the likeness of *P. tropicus* to East Coast Fever, and *anaplasma marginale* described by him. It is again a material point to note in connection with these outbreaks that the presence of ticks could not be demonstrated, and the question arises as to the possibility of a dipterous insect being responsible for the dissemination of *Piroplasma*.

Jolliffe(20) has already drawn attention to the fact, and Lingard (26) considered that *culicidae* were concerned in the sporogonic cycle of this protozoan. In some recent observations I have been making in connection with the dissemination of surra by the Tabanus, I have found bodies curiously resembling *Piroplasma*, which upon inoculation into guinea-pigs have reappeared in large numbers in the corpuscles and plasma of these animals.

They appear in from 15 to 25 days after the inoculation and persisted for some 10 to 12 days, during which time there was an irregular

temperature, occasionally rising 2 to 3 degrees above normal, but causing no other symptoms. The tabanus flies used in the above experiment had not been intentionally fed upon piroplasmic infected animals, but they were caught in the neighbourhood of this laboratory, and many of the serum making cattle frequently show piroplasma infection without any marked clinical symptoms. It is possible that a cycle occurred in the tabanus and that the guinea-pig is capable of being infected by this means without suffering from an acute form of the disease. All guinea-pigs which showed these *P.* forms, spontaneously recovered in the time already mentioned. Infection only took place in guinea-pigs which were inoculated with salivary gland contents of flies which had fed upon surra infected animals 5 to 8 days previously. I would not suggest that surra has anything to do with the appearance of the *Piroplasma*, but it is a significant fact that this happened. Neither can I state definitely that the *Piroplasma*-like bodies found in the salivary gland of the fly are identical with the protozoan found in the guinea-pig blood. Observation upon this coincidence will form the subject-matter of a separate paper.

From a very considerable experience of *Piroplasma* gained in this Laboratory amongst serum-making animals, it is found that the protozoan is widely distributed in cattle in at least two forms. It is in itself a comparatively harmless infection, and as Lingard and others have pointed out it is only when complicated with other diseases that it may cause fatalities. Young animals are attacked with it and usually suffer from a mild form, in fact, the younger they are the milder is the attack. By this I mean that calves before they are weaned possibly suffer the least inconvenience; when over 6 months they do frequently suffer from a severe or even fatal attack, if such an attack is the first. Older animals when attacked for the first time invariably have more or less severe symptoms.

Patton observes in his progress Note that 65 per cent. of all calves die of *Piroplasma*. It seems to me that this estimate is exceptionally high, and if such is the case we are rapidly approaching the time, when there will be no animals left in Southern India. This is undoubtedly a very serious state of affairs. From the remarks made by the many authors quoted in this article and from personal observations of some years, I think the *Piroplasma* in cattle in India is not a very pathogenic infection except when complicated with other diseases. It causes considerable anxiety in the Laboratory work at Muktesar and probably at the Vaccine Institute, but it is not nearly so formidable as the complication of foot and mouth disease, and fatalities are rare in the districts from

cases of *Piroplasma* alone. It would undoubtedly be an advantage to absolutely prevent or suppress *Piroplasma*, but this is not easily capable of accomplishment, and under the present conditions of acquiring immunity no great anxiety need be felt.

The result of the above-mentioned attack is protection, although the animal remains as a carrier, and the immunity may disappear in the presence of anything which causes a diminution in vitality. As the disease is so universal in cattle it seems impossible to adopt any means of prevention. The fact that young animals are almost certain to become infected, and thereby acquire an immunity indicates that the best of . . . all methods for lessening losses which the disease may cause, is by exposing such young animals to natural infection, as recommended by Berlitzer(31) in connection with Russian remounts. To absolutely prevent such an infection would mean the destruction of all ticks, but this would necessitate a very elaborate system of dipping, and the cleaning of all grazing areas. To accomplish this, with a Veterinary Department of about 19 district officers in the whole of India, would be quite impossible. There is doubtless a great economic loss in the condition of animals, injury to the hides, loss of wool in sheep, etc., etc., by ticks, and the diseases they induce, which points to the necessity for an increased Veterinary staff. Concerning this point I have already written in the *Agricultural Journal of India* (29), on the benefits to be derived from systematic dipping.

There is, moreover, another consideration which justifies the suggestion for endeavouring to produce immunization by facilitating natural infection in young animals.

Wild animals are carriers of the Piroplasmic infection, and it is impossible to legislate for the destruction of ticks upon them, so that they must always be a focus of infection. Domestic animals may remain carriers of the disease indefinitely, i.e., all Piroplasmoses with the exception of *P. parvum* are so carried. This again renders the absolute stamping out of the disease the more difficult and suggests early immunization as the most efficient preventive of loss.

Patton(30) has written on what he considers a new species of *Piroplasma* of the dog. Pease and Gunn have described an outbreak amongst Madras Hunt Hounds (15), and the one noted by Patton appears to be of the same nature as described by these authors in 1908. The characteristics of the new species, *P. gibsoni*, seem from Patton's description to be identical with the form in dogs described by Lingard and called by him *P. tropicus* (*Indian Medical Gazette*, refer No. 26). The plate in the Lingard's article shows the central position of the

chromatin in many of the corpuscles, and the description containing remarks as to the connecting bar between two dots, being similar to the thread described by Patton. The majority of the forms seen by Lingard were small ring forms and typical *P. canis* are not present in his description of the dog's blood. The small punctiform Piroplasmic bodies have, therefore, been observed long before Captain Patton has done so, and his adding another name to the list appears to be unnecessary. The term *P. tropicus* is well recognised in India and sufficiently describes the parasite of Patton. It is also the form most commonly seen in both Equines and Bovines in India. Why, therefore, multiply terms in a disease which is already sufficiently complicated?



An Organism Simulating Anthrax.

BY

MAJOR F. S. H. BALDREY, F.R.C.V.S., D.V.H., C.V.D.

The Superintendent, Civil Veterinary Department, Assam, forwarded in March last, skin from a pony supposed to have died of anthrax. No anthrax could be demonstrated, but in the course of investigation the organism herewith described was isolated.

Bacteriology.—A rod-shaped aerobic sporulating organism which compared with anthrax is as follows:—

ANTHRAX.	NEW ORGANISM.
<i>Length</i> —1·7 8·5 μ	... 1·7 5·95 μ
<i>Width</i> —0·85 1·27 μ	... 0·85 1·27 μ
<i>Ends</i> —Square	... Rounded.
<i>Capsule</i> —Present	... Absent.
<i>Culture agar</i> —Parallel and entangled	... Same.
<i>Motility</i> —Absent	... Present.
<i>Staining</i> —Gram positive, ordinary aniline dyes.	... Same.
<i>Spores</i> —On 7th day with many bacilli	... 7th day many spores, no bacilli.
<i>Broth cultures</i> —Thread-like growth, later slight dimness. No pellicle, only ring growth.	... Not thready, very cloudy and later on very thick. Pellicle after 48 hours.
<i>Broth glucose</i> —Clear growth	... Very turbid.
<i>Potato</i> —Slight whitish growth	... Thick wide growth.
<i>Agar surface</i> —Moist opaque wavy growth	... Same.
<i>Agar stab</i> —Top growth stab branching	... Same.
<i>Litmus milk</i> —Peptonised slight acid	... Same, but quicker.
<i>Ordinary milk</i> —Do. do.	... Do.
<i>Neutral broth</i> —Slight clear growth, no change.	... Dimness, no change.
<i>Smith tube</i> —No gas, clear	... No gas, dimness.
<i>Bile salt agar</i> —No growth	... Same.
<i>Litmus broth</i> —Slight growth, faint acid	... Good growth, slight acid.
<i>Gelatine</i> —Branching growth; slightly liquefied 5th day.	... Quickly liquefied.
<i>Litmus gelatine</i> —Do., slight acid	... Quickly liquefied, slight acid.
<i>Indol</i> —None	... Same.

Grown on the following media, reaction of new organism—

<i>Glycerine broth</i>	... Forms turbid, sediment in threads. A scum in 48 hours; clearer after 6 days, simulates mucus in 11 days.
<i>Horse serum</i>	... Slight dimness, sediment and later a scum.

<i>Glycerine agar</i>	... Opaque. Wavy growth.
<i>Glucose agar stab</i>	... Top growth and branching along stab; increases in later growth.
<i>Neutral red milk</i>	... Peptonised, deep red colour.
<i>Crystal violet</i>	... " slowly, colour changed to acid.
<i>Malachite green</i>	... " " colour faded.
<i>Neutral red broth</i>	... Slight dimness and sediment. No change in colour.

Pathology.—The organism is seldom sufficiently pathogenic to cause death by subcutaneous inoculation, but frequently induces a severe necrosis and a gangrenous condition at the seat of inoculation, which tends to spread and can be cured only with great difficulty by surgical and aseptic means. In some cases only a severe oedematous and inflammatory swelling or lymphangitis is induced, which is recovered from spontaneously.

Intraperitoneal inoculations in guinea-pigs, rats and rabbits produce death in 20—48 hours.

EXPERIMENTS.

Guinea-pig No. 498A, inoculated 23rd March, subcutaneously with 0·2 c.c., broth culture, 48 hours old, had developed a severe and extensive gangrenous patch at the seat of inoculation on the third day. It was destroyed on the fifth day, and the organisms recovered from the lesions.

Guinea-pig No. 508, inoculated 31st March, with 0·5 c.c., broth culture suffered from extensive swelling and abscess formation, subsequently burst and discharged foul smelling pus from which the organism was recovered. This case was allowed to run on and the lesions healed after 40 days, when the animal was discontinued.

Guinea-pig No. 510. Inoculated intraperitoneally 1·0 c.c., broth culture, 48 hours. Next day was off feed, had slight diarrhoea and swelling at seat of inoculation; died on third day. The microscope revealed the organism in the peritoneal fluid and was recovered by culture from the same as well as from heart blood.

Rabbits Nos. 612 and 617. Inoculated subcutaneously 0·5 c.c. broth culture, 48 hours. Severe swelling at seat of inoculation; abscesses did not form; gradually subsided; animals discontinued after 32 days.

Rat showed practically no symptoms, from the inoculation subcutaneously, beyond a slight swelling.

Rat No. 345. Inoculated intraperitoneally with 0.5 c.c. of broth culture, 24 hours old; died the same night. Pure culture from blood and peritoneal fluid. Organism found microscopically in blood and peritoneal fluid.

Bulls No. 3138 and 3154. Inoculated subcutaneously with 1 c.c. and 5 c.c. broth culture respectively; showed severe swelling and some indisposition for a few days and eventually recovered.

Bull No. 3162. Inoculated intraperitoneally with 5 c.c. of broth culture. Practically no symptoms beyond slight febrile reaction.

Bull No. 3155. Fed with broth culture. Off feed for 3 days, eventually recovered.

Camel No. 35. Inoculated subcutaneously with 5 c.c. of broth culture, 24 hours old. Swelling and inflammation, at seat of inoculation which disappeared after 48 hours.

Pony No. 155. Inoculated subcutaneously with 2 c.c. broth culture, 24 hours. Slight swelling and inflammation, which disappeared on the fourth day.

CONCLUSIONS.

The above described organism is interesting from the possibility that it is the cause of some of the gangrenous sloughing wounds that are so common amongst cattle. As a Laboratory experiment and from inoculations from culture its effects are very uncertain, but this cannot be compared with the organism as it probably exists in a state of nature. It would be of considerable benefit if material from chronic phagadenic ulcers could be obtained and further research made into the cause of such lesions.

Col. Raymond has described an organism causing similar lesions (*Journal of Tropical Veterinary Science*, Vol. V. No. 2, pp. 213-232), but it is evidently nothing to do with the organism under consideration. The organism is pathogenic and probably is one of the causes of chronic sloughing ulceration of the skin. That described by Col. Raymond produces an infectious lymphangitis, but culturally and morphologically has no likeness to the one under discussion.

EXTRACTS.

On Altered Types of Disease and Modern Ideas of Treatment

BY

E. WALLIS HOARE, F.R.C.V.S.

In the present day one hears the remark that certain diseases have altered in their characters. A little thought may enable one to decide whether there is a grain of truth in the suggestion or otherwise.

No doubt individuals who believe that every disease possesses a classical set of symptoms, the latter being as unalterable as the laws of the Medes and Persians, are hardly likely to enter into a discussion which may rudely shake their implicit faith, or lead them to accept unorthodox views. On the other hand, those who admit the possibility and probability of errors in diagnosis and who confess, how little they really know with reference to even commonplace diseases, will conclude that the subject is worth consideration.

The crucial point to decide with reference to altered types of diseases is whether such types were not always in existence, but were overlooked, or erroneously ascribed to other affections.

Take, for example, canine distemper. It is not uncommon to hear that the type of this disease has altered, the reason adduced being that cases showing the time-honoured classical symptoms of catarrh of the nasal passages and conjunctival are by no means so numerous as those occurring with an absence of these symptoms. A little reflection, however, will explain the matter, at any rate to a certain extent. A far greater number of cases of distemper are diagnosed in the present day, because practitioners have learned that a discharge from the eyes and nostrils of the affected animals is not an essential symptom. This being so, it follows that cases showing the catarrhal symptom mentioned will be fewer in number as compared with other types of the disease.

Much has been learned of late years with reference to the clinical aspect of distemper, and one result of this knowledge is that early isolation of cases is secured. Another is that cases are treated earlier, and thus exposure to cold and chills is prevented. A more rational line of treatment is also adopted, the heroic measures of former days being now abandoned.

It must be confessed, however, that some practitioners still hold antiquated notions with reference to distemper, the result being that many cases of the disease are overlooked and irrational treatment adopted. An unwise scepticism is inimical to progress, and he who does not regard a case as one of distemper until he observes the presence of what he regards as classical symptoms of the disease, is not doing his duty to the animal or his client.

A medical man once made the remark to me that "any fool can say that a case is one of distemper," to which I replied, "that it is a far bigger fool who dogmatically asserts that a case is not one of distemper at his first examination of the animal." Those who specialise in canine medicine have opportunities of observing cases which have been under treatment by other practitioners for various affections, but which prove without doubt to be cases of distemper that were not recognised.

Old customs and ideas die hard! The diagnosis of distemper, according to antiquated ideas, is a typical example. Another disease which is said by some to have altered in its type is strangles. So many cases are now observed which do not show the so-called typical submaxillary abscess, that even the most hardened sceptic in question of diagnosis is bound to admit the veracity of modern views on the subject. But it is not likely that the various types of strangles were always in existence, but were overlooked because practitioners depended on certain symptoms as essential to diagnosis. Observation amongst a number of cases of strangles occurring on a farm will clearly demonstrate the various types this disease may assume. Formerly those cases showing only symptoms of pharyngeal and nasal catarrh, were not regarded as suffering from strangles, they were often said to have escaped it. We now know that such cases are capable of infecting other horses with strangles, and this will account for the mysterious outbreaks of the disease in town stalls when a new horse has been purchased suffering from what is described as a simple cold.

One peculiarity I have observed with reference to strangles recently is that a horse may be affected with very severe pharyngitis, and after a tedious course apparently recovers. After this he develops a typical strangles abscess in the submaxillary region and the original symptoms reappear. The rapidity with which the submaxillary enlargement occurs is surprising.

Are these cases to be regarded as strangles from the first, or as cases of influenza with a secondary infection of strangles.

Probably considerable temerity will be necessary to dogmatically assert that a given case of nasal and pharyngeal catarrh is not one of

strangles in view of our present knowledge concerning the different types of the disease.

As an example of mistaking one of the types of a disease for a separate and distinct affection, we have the so-called scarlatina of the horse. Why it was ever termed scarlatina is a mystery, as it bears no resemblance to that disease in the human subject. A consideration of the clinical aspects of the disease and also of the suggestions put forward for its differential diagnosis, leads one to the conclusion that it is in reality one of the types of purpura hæmorrhagica.

Milk fever in cows would appear to show a greater number of mild cases than formerly, but one must take into consideration that in former times these mild cases were ascribed to other causes. Moreover, the practitioner is generally called in earlier in the present day and the owner does not adopt a treatment which is likely to convert a mild attack into a severe and fatal one.

The more intelligent management of animals, and the fact that professional assistance is called in earlier than formerly no doubt exerts an important influence on the type of various diseases as regards severity and also fatal results.

Certainly we do not meet with so many cases of pulmonary gangrene following pneumonia, or of hydrothorax, purpura hæmorrhagica, etc., as in former times.

Generally speaking, respiratory affections run a more favourable course in the present day, but it must be remembered that a more rational system of treatment plays an important part in this direction.

Polypharmacy and a deep-rooted belief in the virtues of drugs were much in evidence in the therapeutics of former days, and it might well be said that cases sometimes recovered in spite of the attentions of the practitioner.

Can it be said that in the present day this belief in the virtues of drugs does not exist? Judging by the enormous number of new drugs that are yearly put on the market, and by the fact that each of these receives testimonials with reference to the wonderful results obtained from their employment, one is led to believe that the natural powers of recovery do not in the minds of many receive their due amount of attention or respect. Evidently the chemists who advertise these new remedies far and wide, take it for granted that amongst the ranks of practitioners there are few who appreciate the remark of Benjamin Franklin:—"He is the best Doctor who knows the worthlessness of the most medicines."

The idea that because a certain agent is administered and the case recovers, the result should be attributed to the drug is a most unfortunate one for progressive medicine.

Before dogmatic assertions are made with reference to the therapeutic value of any agent, a long series of observations should be carried out and the result carefully compared with those obtained from the employment of other agents.

The success of the Schmidt treatment of milk fever was at one time attributed to the jodide of potassium which was injected, but as the employment of air gives as good if not better results we must doubt the therapeutical action of the iodide. When such simple treatment succeeds in a disease which formerly proved so fatal, who knows but what in the future simple measures will be discovered for other diseases that drugs are now believed to cure or more frequently fail to benefit.

The craze for drugs that seems inherent in mankind, has much to do with indiscriminate prescribing. If a practitioner, having the courage of his convictions, does not prescribe drugs for a case in which he knows they are unnecessary, it is the exception to find that the owner of the animal is satisfied. Medicines they will have, of distinctive colour and smell, and if their fancy in this direction is not pandered to by the practitioner, the prescribing and dispensing chemist and the patent medicine vendor adds another name to their list of customers.

No doubt, in the present day, when unnecessary medicines are prescribed they are of a harmless nature, meriting the appellation of *placebos*. But supposing the public were educated in the rational uses and in the abuses of drugs, what a difference it would make from a commercial point of view.

When professional advice is valued at so low a price, and drugs skilfully got up to please the eye and so highly prized, would not that very important book—the ledger—show remarkable changes in the way of abridgement of accounts?

Recently a former client called and announced in a stentorian voice that he wanted medicines and would not advise for a horse that was sick, a truly honest request but really typical of the desires of many in this direction. One would almost be tempted to say like Iago:

“Work on, my medicine work,
Thus credulous fools are caught.”

But the implicit belief in drugs exist in some professional minds as well as in the minds of a credulous public. The self-satisfied egotistical individual who blindly imagines that he is infallible with regard to diagnosis, believes also that he controls the issue of life and death by means of his drenches and powders. But *mirabile dictu* the pharmacopea is not sufficient for the needs of some, they must fain resort to

preparations concocted by wholesale chemists, the formulæ of which are trade secrets.

Judging by the testimonials given as to the efficacy of these trade preparations and by the extent to which they are advertised, one must believe that they are largely used. Never before was the output of literature by chemists so extensive as at present. One has now but to name the disease and the remedy is suggested. The idea seems to be that the practitioner should adopt a sort of “penny in the slot” system in the treatment of diseases.

It is fortunate that a spirit of scepticism still exists amongst a certain number of practitioners. Otherwise we should degenerate into a species of automata, believing all we hear and read ignoring the *vis medicalatrix naturæ* and living in a fool's paradise, we should blindly accept as gospel the dogmas of credulous enthusiasts, whose faith in the virtues of drugs is only exceeded by their egotistical imagination of their own superior skill and knowledge.

No wonder that the pendulum is now commencing to swing in the other direction, and the time-honoured Epsom Salt with the assistance of Dr. Green, Dr. Nature and Dr. Time are regarded as the most important attributes in therapeutics.



A Modification of the Technique of Chloroform Administration.

Charmoy (*Recueil d'Alfort*) describes a method of chloroforming small animals which is analogous to that employed in humane surgery by Dr. Klapp. It consists of withdrawing a portion of the blood from the action of the chloroform by means of elastic ligatures placed at the roots of the anterior and posterior limbs, and tightened so as to occlude the circulation. Loss of consciousness is then more easy and takes place earlier while recovery is more rapid for the blood which has been imprisoned by the ligatures and shut out from the action of the chloroform, dilutes and purifies that which has undergone the influence of the drug as soon as it is allowed to re-enter the circulation. It is also charged with carbonic acid which excites the bulbar respiratory centre, and finally, in the case of syncope it is said to form "a veritable transfusion of blood." This method is very advantageous and presents few inconveniences. The double radial paralysis resulting from the constrictions of the fore limbs disappears very rapidly, and may have a favourable action in certain cases by preventing the patient from moving for some time.

(I believe that some surgeons who have practised Klapp's method upon human patients pronounce it by no means free from danger)

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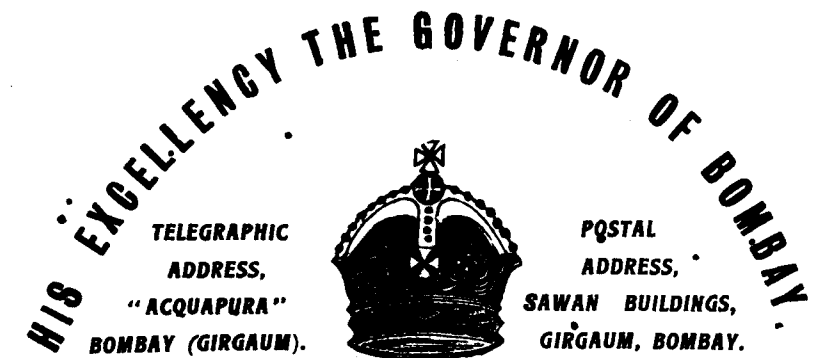
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EDITORIAL.



It is difficult to understand why our old friends and readers in the Panjab and United Provinces have deserted us in the matter of sending in original articles; one year ago practically every article was sent in by graduates serving in these provinces; while in the issue just published there is only one. I regret this very much, as articles had shown such a great improvement that it looked as if men were anxious to improve their knowledge by interchange of ideas derived from the study of cases they had seen. I know of three cases where men who wrote good articles brought themselves right to the front rank. As I have often before said, a man does such a lot for himself by writing and by doing so he keeps himself in touch with the very latest methods; besides this, his name is ever before the public, and that means he is selected for promotion before those who keep themselves in the dark and away from the mind of their superiors. I hope that after this readers will make an effort and send in all interesting cases which they may come across. It helps themselves and also their professional brethren. Photographs attached to cases are always acceptable, as is also any news relating to the profession; such as promotions, fresh appointments, &c.

A CASE OF PIROPLASMOSIS EQUI. Recovery after treatment with "Trypanblau"

BY

CAPTAIN W. O. DAWSON, A.V.D.,
Editor, "Indian Veterinary Journal."

Subject.—A bay English racing mare—In training with Mr. Thomas, Bangalore.

This mare was taken out of the train, on her way from Calcutta to Bangalore, in a very precarious condition. The symptoms shown at the time were described as follows:—

High fever, 105.5 F. Staring coat and very difficult breathing. Visible mucous membranes inflamed, showing ecchymosed spots; but not yellow.

The animal was at first treated by a native Veterinary Surgeon, in private practice, who diagnosed the case as double pneumonia. The treatment consisted of the application of strong linament to the sides, and the administration of the usual treatment for that disease. For three days there was no improvement and a wire was sent to Mr. Thomas, who replied asking that I might be called in.

On first seeing the animal I was convinced that the diagnosis was correct and that the animal was suffering from ordinary pneumonia and pleurisy. On minute examination, I found the lungs to be congested and, with the exception of one small area, there was no hepatization. The pulse was small, soft, and increased, the heat being 65 to 75 per minute; respirations 35 and distressed to a great degree. The temperature was 106.2°; there were pleuritic symptoms due, no doubt, to the strong linament which had been rubbed in and removed the hair in patches. The faeces were a little hard, but practically normal; urine fairly high coloured. Taking these symptoms into consideration, I was, I must admit, puzzled. I then took six blood smears for examination and continued the treatment for pneumonia and high fever. The following drench was given at once:—

Liq. ammon. acet.	℥ i.
Sp. æther nit.	℥ ii.
Tinct. aconite (B.P.)	min. xx.
Aqua.	Oi.

This to be repeated in four hours.

The parts affected by the linament were washed with warm water and soap, well dried and "mustard soaked" brown paper, applied over fine linen, was allowed to remain on the sides for twenty-five minutes and then removed. In the meanwhile I stained and examined the slides, and found piroplasma to be present in all slides; the average being 4.5 for six slides; the corpuscles seemed crenated, but this was probably due to the defective drying of the slides. Leucocytosis was very marked. The mare being a very valuable animal (probably worth 15 to 20,000 Rupees) it will be understood that I was very undecided as to what I ought to do. As most readers know the Trypanblau treatment has been very little used in the horse and even then its usefulness has been doubted. I, therefore, decided to continue the usual treatment for fever, with the exception that I gave Quinine Hydro Bromide ℥i with Calomel grs. xxx twice daily in bolus. The same evening the temperature was, 107. So I sponged the entire body with vinegar and cold water, dried well, and had a warm rug put on, an hour after this the temperature dropped to 104.2. During the night the mare ate a little oats, lucerne and carrots. The blood was again examined and found to be in practically the same condition, showing that, up to this point, the Quinine and Calomel had no action on the parasites, although 6 drachms of Quinine and 1½ drachms of Calomel had been given in all. I then decided to try "Trypanblau," and after procuring a 2% solution, I injected 20 c.c. into the left jugular vein; my reason for using the vein was on account of fear of abscess formation, if injected sub-cutem. The animal was left food, lucerne, grass and water and kept quiet, a syce always being near at hand. Next morning the temperature had dropped to 103.2 and breathing had become more natural; the pulse was weak, soft, and beats were 48. No sign of colouring of the visible mucous membranes by the dye were noticed. As the heart was inclined to be weak, Strychnine Sulph. 1 gr. and Digitalin 1 gr. were injected subcutaneously; a ball containing Ammon. Carb. ℥ii was also given. The microscopic examination showed an average of 2 parasites in 6 slides examined. 40 c.c. of a 2% solution of Trypanblau was again injected, this time sub-cut., 20 c.c. on either side of the neck, the hair being well singed with a spirit lamp and every possible antiseptic precaution taken. Another dose of the original fever mixture was given and the animal left quiet.

Next day the mare seemed very much improved, breathing being

only very slightly accelerated, pulse stronger and 43 beats. Temperature 101.2. Microscopic examination showed 8 slides to be negative. There was slight swelling at the seat of inoculation, but no heat, or other inflammatory symptoms, were present. 10. C.C. was again injected sub-cut. on either side, and at a fair distance from the previous inoculation, the space being left in case abscesses should form and coalesce. From this time onwards the daily examination of the blood gave negative results. The membranes became dyed blue, black in colour after the second inoculation and remained so until the mare left for Bangalore, which she did on the 14th day after I had first seen her.

I heard from Mr. Thomas some time later, that the mare had continued to improve and showed no further signs of fever; he promised to let me know if another attack came on, but I am informed that the animal has since been in hard training and showing no signs of disease.

Conclusions.—The result of the administration of Trypanblau in this case was satisfactory, still it would be a very brave man who would draw conclusions from this one case, or who would claim for the drug the right to be called the "curative agent." It would have to be substantiated with several cases. One point, however, is interesting, viz., that although fairly large doses of Trypanblau were injected subcutem, no signs whatever of abscess resulted. There is no reference literature to hand on the treatment of "Piroplasmosis Equi" by this drug. Pallin and others claim to have cured the disease with Quinine and febrifuge medicines. I, in my experience, have had no success with Quinine. Calomel, I have found beneficial for a time; but the parasites invariably reappeared in the blood.

The case shows certain peculiarities from others I have seen in Rajputana and Lahore. The visible mucous membranes never showed the "dirty yellow colour" usually seen, but were injected and showed clear ecchymosed spots. The animal was never really constipated and no alterative medicine was necessary during the treatment of the case. The urine was high coloured, but never reached that extent described by writers on the subject. The limbs were never swollen, probably due to the fact that they were always well hand-rubbed and bandaged. There can be no doubt that the splendid constitution of this animal helped to a great extent in saving her life; although she lost condition rapidly during the stages of high

and continuous fever, she quickly picked up again, as soon as the temperature dropped. I think this treatment worthy of further trial, especially in large hospitals and colleges, where every antiseptic condition can be readily adhered to.

In practically every case in the dog, the drug is reported to cause abscess formation; it will, therefore, be very interesting to hear the experience of others regarding its merits in the treatment of the disease in the horse, and also as to whether it causes abscess formation or not in that animal. I would have tried to infect another animal with the blood from this case, but at the time a cheap animal could not be procured, and the animal being such a valuable one, I could not delay treatment. The animal had only arrived recently from England and was said to have been kept in a stable quite free from ticks and always perfectly groomed; it is, however, possible that the infected ticks had remained on board the ship from the time it had last carried Australian horses. It has not yet been proved whether the tick or its progeny or other vermin, carry the disease, but there can be no doubt as regards it being carried by one of the blood sucking insects.



Fowl Cholera (Pasteurellosis.)

BY

COLONEL F. RAYMOND, F.R.C.V.S., ETC.

(From the Research Laboratory of the Bengal Veterinary College, Calcutta.)

The object of this paper is to demonstrate that Fowl Cholera exists in Bengal ; to reproduce in a series of pictures the normal course of the disease in poultry and rabbits so that anyone can recognize it ; and to tender some practical advice in regard to prevention and management of outbreaks in this Province.

"Fowl Cholera" (it will be seen that the disease might just as suitably be called "Sleeping Sickness") is the name given to an infectious disease which attacks all birds kept in confinement, and rabbits ; it belongs to the group of Hæmorrhagic Septicæmia and the sub-group of Pasteurella according to the classification advocated by Ligniere, Nocard and Leclainche. The disease has acquired its name through one of its symptoms, and because severe epidemics of human "Asiatic" Cholera have coincided on several occasions with equally virulent epizootics of Fowl Cholera in poultry, thus giving rise to the erroneous idea that they are the same disease. To those who specialise in the diseases of the lower animals in India, no bacteria can be more interesting than the Pasteurella ; this is due to the number of diseases which they cause and to the biology of the microbes. The Pasteurella group has the following general characteristics :—The bacteria measures about 1 micron in length and 0.5 micron in breadth, take an ovoid, spherical or dumb-bell shape and stain, when in the ovoid form, very often at the poles only ; they take the ordinary dyes but not Gram ; they grow in the ordinary media but not on potato ; they do not liquefy gelatine ; they are nonmotile, and do not coagulate milk. They lead a facultative existence and live as saprophytes in the soil. They have been found (by other observers) in the intestines and other parts of healthy animals as apparently harmless guests. The virulence of Pasteurella varies ; it is liable to increase by passage from one individual to another ; and it may diminish and be destroyed from such causes as exposure to the sun and air. In this way a class of epizootics is created which may range from very obscure and chronic diseases to the acute and sur-acute forms of such maladies as Fowl Cholera, Bubonic Plague, Barbore, Rabbit Septicæmia and others.

Of Fowl Cholera in India little has been recorded and that little has been very vague. In Jessore in 1817 and in Madras in 1828 epizootics of the disease are said to have occurred ; Colonel H. Pease has informed me that Fowl Cholera was reported to him in the Punjab ; some years ago I heard of a mortality in a poultry yard in Behar which might have been due to Fowl Cholera ; later, an equally indefinite report reached me from Calcutta. It is, however, not very safe to attach importance to vague reports about Fowl Cholera because there are other virulent infectious diseases of poultry which have come to notice in recent years which might possibly be mistaken for this disease.

On the 26th October 1909, Major W. D. Sutherland, M.D., I.M.S., the specialist in blood stains, asked me to look at some fowls kept by him for experimental purposes, which were the victims of a serious mortality. The disease was Fowl Cholera. He was kind enough to give me the bodies of two fowls which had just died (A and B) and two living fowls (C and D) which were very ill. My thanks are due to Major W. D. Sutherland for his present.

The *post-mortems* of A and B were as follows :—

Fowl A.—*External appearances.*—The face was swollen owing to œdema and there was conjunctivitis. The comb and the wattles were purple. The skin was congested, especially about the legs, the feathers were much roughened, and soiled with faecal matter. In the thorax, the blood was found to be semi-coagulated ; the lungs were inflamed ; the pleura was the seat of fibrinous inflammation and adhesions ; the pericardial sac contained a considerable amount of serosity which gelatinised as soon as it was exposed to the air. The myocardium was congested, contained some clotted blood ; the coronary vessels were engorged. The larynx, pharynx and trachea were rather thickly coated with mucus, but otherwise normal. The crop contained food and was normal ; the gizzard was inflamed ; the intestines were inflamed and marked with petechiæ ; there was ecchymosis in the peritoneum and mesentery. The proventriculus was marked with hæmorrhagic spots and the glands were swollen. The cloaca was slightly congested. The liver was in a state of cloudy swelling ; the spleen slightly enlarged, but free from ecchymosis ; both the kidneys were hyperæmic. The generative organs were normal. Microscopic examination of the blood of all the organs revealed bipolar staining ovoid bacteria in swarms.

Fowl B.—The external appearance of this bird was the same as those of Fowl A, already described. The same remark applies to the general appearance of the internal organs with the following exceptions: the pleura was ecchymosed, but not adherent; the larynx and pharynx were spotted with hæmorrhages. The duodenum was highly inflamed, the rest of the intestines less so. The rectum and cloaca were inflamed and marked with petechial spots. The blood, especially of the liver, contained swarms of ovoid bipolar staining bacteria.

Fowl C.—*Symptoms.*—The bird was in a sleepy condition from which it was not easily roused; when undisturbed, it curled its head under its wing and went to sleep; from time to time it roused itself, shook its head, moved its jaws, and slept again. The face in the region of the eyes was swollen and there was conjunctivitis with a whitish discharge. The bird could not stand for long and generally squatted on its hocks; this seemed to be partially due to sleepiness, but also to weakness and to pain in its feet. The feathers were very rough, the wings limp and drooping; the tail depressed. No excessive diarrhoea was noticed, but the faeces were loose and partly white. The fowl was sacrificed in a dying condition. The *post mortem* examination gave results which were in no way different from those already described in the cases of A and B. Microscopical examination of the blood from the different organs showed very large numbers of ovoid bipolar staining bacteria.

Fowl D.—This bird was received with A, B and C and was in a comatose condition. It presented the same clinical symptoms in every respect as Fowl C, except that, besides whitish discharge from the eyes, large cream-cheese-like deposits were found under both eye-lids and in the orbits. The fowl was killed in a dying condition. The *post-mortem* lesions were the same as those described in the case of the other fowls. Microscopical examination of the blood and also of the caseous deposit showed swarms of ovoid bipolar staining bacteria.

With the object of obtaining a series of pictures of the disease from its very onset, 2.5 c.c. of Fowl Cholera blood were diluted with 3 c.c. of physiological salt solution and injected at 2 P.M. on 26th October under the skin of a healthy fowl. At 9 A.M. on 27th October this bird's temperature was 108°F.; it was dull but not sleepy; there was no diarrhoea. At about 9.5 A.M. on 27th October,

it rolled over suddenly and died. This case represents the suracute form of the disease. The blood swarmed with bipolar staining ovoid bacilli. When a smaller quantity of blood (a few drops) after being mixed with a little physiological salt solution was injected under the skin of a bird, all the usual symptoms of the disease were reproduced and ran their course in two days. Thus, a fowl received on the 27th November at 2 P.M. under the skin 0.5 c.c. of blood from a bird that had died of the disease. The next morning he was found squatting on his hocks, unable to rise, very sleepy, the feathers were very rough, head drooping, eyes closed; there was some diarrhoea mostly white in colour, some trembling of the body and spasmodic contractions of the muscles of the legs. The stupor gradually increased and he finally rolled over and died in coma at 12 noon on the 29th November. The temperature curve was as follows:—Before injection on 27th November, temperature 104°F. Injected 2 P.M., evening temperature 105°F. 28th November morning, 107.2°F. Evening temperature 108°F. 29th November, morning, 102.4°F. At 12 noon, the time of death, 98°F. The *post-mortem* lesions were similar to those described in the original case of Fowl C. The blood swarmed with bipolar staining ovoid bacilli. This represents an ordinary acute case of the disease; the symptoms might justify the name of "Sleeping Sickness" being applied to it. It may be added that the same symptoms and course can be reproduced in the same way with any of the fluid or discharges from an acute case.

CULTURE EXPERIMENTS.

Some experiments were carried out with pure sub-cultures of the bacillus grown from the blood of birds that had succumbed to the disease. An emulsion was made by adding 5 c.c. of sterile water to a 3 days' growth on agar, and 2.5 c.c. were injected into the pectoral muscle of a large healthy fowl, whose temperature was 104.3°F. at the time of injection, at 1 P.M. on the 24th November. The temperature in the evening was 105°F.; the following morning the temperature was 104.4°F., and the bird was rather dull; there was also a certain amount of white diarrhoea with slight blood markings. That evening the temperature rose to 106°F. and the fowl was very sleepy. His temperature at 9 A.M. on the 26th, just before death, fell to 98°F., and he was comatose. The *post-mortem* lesions were the same as those generally seen in the original disease. The blood swarmed with bacilli. An emulsion was made by adding

5 c.c. of sterile water to a 48 hours' growth on agar, and 0.5 c.c. of the emulsion was injected under the skin of a large fowl at 2 P.M. on the 2nd December; the temperature of the bird was then 104° F. At 3 P.M. the temperature had risen to 107° F., but no other symptoms were noticeable. At 8 A.M. on the 3rd December the temperature was 106.3° F., and the fowl was dull, squatting in a corner of the cage; he remained in this condition throughout the day, the evening temperature had risen to 109.4° F., and the sleepiness was marked; the feathers very rough and the wings drooping, the eyes were swollen; white diarrhoea was present, and the crest and wattles were cyanosed. At 8 A.M. on the 5th, the temperature was 105.2° F., and he was more or less comatose. At 12 noon he rolled over and was quite comatose; the evening temperature was 100.1° F. He died in the night. The *post-mortem* lesions were the same as in the original cases. The blood swarmed with bacilli.

FEEDING EXPERIMENTS.

In order to study, if possible, the chronic form of the disease and other matters, healthy birds were isolated in large properly disinfected cages, and were fed once on chopped-up raw meat of birds that had died of Fowl Cholera; the results are rather interesting because they show that when the fowls are placed in apparently favourable circumstances for developing the disease rapidly, the clinical symptoms may take some time to appear. Nocard and Leclainche recommend a quarantine of 4 days for new purchases, but my results seem to show that, that period is not enough in this country.

No. I. Fed on 28th October 1909 with meat containing many of the bacilli of Fowl Cholera. The bird exhibited no clinical symptoms until the 13th November 1909; after that date the following were noticed:—Dullness, loss of appetite, then whitish diarrhoea and stupor. The bird remained in a recumbent position, and died in coma on the 18th November 1909.

Post-mortem.—The alimentary canal was the main seat of morbid changes. The intestinal mucous membrane showed patches of ecchymosis, extensive congestion, exudation and thickening. The duodenal folds presented epithelial degeneration and desquamation. The pericardium and endocardium were marked with petechiæ. The lungs were hyperæmic, and the liver, spleen and kidneys were

enlarged, congested and soft. A few coccoid forms were found on slides prepared with the blood of the heart.

No. II. Fed on 28th October with meat containing many bacteria of Fowl Cholera.

The first symptoms were seen on the 26th November (30th day), when the bird was found to be dull and the temperature 108.2° F. On the 27th November diarrhoea began and persisted to the end. On the 36th day he was very sleepy; on the 37th day he was comatose, and on the 5th December (39th day) he died in coma.

Post-mortem.—The pathological lesions were confined to the gastric and intestinal mucous membranes which were thickened and marked with hæmorrhagic spots. The contents of the organs were semi-fluid and mixed with blood. The duodenal folds were highly inflamed. One or two doubtful specimens of diplobacilli were seen in the heart's blood.

No. III. Fed on the 3rd November 1909 with meat containing many bacilli.

The bird showed no symptoms until the 13th November 1909, when the temperature reached 107° F.; the fowl was then dull with ruffled feathers and loss of appetite. Between 13th and 17th the symptoms became worse; there was diarrhoea, sleepiness, and loss of power in the legs. From being very sleepy the fowl passed into stupor and then coma, and so died on the morning of the 19th.

Post-mortem.—The most striking lesions were found in the intestinal tract which was the seat of general congestion of the hæmorrhagic septicæmic type, varying from petechial spots to patches of ecchymosis. There was also thickening of the mucous membrane and erosion of epithelium in various places. One or two doubtful cocci were found on slides made from the heart's blood.

No. IV. Fed on the 10th November 1909 with part of a dead fowl containing many bacteria.

The first symptoms appeared on the 17th day after feeding (26th of November), when the fowl was found to be dull. On the 19th day white albuminous stools set in and persisted to the end.

On the 20th day drowsiness began and on the 21st day there was semi-coma. On the 24th day it was comatose and died on 5th December 1909 (the 26th day after being infected) ; before death its temperature fell to 96.2° F.

Post-mortem.—The intestinal mucous membrane was inflamed and there was whitish discharge in the eyes. The other morbid changes were similar to those of general septicæmia. Numerous bipolar staining, coccoid, and diplococcoid forms of the bacillus of Fowl Cholera were seen in the heart's blood.

No. V. Fed on the 10th November 1909 on meat containing many bacteria of Fowl Cholera.

The first symptoms appeared on the 14th December with diarrhœa followed by general dullness ; the comb and wattles were cyanosed. Then symptoms of stupor and coma set in, and became more and more pronounced until the death of the bird on the 19th December.

Post-mortem.—The body was emaciated ; there was fibrinous pericarditis ; pneumonia and pleurisy with adhesions were also present ; the liver was enlarged and friable ; the intestines were inflamed and denuded of epithelium in parts. Two or three polar-staining bacilli were seen in slides made from the blood of the heart.

No. VI. Fed on the 19th November with meat containing many bacteria of Fowl Cholera, and showed the first clinical symptoms on the 18th day after feeding, when white albuminous diarrhœa was noticed. It died in coma on the 10th December 1909 (22nd day).

Post-mortem.—The same lesions as those found in original birds ; but they were chiefly confined to the intestines. The heart's blood appeared to be free from bacilli.

No. VII. Fed on the 19th November 1909 with meat containing many bacteria of Fowl Cholera.

The bird appeared to be healthy until 14th December, when it was seen to be dull and sleepy ; there was passage of semi-liquid fæces. These symptoms became more pronounced as the disease progressed : whitish fluid was seen passing from the beak and

nostrils ; a caseous mass developed in orbits (as found in original case D). The fowl died in a comatose state on the 16th December 1909, 27 days after being fed.

Post-mortem.—The feathers were rough and soiled with fæces. The face had a swollen appearance due to a cream-cheese-like deposit in the orbit. The heart was anæmic and pale. The lungs adhered to the wall of the chest. The liver was slightly enlarged. The intestines were inflamed in patches, the mucous membrane being ulcerated in parts ; the cloaca was inflamed. The brain was pale and anæmic.

One or two coccoid bacteria were seen on the slides mounted from the heart's blood.

No. VIII. Fed on the 19th November 1909 with meat containing many bacilli of Fowl Cholera.

The first clinical symptoms appeared on the 25th November, when the bird was very sleepy with diarrhœa and discharge from the nostril and beak. It died on the 26th November comatose.

Post-mortem.—The chief lesions were confined to the lungs, the pleura and the intestines. The lungs were congested and the pleura was marked with hæmorrhagic spots. The intestines were inflamed, especially the duodenum—its mucous membrane was thickened. The heart, kidneys, spleen and liver were congested to a certain extent. The heart's blood was apparently free from bacteria.

No. IX. Fed on the 2nd January with part of a pigeon containing many polar-staining bacilli. The temperature continued to rise from 106° to 109.3° F. on the evening of the 4th January. On the morning of the 5th, the bird was sleepy with a drooping comb and albuminous diarrhœa, ruffled feathers, and so on ; on the same evening the temperature came down 106.2° F., and the bird died in the night.

Post-mortem.—The lesions were those of general septicæmia. The intestines were uniformly inflamed. The heart's blood showed a large number of cocci and diplococci forms, but no polar-staining bacilli.

No. X. Fed on the 2nd January 1910 with part of a pigeon containing many bipolar-staining bacilli.

No symptoms appeared until 6th January (morning), when the temperature was 108.1°F ., the feathers were ruffled and there was slight looseness of the bowels which changed to diarrhoea on 11th January. Between 14th and 16th January, the temperature rose to 109°F ., the bird was very sleepy, mucous rales were audible, the comb and wattles were becoming purple, the wings drooping, the head was carried under a wing; there was thirst, and refusal of food. On the 17th the bird was comatose and considerable dyspnoea was observed. On the 18th the temperature fell to 100.1° , the stools were mixed with mucus, the comb purple; dyspnoea was pronounced. The symptoms persisted throughout the 19th January with a temperature which fell from 93.4° to 91.2°F ., death took place in the night.

Post-mortem.—The body was emaciated. Heart congested. Blood half-coagulated and dark. Pericardium contained serous fluid. Lungs, slightly congested. Liver, slightly enlarged. Spleen, normal. Pancreas, normal. Gizzard, normal. Intestines, congested in patches. Kidneys, normal. The blood of the heart was apparently free from bacteria.

No. XI. Fed on the 2nd January with part of a pigeon containing many polar-staining bacilli of Fowl Cholera.

On the evening of 4th January the temperature rose to 108.3°F . There was watery diarrhoea, dullness and some roughness of the feathers, the top of the comb drooping. On the 7th January the temperature was 109°F ., the bird was very sleepy; the feathers were more ruffled; the same symptoms continued up to 10th January, the stools being quite watery. On the 11th, fowl refused all food, and on the 12th, symptoms of dyspnoea were noticed. By the 15th January the bird was quite comatose and so died on the 16th morning, the temperature being 92.4°F .

Post-mortem.—The body was emaciated, the comb cyanosed. Heart, congested. Pericardium, distended with effusion, which solidified when exposed. Lungs, engorged with dark blood. Liver, enlarged and softened, its blood vessels engorged. Spleen, slightly enlarged. Intestines inflamed, thickened, the mucous membrane desquamated. No bacilli found in the blood of the heart.

No. XII. Fed on the 2nd January 1910 with part of a pigeon containing many polar-staining bacteria, and showed no clinical symptoms of the disease up to 4th January, when its temperature went up to 109.3°F ., but no external symptoms were observed until the 6th January, when the bird appeared to be dull, and lame in the right leg. From the 9th to the 12th dullness became more marked; ruffled feathers, drooping of wings, partial loss of appetite, dyspnoea and diarrhoea were also present. These were soon followed by paralysis of the legs and coma. On the 16th in the evening the temperature fell to 93.1°F ., and the bird died in the night.

Post-mortem.—The body was very emaciated and the skin of the legs was darker than normal; some conjunctivitis of the left eye was present. Heart, very congested; vessels arborescent; pericardium contained serous fluid. Lungs normal, but there was one small patch deeply congested. Liver, normal. Spleen, normal. Pancreas, normal. Gizzard, normal; kidneys, normal; intestines, not much affected, but showed a number of minute petechiae.

No. XIII. Fed on the 2nd January with part of a pigeon containing many polar-staining bacilli. The temperature at the time of feeding was 104.4°F . and rose to 108.2°F . on the evening of the 3rd January. On the morning of the 4th January temperature fell to 104°F ., and the bird was very drowsy, the feathers were ruffled and there was vomition, and passage of watery stools; symptoms of coma also developed and persisted until the bird died on the night of 4th January, after the temperature had fallen to 106°F .

Post-mortem.—The lesions were those of general septicæmia. A few polar-staining bacilli, diplobacilli and coccobacilli were visible in the blood of the heart.

No. XIV. Fed on the 2nd January with part of a pigeon containing many bipolar-staining bacteria.

The temperature of this bird rose to 109°F . on 3rd January 1910, but no clinical symptoms were observed at the time. Between 4th and 8th January it presented the following symptoms: whitish and watery diarrhoea, ruffling of feathers, general sleepiness; occasionally dyspnoea. On the morning of the 9th

January the temperature rose to 109.4° F., and the bird was quite comatose ; in the evening the temperature fell to 103.1° F. ; death occurred in the night.

Post-mortem.—The alimentary canal was the main seat of morbid changes. The intestinal mucous membrane showed patches of blood extravasation and extensive areas of congestion, exudation and thickening. The duodenal folds exhibited epithelial degeneration and desquamation. The pericardium and endocardium were marked with petechiae. The lungs were slightly hyperæmic, and the liver, spleen and kidneys were enlarged, congested and soft. The blood of the heart contained cocci and diplococci besides the usual polar-staining forms of the bacillus.

PASTEURILLOSIS IN OTHER BIRDS.

Pigeons.—A bird received 1 drop of blood from another diseased pigeon in 1 C.C. of physiological salt solution at 8 A.M. on the 29th December 1909 ; the temperature was then 105.1° F. At 11 A.M. the temperature was 109.4° F., at 2 P.M. 107.3° F., and it died at 3-15 P.M. on the same day (29th December). The principal symptoms were dulness, rough feathers, green watery diarrhoea and coma. The *post-mortem* lesions were as follows :—Skin, purplish. Muscles, congested. Blood more or less coagulated. Heart, highly inflamed, with petechiae round the base. Lungs, engorged with blood. Pleura, ecchymosed. Liver, engorged with blood. Spleen, somewhat enlarged. Intestinal, mucous membrane thickened, inflamed and ecchymosed with the blood vessels arborescent. The cloaca inflamed. The kidneys congested. The blood swarmed with bipolar-staining bacilli.

Ducks.—A duck received subcutaneously a few drops of blood from a diseased bird in the afternoon of the 15th December, when his temperature was 103.2° F. At 8 A.M. next morning, the temperature had risen to 109° F., and he was rather sleepy, did not eat. The evening temperature of the same day was 107.3° F., and there was considerable diarrhoea. He died in coma the following morning, his temperature having fallen to 98° F.

Post-mortem lesions.—External appearances : The feathers were rough and soiled with faeces. The eyes were sunken. The muscles generally were congested. The blood more or less coagulated. Heart.—There was a pericardial effusion and the pericardium had spots of ecchymosis round the base. The myocardium was darker than normal, the vessels were congested. The lungs were inflamed, the liver enlarged, and there was some cloudy swelling. The spleen was congested. The intestines were generally congested and so was the cloaca.

Geese.

Two drops of blood from a diseased pigeon were placed under the skin of a goose at 8 A.M. of the 29th December 1909 ; the bird's temperature was then 104.1° F. At 11 A.M. the temperature was 105° F., at 2 P.M. 109.2° F. and at 5 P.M. 101.3° F. ; it died at 5-15 P.M. on the same day. The symptoms were sleepiness, rough feathers, drooping wings, excessive watery diarrhoea and coma.

Post-mortem lesions.—Blood, semi-fluid ; the pharynx and larynx, slightly congested ; the pleura, ecchymosed ; the lungs, congested ; the pericardium contained a pinkish effusion ; the myocardium was darker than normal. The liver was much congested ; the spleen somewhat enlarged and soft. Ecchymosis was noticeable on the peritoneum and its vessels were injected. The mucous membrane of the intestines was generally thickened and inflamed as usual : the ingesta were mixed with blood. The kidneys were congested. The cloaca was inflamed. The blood swarmed with bacilli.

The susceptibility of individual geese to the disease seems to vary considerably. A small quantity of infected blood may produce fatal sur-acute septicæmia in one bird and the same quantity may produce in another a very much milder attack, ending ultimately in recovery. In a case which recovered, the amount of water drunk by the bird and evacuated almost in the same condition, was astonishing.

Turkeys.

At 2 P.M. on the 20th December the conjunctivæ of a turkey (whose temperature was then 104° F.) were gently moistened with a very small drop of blood from a pigeon that had succumbed to pasteurellosis. The evening temperature was 104.4° F., and there

were conjunctivitis and dullness. On the 21st at 8 A.M. the temperature was 108.3° F., and the symptoms were somewhat intensified. On the morning of the 22nd, the temperature was 107.1° F., and in the evening 107.2° F., and there was diarrhoea. The morning temperature on the 23rd was 106.3° F., and the bird was very sleepy; the diarrhoea was considerable. That evening the temperature fell to 104° F. He died comatose on the morning of 24th December, at 8 A.M., with a temperature of 96° F. The *post-mortem* lesions were as follows:—The face was swollen from oedema and there was conjunctivitis. The muscles of the body generally were dark. The heart was congested, the pericardium inflamed and contained serous effusion; there was pleurisy and the lungs were congested. The liver was enlarged. The peritoneum was inflamed and the intestines also in places. The cloaca was inflamed.

This experiment confirms the view that birds may be infected through their eyes.

Pea-Fowl.

The symptoms of the disease in pea-fowl are so exactly the same as in the turkey, that I have not deemed it necessary to describe or to reproduce them in a drawing.

Rabbits.

The course of the disease in the rabbit are not very marked. The animal appears to be quieter than usual, then sleepy, finally becomes comatose and then it dies. Diarrhoea may or may not be present.

MORBID ANATOMY.

The *post-mortem* appearances in this disease have already been described as part of the history of the cases that I have recorded; but special attention may be paid to the lesions, namely, a more or less congested and arborescent condition of the intestines, petechiae or ecchymosis of the intestines and cloaca. The intestinal mucous membrane under the microscope is seen to have lost some of its epithelium, and in places the membrane has broken down and given place to small ulcers. Congestion and ecchymosis of the heart is generally seen. The pericardium contains a considerable amount of serous fluid which coagulates on exposure to the air. General wasting of the muscular tissue is a noticeable feature in the more extended cases.

BACTERIOLOGY.

The blood of all the organs of the animals that died of sura acute and acute fowl-cholera contained swarms of bacilli which could be easily grown on ordinary media and sub-cultivated. Inoculations into healthy birds reproduced the disease in typical form. Extremely few or no bacilli were found in the heart blood of fowls which developed the disease slowly after being fed on infected meat. The absence of bacilli from the heart's blood in the chronic form of the disease has been noted by Nocard and Leclainche, and I believe by Lignière whose papers unfortunately I have not by me at present.

Morphology.—The bacillus of fowl cholera varies in appearance; it may be ovoid and show polar-staining, or it may assume more or less the appearance of a micrococcus or there may be combinations of all the types. Thus the culture when inoculated into a pigeon and a fowl, produced in the pigeon, polar-staining bacilli and in the fowl, non-polar-staining bacilli. The ovoid form averages about 1 micron in length and 0.5 micron in breadth, rather more than less; the coccoid form is less than a micron in diameter, and the diplococcus averages rather more than 1 micron in length and rather less than half a micron in breadth. The bacillus is non-motile; neither flagella nor spore formation were seen.

Staining reaction.—The bacillus stains well with weak solutions of Kühn's blue, carbol-thionine, carbol-gentian-violet, and methylene-blue; it does not stain with methyl blue (watery solution), Gram, Gram-Weigert or Claudius.

Cultures.—In bouillon, it causes general turbidity at 37° C. In glucose and lactose broth and Durham's medium, there is no gas formation. In pancreatic bouillon treated with nitrite of soda and sulphuric acid, it gives some indol reaction. There is no growth in a vacuum. It does not coagulate milk. In gelatine at 20° C., a nail-shaped growth is shown: the single colonies can be seen after a time as infinitely small beads along the needle track; there is no liquefaction, gas formation or pigmentation. On gelatine stains at 20° C., the growth is for a time almost invisible, on account of the transparency of the colonies, which grow in round discrete beads; after a time, they extend a little and become slightly iridescent, and later they are white and opaque, without liquefaction. On ordinary agar at 37° C., the growth pursues a

similar course ; at first transparent, later whitish. No change in colour occurs when the bacillus is grown on neutral red agar. On potato there is no growth.

TREATMENT, ETC.

In view of the danger of the disease spreading, and the very doubtful success likely to accrue from treatment, it seems advisable that all sick birds should be killed and their bodies destroyed whole by fire, as soon as possible.

Prophylaxis.—Fowl-cholera (pasteurellosis) is caused by a micro-organism which may exist in the body of an apparently healthy "carrier" for some time ; its virulence may be increased by passage through one animal to another, especially if such factors as overcrowding, dirt, and bad ventilation are present. It is also known that roosts, aviaries, cages, etc., which have held diseased fowls will regenerate the disease in a fresh batch of poultry. Therefore, fresh purchases should not be introduced into a poultry-yard until they have been quarantined for some weeks. Valuable birds, if kept in confinement, would be safer in large wire-covered runs which exclude crows, sparrows, minas and pigeons, which may carry infection. Rigorous cleanliness and clean drinking-water are, of course, at all times, essential : and overcrowding should never be permitted. The floors require constant cleanliness and disinfection and should be renewed from time to time if constructed of porous material. Some years ago I suffered considerable inconvenience from outbreaks of pasteurellosis among the rabbits kept in the College ; at last, I made it a rule to quarantine every new purchase for a month, and so soon as one or two rabbits in the block died for an unexplained reason, or showed any symptoms of hæmorrhagic septicæmia, each remaining animal was separated in a box (I used kerosine oil boxes). By this means I succeeded in preventing fresh outbreaks. In poultry-yards, the earth should be removed from time to time to a depth of, say four inches, and replaced with fresh stuff. Roosts, cages, etc., should be scraped, and frequently well washed with soap and a disinfectant. Steam under pressure is a very useful disinfectant. Exposure to our tropical sun for some days will be beneficial, after cleaning.

Other means of combating the disease have also been employed in Europe, thus : Pasteur devised a vaccine against fowl-cholera,

but it did not commend itself to poultry owners in the long run ; I understand that it has ceased to be manufactured in the Pasteur Institute at Paris. Possibly it belonged to those vaccines which have excellent results in the hands of experts in a Laboratory and are less satisfactory in general use. Besides Pasteur's vaccines, attempts to apply sero-therapeutics have been made ; the results do not appear to have aroused much enthusiasm.

On the whole, at least as far as India is concerned, it seems that the adoption of the principles I have suggested will be of the best practical value to poultry farmers : *viz.*, slaughter of suspected fowls and isolation of the others ; and quarantine of new purchases.

As a rule, these simple but somewhat troublesome measures will clear the poultry yard of the disease, if applied patiently ; nevertheless it may happen that the flock and the land and the roost are so thoroughly infected that more stringent measures are necessary ; it may then be necessary to kill off the whole flock, burn the roosts, and start with fresh birds on quite fresh ground with fresh roosts.



Cutaneous Filariasis in a Dog

BY

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[From the Raymond Research Laboratory, Calcutta.]

On 29th September of last year, a Rampur hound was admitted into this College Hospital for treatment with the following clinical symptoms :—

Emaciation was very marked, and the animal was so weak that it could scarcely walk ; there was a large patch of small pustules and ulcers, each surrounded by a hæmorrhagic zone, on the neck, extending downwards, from which sero-sanious and sometimes sero-purulent fluid was discharged. The same kind of eruption was found on the hind legs. The dog also suffered from dysentery. The temperature and appetite were normal.

On examining, under the microscope, a drop of the fluid obtained by puncturing one of the fresh pustules, a small filarial embryo was discovered. The examination of some other pustules had the same result. A considerable number of similar parasites was also observed in the blood of the aural vein. In fresh specimens the embryos appeared as long, slender, translucent, apparently structureless, snakelike bodies wriggling about in the fluid in which they were found ; the head was more or less rounded and slightly tapered ; and the body was cylindrical and tapered gradually down to the point of the tail. The method of Sir Patrick Manson failed to demonstrate a sheath. This method consists mainly in preparing ordinary wet specimens of blood and then cooling them on ice for about 8 hours ; after removal from the ice the temperature rises, and the worm revives, and can be seen in the diffused hæmoglobin to be trying to break through his sheath. Under 1/12" objective a fine transverse marking was observed in some preparations, especially at the caudal extremity. The mouth of the embryo was conical and showed no cephalic armature, but sometimes a small spine was seen protruding. The number of parasites in the different fluids varied considerably ; in the pustules, one generally, but occasionally two worms were found ; in a small drop of blood as many as 5 to 10 were seen. The examination of the fæces gave negative results.

In order to make a study of stained preparations, thick smears were dried in the air, the hæmoglobin was washed out with distilled water, and the specimen stained with weak solution of fuchsine, methylene blue or hæmotoxylin and eosin. The embryo was then seen to be composed of closely packed granules of protoplasm. The length of the embryo was approximately 460 microns.

The local treatment consisted in applying tar and oil (1-40). The administration of creosote, bismuth, ipecac and camphor cured the dysentery. General and nervine tonics were given during convalescence, and the animal was discharged quite cured on 31st January 1910.

An attempt was made to convey the disease by inoculation to a healthy dog, but without any results. Possibly an intermediate host is required, as pointed out in the observations on the metamorphosis of *Filaria nocturna* of man by Manson and of *Filaria recandita* of the dog by Grassi.

In "La Clinica Veterinaria" of 1906, there appeared from the pen of Dr. Dell'Aqua, a paper on "Canine Filariasis," in which he claimed to have found embryos of *Filaria immitis* in the liquid obtained from a fistulous ulcer in a skin affection of the fore and hind limbs of a dog which had been under treatment for two years ; similar parasites were also discovered by him in the blood of the auricular vein.

"Cutaneous Filariasis" in the dog has been observed by Rivolta, Siedamgrotzky, Moller and others. There appears to be some confusion about the biology of these parasites or possibly the disease is caused by different worms. Rivolta considers them to be embryos of *Filaria medinensis*. Siedamgrotzky is inclined to believe that they are *Anguillulæ* (strongyloids).

The line of treatment adopted by Rivolta was the application of mercurial ointment. Siedamgrotzky's dog was cured by general cleanliness. Dell'Aqua's treatment consisted in the local application of 1 per cent. sublimate solution. Calomel ointment, intramuscular and intravenous injections of bichlorate of quinine, produced negative results. The dog gradually recovered, and the embryos and the cutaneous lesions disappeared.

Aneurism of the Aorta in a Terrier Bitch

BY

R. NARASINGA ROW, G.B.V.C., VIZAGAPATAM.

Subject.—A white terrier bitch aged about 3 years, belonging to Mr. P. B. Arbuthnot, District Board Engineer.

History.—That the bitch jumped on to a chair and immediately afterwards screamed twice or thrice and fell dead, and that the dog had been getting emaciated for sometime past.

Post-mortem.—The carcase was very poor in condition. Thoracic cavity contained blood showing the rupture of some great vessel.

Left ventricle of the heart was dilated and filled with blood clot.

Three inches from the left cavity of the heart along the course of the wall of the aorta, a tumour was found imbedded in the wall of the aorta.

It was red and indurated, when it was cut into and examined there was a thread like worm coiled up in it alive and it was of pale red in colour measuring about $\frac{3}{4}$ inch in length. The other organs were normal. The worm, in my opinion, is *spiroptera sanguinolenta* (*filaria sanguinolenta*).

II.

Subject.—A bull dog terrier, property of Mr. H. Tyler, I.C.S., was admitted into the Hospital on 23rd August 1909.

History.—That the dog had been getting emaciated since a fortnight.

Symptoms.—Anaemia, temperature normal. Appetite, good.

He was treated several times for "worms" and put on a course of iron and liq. arsenicalis, but he never made any progress and began to show rapid emaciation, in spite of best attention with regard to food and medical treatment.

The dog died on 31st October 1909.

Post-mortem.—Carcase, a mere bag of skin and bones.

There was a tumour along the course of the wall of the oesophagus.

The tumour when cut into presented large number of red thread worms measuring from 2 to 4 inches in length, coiled up in the tumour.

I think these worms are also *spiroptera sanguinolenta*. The other organs were normal.

These filaria are naturally found in the blood and they are classified into—

(1) *Filaria immitis*; (2) *Spiroptera sanguinolenta* (*filaria sanguinolenta*); (3) *Strongylus vasorum* (Glass and Muller).

(1) *Filaria immitis* finds its abode in the right side of the heart.

(2) *Spiroptera sanguinolenta* (*filaria sanguinolenta*) forms aneurisms in the aorta and is occasionally seen in the walls of the stomach and mucous membrane of the oesophagus and in the bronchial lymphatic glands. When this variety seeks oesophageal wall as its abode, it causes more or less rapid emaciation which was observed in the case referred to above.

(3) *Strongylus Vasorum*.—These are found in the right ventricle and pulmonary artery. The eggs reach the capillaries of the lungs through circulation and the embryos are arrested in the alveoli and bronchioles where they form nodules, giving the appearance of a tuberculous lung.

Mode of entrance into the system :—

First, the eggs and embryos are passed in the urine by the infected dogs and these are carried by water into swampy places, &c., and find entrance into the system by the dog drinking the water.

Secondly, they are conveyed into the system by means of intermediate hosts such as cockroaches, kitchen moths, beetles and mosquitoes.





The Vice of Weaving in a She-buffalo

BY

MR. M. C. JOSHI,

Veterinary Assistant, Godhra.

A she-buffalo, aged 5 years, was admitted as an in-patient at the Veterinary Hospital, Godhra, for "Inversion of Uterus" on the 1st July 1910. She has been discharged, cured of the disease on 10th August 1910. While she was at Hospital, I have observed her practising the vice of weaving. She kept her legs steady and moved her head and body from side to side. The head moved more rapidly than the body, and she appeared like an elephant moving its head and trunk from one side to the other.



Bhowra in a Buffalo

BY

MR. A. SUBANNAH,

Veterinary Assistant.

A buffalo belonging to the Government Farm Labhandu of Raipur, was brought to the Raipur Veterinary Dispensary for treatment on the 10th August 1909, the disease of which was diagnosed by me as "Bhowra."

Cause.—I believe this is due to the animal, while grazing off green grass just after the setting in of the monsoons, chances to swallow up the embryo expelled from the ovum of the tape worms of the dog; thus the embryo finds its way into the blood vessel from the digestive canal and is thence conveyed to the brain during the circulation, when by chance it lodges and develops itself in the shape of a parasite (if the circumstances are favourable); when it attains to a size enough to cause pressure on the brain, the diagnostic symptoms are manifested. The animal turns to the side, either right or left, round and round, according to the lodgment of the parasite and eventually dies.

Symptoms.—Dullness, loss of appetite and whirling to the left many times when at large. Temperature between 102° and 103° and bowels constipated.

Treatment.—First administered purgative and afterwards treated with Pot. Bromid. and Iodide. On the 13th it was a little better but subsequently the disease relapsed.

Result.—Treatment was of no avail and the animal succumbed to the disease on the 31st August 1909. The day following, the brain which was taken out from the skull of the animal, was found normal in size and natural in colour with the exception of a little congestion and depression about the size of a pea on the surface of the left lobe and was sent to the Superintendent, Civil Veterinary Department, Central Provinces and Berar, for examination as instructed, who also corroborated that cysts were found in the left lobe.

History of a Surra Case occurred at Basim,

BY

W. A. KULKARNI,

Veterinary Assistant, Central Provinces.

Patient.—Iron Grey Arab, entire aged horse.

Owner.—R. Hamilton, Esq., I.C.S., Sub-Divisional Officer, Basim.

The animal was for the first time brought to the dispensary for treatment on the 16th October 1910, and treated it for urticaria, with œdematous swelling of the legs, the eruption on the body being more or less like bean seed with yellow tinge on the visible mucous membrane; his appetite was somewhat capricious. A physic ball containing aloes and calomel was administered. It acted well. The eruptions and swelling of the legs disappeared. On the evening of the following day I was informed by the owner that the animal was suffering from colic. Whereupon I went to the stables and found the animal eating grass. I took it to be a case of spasmodic colic, and gave him an anodyne ball, containing half a dram of opium. Next morning the animal was well, and it was afterwards given with carminative powders.

No complaint was heard till the 11th November 1910, 26 days after the attack of urticaria, during which period there were heavy rains and the animal was taken on tour.

On the 12th November 1910, the animal was sent back to the head quarters for being shod, and casually it was brought to the dispensary for urticarial eruptions.

The syce told me that the animal did not feed well and used to get tired even on little exertion. On examination I found the mucous membrane yellowish, watery discharge from nostrils and eyes, œdematous swelling on legs below the knees, eruptions like bean seed on the neck and hind quarters, temperature 101.4, pulse 46, respiration 20 per minute.

For four days I treated the horse for jaundice with mild blister on liver region. On the 16th November, the temperature was over

105 F. and patechæ were seen. Grain used to be rejected for grass of which large quantities were consumed. The animal seemed to lose flesh and its movements were languid, urine was of a high colour and there were pains on pressure on the loins. From the above symptoms I suspected it to be a case of surra, and blood smears were taken and sent to the Superintendent, Civil Veterinary Department, Central Provinces and Berar, for microscopical examination. The previous treatment was stopped and the case was treated with acid arseniosum, 4 grains a day in food. On the 19th the temperature fell down from 103.8 to 100 F. For 4 days the temperature was varying between 98 F. to 101 F. During this period patechæ disappeared. From the 23rd to 28th the temperature was above normal, rising as high as 104.8 F.

On the evening of the 28th at the temperature of 104.2 F., 50 c.c. of 4% solution of atoxyl was injected subcutaneously under anti-septic precautions as the animal's body weight was below 500 lbs. On the next day the temperature went down two degrees and there was a little swelling at the injected part. From the 30th arsenical treatment was continued according to the instructions given in the letter No. 1513, dated 1st October 1910, from the Imperial Bacteriologist, Muktesar to the Inspector-General, Civil Veterinary Department, under 606."

From the 30th November to the 5th December the temperature ranged from 99.4 to 101.4 patechæ being visible. On the 3rd, blood smears were taken and sent to the Superintendent, Civil Veterinary Department, for microscopical examination who informed that no surra parasites were found. On the 6th the temperature began to rise and went to 105.8 F. on the 8th December. On the 6th and 8th, blood smears were taken and the Superintendent, Civil Veterinary Department, declared that few surra parasites were found in the former and many in the later. The patechæ spots were not seen from the 6th to the 14th December. The animal was greedily eating from the 9th to the 14th. The animal had slight dysentery on the 9th and 10th. From the 15th the remission began lasting as far as the 20th when the intermission of a very short duration took place. On the 15th blood smears were taken and contained trypenosomes. Patechæ were again seen from the 14th and they were of purple colour. On the 18th and 20th, the animal became very weak and was quite unable to walk and partly abstained from

partaking food. In these days it had again a slight attack of dysentery. On the 21st, the animal was seen and found by the Superintendent, Civil Veterinary Department, Central Provinces and Berar, to be in an extremely emaciated condition and continuation of atoxyl or any other treatment was considered of no use, and it was decided to finally relieve the animal of its sufferings ; it was accordingly destroyed on the 23rd evening.



Ratanjot Plant.



$\frac{1}{2}$ of the natural size.

Ratanjot

BY

G. SHANKER,

Veterinary Dispensary, Jubbulpore.

The medicinal plant described below is not, I think, used in our practice though the qualities of the stuff deserves careful attention. I am indebted to an English book on Polo and a Vernacular *Materia medica* for much of the information contained in the article

Family.—Umbelliferae.

Natural Order.—Euphorbiacea.

Latin name.—*Jatropha curcas.*

Vernacular name.—Ratanjot.

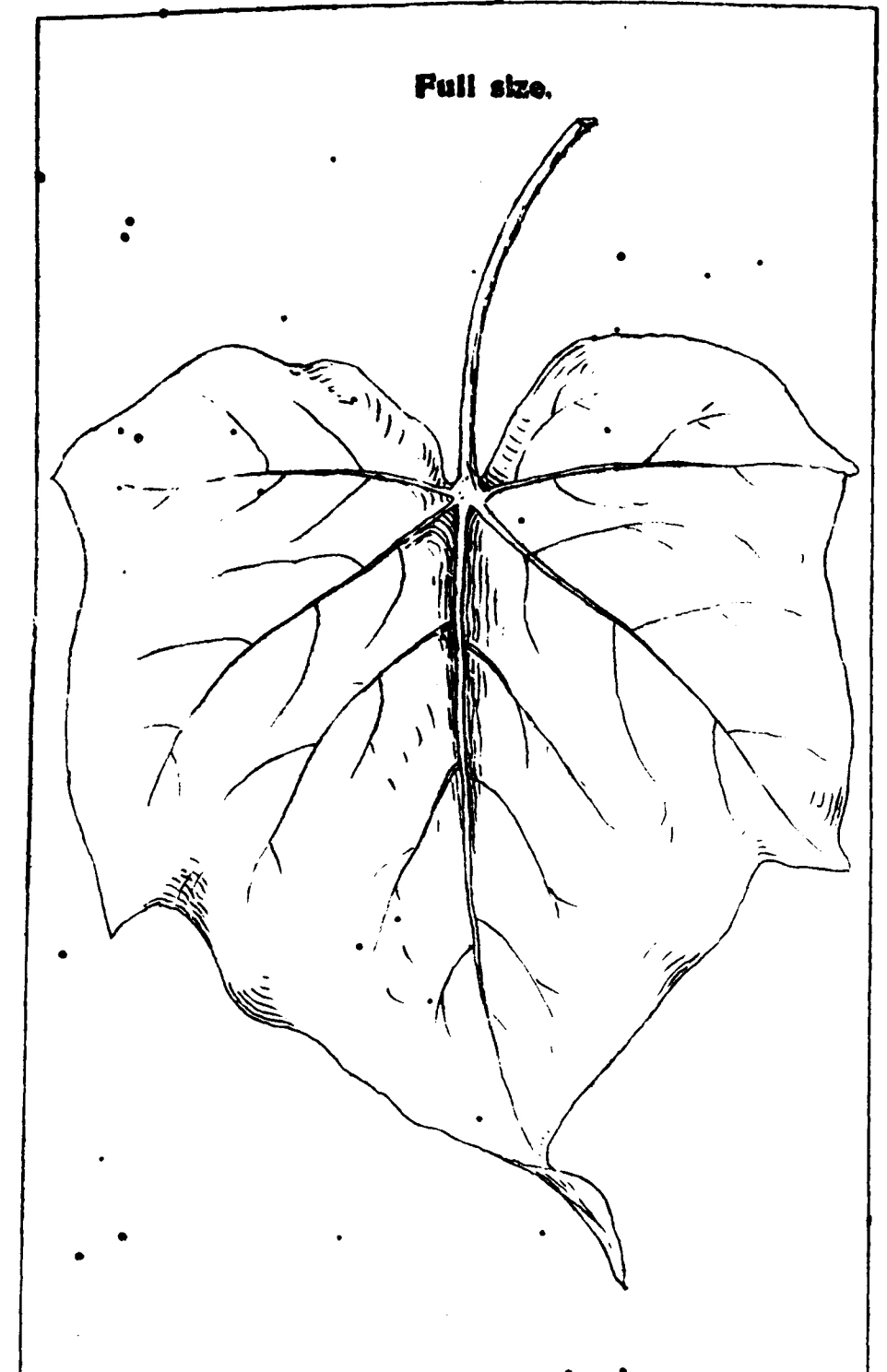
The ratanjot plant is of medium size, the height being from 6 to 9 feet. The leaves resemble those of castor plant, but are a bit smaller. Ratanjot is mostly planted for fencing, its wood is very delicate and light and yields much milky juice when cut. The seeds are poisonous and contain oil, which is purgative, aphrodisiac, tonic, expectorant, emetic, alterative and externally vesicant. It is used by Indians in rheumatism, hysteria, cough, neuralgia, and externally in fistulae and leprosy.

The juice of leaves is said to be very efficacious in removing delirium among cattle within 24 hours when caused by eating diseased Indian corn, "kodo."

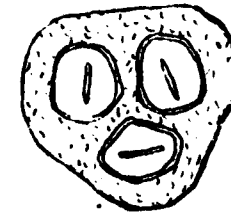
The bark of the root is dried in the shade and then powdered before it can be used. It is antiseptic and astringent and is very useful in healing wounds and ulcers. Wounds must be washed in warm water and then dried, sweet oil should then be applied to the wound and the powder sprinkled over it, this relieves pain and reduces inflammation. In the case of sprains of ligaments and tendons the powder is to be boiled in sweet oil for 10 minutes and then applied as a poultice for a few days daily. For the treatment of ossifications such as splints, bone spavins and ring bones mustard oil should be substituted for sweet oil and the paste

prepared should be rubbed on the affected parts for 10 minutes and the same should then be applied as a poultice. Three days' application is sufficient to remove lameness. It is not a painful counter-irritant as might be expected and its rapid action is valuable where time is a consideration.

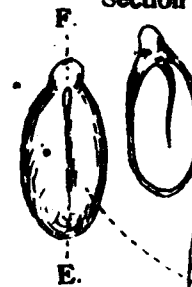
I have tried the medicine only externally as yet, in cases of wounds and sprains with satisfactory results and hope to put it to further tests gradually.



Section on C. D.



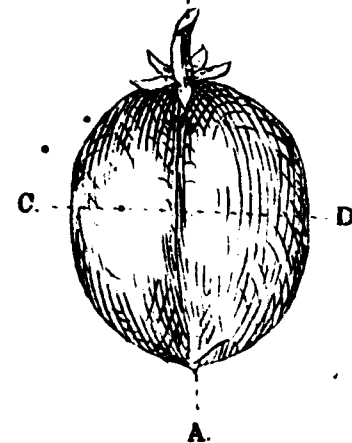
Section on E. F.



Section on A. B.



B.



**An abscess over the region of the triceps
muscle of an elephant 19 years old**

BY

MR. V. KUNHI RAMAN NAIR, G.B.V.C., *Nellore.*

History.—The animal began to go lame since the last 9 months and was treated by good many physicians for rheumatism without any cure.

Symptoms.—The animal was lame on its off-fore, pointing to relieve weights. On examination I found a circumscribed swelling above the forearm and below the shoulder. As the swelling was flat it had occupied a large area. I manipulated the part and felt fluctuation, therefore I determined that was an abscess. I explained to the owner about the presence of an abscess which he did not believe and told me that was an hypertrophy of the skin usually occurring on elephants, those that are used to drag timber. I told him to go and see the fluctuation; as he was a man wanting in common sense he could not detect any. With good deal of explanation and taking the responsibility to pay for the damage if anything bad occurs, I settled to open the abscess. The animal was particularly mischievous, and the elephant keepers refused to stand by the side of the elephant to assist me when I wanted to perform the operation in a standing position. Therefore I kept the elephant on the latter incumbent posture, tied both the front legs and the hind legs to two separate cocoanut trees with strong iron chains. I washed the part with boiled water and opened the abscess and evacuated the pus. There were nearly three bushels of pus encysted in that abscess. I cleaned the cavity with lotio acidii carbolicii and plugged it with tow dipped in carbolic oil. The dressing was continued for 17 days and the wound, though it was deep-seated, healed very rapidly.



Suppuration and discharge of Ichorous pus from the cavity of a tusk of an elephant 8 years old of 2 years' duration

BY

MR. V. KUNHI RAMAN NAIR, G.B.V.C., Nellore.

The animal was caught from the forest two years back by the pit system. At the sight of men the animal got irritated and butted at a stone which was left unnoticed at the side of the pitch, and by this violent act both of its tusks were fractured. The tusk is considered to be a very valuable asset in an elephant as it increases the price. A few days after this accident one of the tusks was shed aside, the other was remaining, pouring out some 12 ounces of pus every day.

Treatment.—I kept the animal on the latter recumbent posture and tied the four legs crosswise by means of strong iron chains. Secured the trunk as explained in the choking case. Probed and cleaned the cavity well by injecting lotio hydrargiri perchloride 1 to 1,000, and plugged the cavity with cotton wool dipped in tannate of glycerine. When I saw the ordinary drugs, having tried one after another, began to fail, I determined to try a chance with tannoform, the preparation of Mr. Merck, Germany, and prepared a powder as follows :—

Rx

Tannoform	...	...	2 dr.
Tannic acid	...	...	1 "
Acid Boric	...	...	4 "
M. Ft. Pulvis	1.		

This powder was blown by the mouth through a bamboo tube into the cavity, after washing with lead lotion. This operation was repeated for 15 days. The suppuration ceased and the cavity healed.

Enteritis complicated with pneumonia in an elephant 9 years old

BY

MR. V. KUNHI RAMAN NAIR, G.B.V.C., Nellore.

I was called upon to treat this elephant in the month of April 1909. It belongs to a landlord 7 miles away from Calicut.

History.—Animal was suffering from dysentery attended with violent attacks of colic since the last 6 months, and treated by many Native physicians with no improvement.

Symptoms.—Temperature was 107° F. Pulse was quick and hard, respiration slow and painful, standing with turned out elbows, eyes red and weeping. Passing shreds of mucus and blood with much straining per rectum, husky cough, pain on pressure over the intercostal and the abdominal region.

Treatment.—I secured the animal in the stall and after emptying the rectum, an enema of warm lotio potas permanganatis (1 dram to 1 pint) with soft soap was applied to clean the bowels. Gunny bags were kept close to the chest wrung out of boiled hot *Kanjee* (rice) and an inhalation of eucalyptus oil was given. When I applied an inhalator to the nostrils, the animal would commence to breathe through the mouth with violent struggle. Therefore I gave sulphur fumigation by covering the four sides of the stall with bamboo mats.

For the first three days the following preparation was given internally :—

Rx

Acid. Salicylis	...	1½ oz.
Ext. Opii	...	2 dr.
Pulvis Canabis Indica	...	4 "
Pulvis Asafoetida	...	1 "
Pulvis Lini ferrini	...	Q. S.
Treacle	...	Q. S.
M. Ft. Bollas	1.	

After three days the temperature had gone to 101, nearly normal, and began to make some improvement, when I took away opium and the same medicine was continued. After eight days the animal had only a slight cough. The diet was boiled rice. The cough was speedily cured by the application of cough electuary:—

R

Pot. Chloras	...	...	1	oz.
Ext. Belladonna.	...	...	$\frac{1}{2}$	dr
Camphor Sublimat.	...	...	1 $\frac{1}{2}$	..
Pulvis Gingiberis	...	...	2	..
Treacle	...	...	Q.	S.
M. Ft. Electuary.				



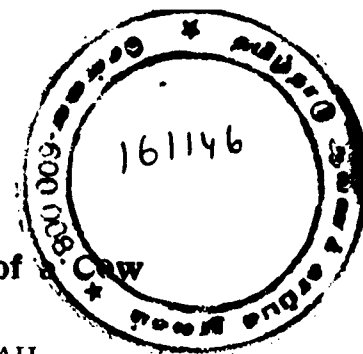
Choking in an Elephant

BY

MR. V. KUNHI RAMAN NAIR, G.B.V.C., *Nellore*.

When I was called upon for the case, I found the creature in a very miserable and fearful stage. This animal was nearly ten feet in height, moving restlessly in its stalls, keeping the trunk folded up on its forehead, bellowing as if the surrounding buildings were to shake, pawing by its forefeet, mouth was kept open widely, saliva was dribbling in strings mixed with blood, passing urine and faeces in small quantities. At the sight of this horrible creature, I was rather kept at a distance watching all the symptoms and at the same time put good many questions to the owner. From the history, I was able to understand only that the animal has not touched its food or drink for the last 20 hours, when the animal was brought back from the river and the owner has found the symptoms since it was brought back. I called the elephant keeper, who was trying to avoid my sight and asked him series of questions, the man did not give me any clue of the matter. During our conversation, a round swelling on the left side of the neck attracted my attention. I approached the animal to look carefully, and I came to understand that there is a mechanical obstruction in œsophagus. I again questioned the elephant keeper in a serious tone, then he told me that the animal has devoured a cocoanut with its shell given by him from the bank of the river. I at once asked the owner to get me half a dozen men and there was no loss of time as there was a crowd in readiness. The animal was standing in a stall which has got strong teakwood bars on four sides. Two elephants can move about in the inside of the stall. I managed from outside to tie the four legs of the animal to the four pillars of the stall with iron chains after keeping the animal first to a side of the stable by inserting blocks of wood between the elephant and the bars. I took a bamboo stick bored three holes and strong, small ropes were passed through them. This bamboo stick was tied to the front, and this was held up by another strong stout rope to avoid twisting and beating us. I inserted a rubber tube into the œsophagus and by attaching a funnel to the end of it poured down nearly one pint of castor oil and applied massage externally but in vain.

Then I thought only two sources were left to me, to pass the probang or to perform œsophagotomy. For the latter I was afraid that the animal may make violent struggle in spite of the precautions. Therefore I determined to carry out the former which is least dangerous to the operator and the patient. I cut a plantain tree and making it fit to pass through the mouth I passed it, leading the funny probang with my right hand until the root of the tongue. (There is nothing to fear to put our hand into the mouth of the elephant because the tusks have taken the place of the incisors and as to the mollars in each jaw with ample room in the middle). When I knew that my probang touched the object I applied gentle pressure and the object was pushed into the stomach. After this I gave the animal one pint of country arrack. The animal was free from all sorts of uneasiness and drank water.



Abdominal Rupture of a Cow

BY

MR. A. SUBANNAH,

Veterinary Assistant-in-charge.

On the night of the 17th February 1910, at about 9 o'clock, a Beradi cow, about 7 years old, belonging to one Gauki by name Elliaha of Raipur was brought to the Dispensary for surgical aid.

History.—The cow, while returning from a bungalow after being milked there, had accidentally chanced to jump over the closed gate that had an arrow like a row of iron bars, the keen edge of one of which cut the right side of the abdomen about 4 inches, longitudinally touching the naval, through which a portion of the intestines about three feet was protruding.

Treatment.—Although I was under the impression that the case was hopeless, having been after the lapse of 2 or 3 hours; when the intestines were already exposed to the atmosphere and subject to congestion, but yet I, however, took up the case in hand at once.

First the animal was gently thrown down on the near side. I washed the intestines and the edges of the rupture thoroughly with Carbolic lotion and after dusting the exposed portions with Boro Iodoform, the protruded intestines were gently and gradually reduced with the thumb pressure of both the hands, while suturing the edges of the cut portion with silk ligature the intestines which were distended with gas intervened the operation and with greatest care I had to complete the operation not earlier than 2 hours avoiding the point of the needle touching the intestines over and again. Last dusted the wound with Boro Iodoform and bandaged firmly padding it evenly with Carbolized Tow.

It was then admitted as an in-door patient. The day following a pint of linseed oil with half a dram of Carbolic acid was administered. *Dict.*—Kept on milk and water for the two consecutive days and from the subsequent days green grass also was given increasing the supply by degrees.

On the third day the temperature was 103.2, had motions, looked

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not so gloomy, as it did on the previous day, though there was enormous swelling around the wound. Tincture Iodine painted over the swelling for about a fortnight when it entirely subsided.

A powder of 1 oz. Soda Hypo. Sulphas with 4 drams of Pot. Nitre was given daily in water and antiseptic dry dressing with bandaging as above continued till the 28th March 1910, the day on which the animal was thoroughly recovered and discharged from the Hospital.



A case of "Pharyngitis" resulting from a bit Injury

BY

MR. M. A. MONTAUNT, G.B.V.C.

This was a somewhat extraordinary case which came under my observation during the course of my private practice in Madras, and I venture to bring it to the notice of the profession for two reasons. Firstly, because it was a case of rare complication, ensuing from the result of a bit injury, and secondly, owing to apparent symptoms of the presence of foreign bodies in the throat which might lead the practitioner to mistake the case as one of choking, whereas it was merely a case of "Pharyngitis." In such a case if measures had been adopted for treatment of choking, the result might have proved fatal.

The subject, a bay waler mare 14 hands, six years old, the property of an I. M. S. officer in Madras, was brought to me one morning with a bit injury. The history of the case was gathered to be as follows :—

When the animal was being driven by the owner, it shied at something and attempted to bolt. To restrain her, the owner had naturally to pull her in, a certain amount of force being of course used, and as a result an injury was caused to the mouth. The animal refused food and looked dull when she was sent to me for treatment. An examination of the mouth disclosed that the buccal mucous membrane was red, hot, and painful and that in the near bar there was a distinct swelling of the size of a walnut, pale yellow in colour, I also noticed a kind of reddish unhealthy looking abrasion on the upper and outer sides of it. Temperature was normal and respiration slightly increased.

The first thing I did was to give the animal a Tannate of Glycerine Swab, and subsequently a gargle of Glycerine and Potas. Chloras was ordered to be used two or three times during the course of the day, when brought again the next morning the animal could only with great difficulty be got to open her mouth, which was swollen and painful and from which a very offensive odour emanated. There was profuse salivation and I noticed that with

the saliva was mixed up streaks of exfoliated buccal mucous membrane. I had intended giving a physic ball, but the aforesaid condition of the mouth precluded me from doing so, and I decided to administer linseed oil instead. Even this was unduly ejected, as it was being poured into the mouth. I now suspected that either the effects of the injury had spread to the Pharynx, or that it was a case of choking in addition to the bit injury. The animal was stabled, and on further examination I noticed that she stood in a corner with her head bent and was continually flapping her lower lip and that there was profuse frothy salivation. The throat was slightly painful to the touch, the visible mucous membranes were injected, the pulse was hard and full and the breathing accelerated. Examination of the lungs revealed a slight, harsh sound, but their condition seemed to be otherwise normal. The animal would not eat, and when water was placed before her she splashes all about the bucket, the discharge from the mouth getting mixed up with the water. I therefore decided that if an admixture of Alum was introduced into the water, it might prove a convenient method of giving a gargle and this was done with excellent results. I now concluded that this was a case of "Pharyngitis" with a tendency to choking and adopted the following mode of treatment:—Eucalyptus inhalations, fomentation of the throat, application of Liniment, Turpentine, Belladonna Electuaries and nutritive enemas. The symptoms originally observed by me continued till the evening of the sixth day, when I noticed a slight improvement in that the animal was able to swallow a small quantity of water which she took of her own accord. On observing this exceedingly favourable symptom I immediately substituted the drink by a quantity of warm linseed tea with very good effect. The animal was subsequently put on linseed mash and Lucerne grass, and on the 10th day was discharged, cured with instructions to give her at least a week's rest. At one stage it was my intention to introduce a probang, but I was dissuaded from doing so since the deportment of the head was not such as to indicate the existence of any foreign body in the throat.

Spiroptera Sanguinolenta

BY

MR. S. A. PADMANABA PILLAI,

Veterinary Inspector.

About the beginning of August 1909 when I visited the District Board Veterinary Hospital, Vizagapatam, my colleague Veterinary Asstt. R. Narasinga Rao, showed me an Indian-bred bull terrier dog aged, about six months, which was admitted on the 5th August, for anaemia and intestinal worms. He was carefully treated for the said complaint, and he passed many worms, specially round worms, but he never improved in condition. As the case was not improving, Mr. R. N. Rao asked my opinion, and I suspected for *Spiroptera Sanguinolenta*, but could not give any positive opinion, as there is no diagnostic symptom for the above disease. Anyhow, a systematic treatment was continued for two months, and the animal died suddenly on the 12th November 1909. A month before death he showed almost all the important symptoms mentioned in Case No. 1.

In the *post-mortem* the tumour was found about six inches below the throat in the oesophagus. The worms were preserved in the hospital, and have no hesitation to say that they are *Spiroptera Sanguinolenta*. In this case I think the death may be due to pressure in the Jugular or Anaemia.

Fibrous Tumour, 1 lb. 6 ounces, in a bitch

BY

MUKHTAR AHMAD SAHIB WARSİ, V.A.

[S. D. KASIA, Gorakhpur, United Provinces.]

Translated from Urdu.

CASE NO. I.

I, while touring on inspection duty, arrived in the Sipha camp on 31st May 1910, for the purpose of investigating the causes of disease amongst cattle. There was a complaint of an outbreak of "black quarter" in this range. I had to visit the officer to confer on this subject, and to receive some help from him in the matter of inoculation, &c. After I had conversed with the officer about the cattle diseases, he showed me a bitch—Deer hound, aged 8 years, colour dark brown—and asked me to undertake her treatment. The bitch had a swelling on the right side of the 1st mammary gland, on enquiries made I learnt that the swelling had been in existence for a month, and was increasing in size gradually. The animal felt no pain even on hard pressure of the affected part, and this led me to suspect that it was a tumour. The swelling was very solid, and moveable. Tincture of Iodine was for some days used, to induce suppuration. Subsequently Iodine liniment was applied with no better result. I was then compelled to obtain the officer's permission for operation. I then ordered the bitch to be conveyed to the Headquarters, Sub-division of Kasia. She arrived in Kasia on 17th June. Since I had not with me the necessary instruments of Anaesthesia, I sent for Cocaine with the permission of the Sub-Divisional Officer, and during this interval, I gave light food and rest to the animal. On the 20th June, I was quite prepared to operate. Accordingly on that date, after sterilizing the animal with the necessary materials, I used Cocaine lotion for the tumour, and made a T-shaped incision into it. During the operation the use of Cocaine lotion was continued to keep the part anæsthetic and the animal thus showed no signs of uneasiness. The operation was, by His Grace, carried on successfully and the tumour was fully entirely removed and the artery was pressed with the artery forceps. Having dressed the wound with borax lotion, I applied Boro Iodoform. I bandaged the wound after stitching the skin, and keepin

it boric cotton pad on which Boro Iodoform was sprinkled. When the bitch was made to stand, she appeared weak. She was made to drink one ounce of Port wine mixed with one seer of water. When the tumour was weighed, it came to about one pound and six ounces. I unbandaged the animal in the evening for re-dressing. A little serum was found. After antiseptic dressing was over, the wound was tightly bandaged.

In the morning, when the wound was being dressed the discharge of serum was very small, on both occasions antiseptic dressing was resorted to. Four days after the operation the condition of the wound was very good. There was no suppuration, &c. The bitch was returned to the officer with instructions to dress the wound twice in a day. The stitches were removed. On the 12th July, I received news of the healing wound and the recovery of the animal.

CASE No. II.

Snake bitten Sheep.—The Efficacy of Potassium Permanganate.

On the 14th July 1910, at 11 P.M., a white sheep aged 2 years, belonging to Munshi Shams-ud-din Sahib of Kasia, was brought to my house for treatment. By a happy coincidence I was present in the Headquarters at that time. The sheep was tiny and fully developed. It was brought in a hopelessly bad state before me. It was foaming abundantly. There was a flow of mucous from the nostrils. Chewing was entirely stopped. There were constant fits and breathing at irregular intervals. Eyes were swollen. Ears drooping, the legs as far as the knees were cold, the remaining portion of the body was hot. Hairs were distended ruffled. The abdomen was swollen with Tympanitis. On enquiries being made, I learnt that till afternoon it was grazing in the pasture land with other sheep. Afterwards it returned to the house. But the sheep was standing with a drooping head. It would bleat occasionally. The people suspecting Tympanitis resorted to native treatment, but it did no good; on the contrary the condition of the sheep became worse. For about half an hour it was lying on the ground, kicking with its legs and jerking coma supervened. I, from these symptoms, suspected snake-bite. Now it was found necessary to find out a trace of the impression of the teeth in order to confirm my opinion. I examined the whole body, especially the legs, very carefully on the

right foreleg above the knee-joint towards the internal region a slight swelling was observed with a red spot about an inch in diameter. When I cleaned it with water I found four small orifices above the spot. When it was dried white discharge was flowing from these orifices. Now all the doubt was removed. I have instantly incised with the scalpals the right side of the back about $1\frac{1}{2}$ inch long and $1\frac{1}{2}$ inch deep. I then put into it a few crystals of Permanganate of Potash and mixed water into it. I have made a wound on the neck and ear and applied the above remedy. After this, I stitched the wounds. After half an hour the sheep opened its eyes and looked about, and shook its ears. This state gave me some satisfaction. After a lapse of about 15 minutes the sheep attempted to sit. It was made to sit by means of a support. Now delirium disappeared and it commenced to breathe regularly. But the abdominal swelling remained stationary, which was painful to the animal. This idea struck me that it was owing to the presence of the excessive gaseous matter. Therefore I have administered a dose of linseed oil, oz. iv, and Turpentine oil, oz. iv. It was carefully attended to during the night. The next morning the sheep was by the Grace of God in a very healthy condition.

CASE NO. III.

Snake-bitten Cow—Gadpurna Plant and Permanganate of Potash.

A cow dark-brown, aged 5 years, the property of Buksh, son of Bhari, of carpenter caste, residing in Kasia. She was brought to my house on the 6th August 1910, at 6 P.M. Her owner told me with great regret that the snake had bitten her. The symptoms were as follows :—Drooping neck, excessive froth in the mouth, cheeks very cold, eyes glossy, irregular breathing and suffocation, jerks, inflammation of the urticarial, swellings all over the body, *hairs ruffled*, swollen abdomen, body hot, the four legs as far as the knee were hot. On enquiry I learnt that she has returned in the evening from the pasture land. Stoppage of *faecal and urinary discharge*, chopped-straw, mixed with oil cake was given to eat, but she felt *no inclination to eat*, when I made a search for the wound, I found impressions of the two teeth on the front of neck from which there was a discharge of serum. One of my friends Saiyed Zafar Yab Ali Sahib, Supervisor of Tongou in the said Tahsil, suggested to me, while I mentioned to him the treatment of the snake-bitten sheep,

that his personal experience so far as snake-bitten persons were concerned, was that the roots of Gadpurna, a natural grass with five seeds of black pepper well-powdered would give immediate relief, and the patient is thereby saved. I have, therefore, sent for that root for experimental purpose. I administered two ounces of the root mixed with 20 seeds of black pepper powdered with water. By its use, the cow commenced to cough. There was a flow of green discharge from the mouth and nose and the abdominal swelling disappeared. The inflammation of the body disappeared; she became out of danger by this treatment. I have as a precautionary measure made an incision in the back, one inch long, and one inch deep, and used Potassium Permanganas. After this she was fully recovered and sent off to her place.

Note.—I have explained to the villagers the uses of the “Gadpurna” root. They also admit them and have different vernacular names for it. In the books on medicine their names are (Biskhopra, *Trianthema pentandra*, a well-known name) (Dev. asp-Persian name.) Gadparnia is a Hindi name for it. It is of two kinds, white and red, but white is largely used. *It spreads on the ground like a creeper.* Has long leaves and small flowers. Its seed resembles that of Henbane. It is an antidote against poison.

[The creeper Biskhopra is commonly found throughout India and known to all as an antidote for Cobra poisoning. There are two varieties of this plant of which the white variety is preferred and the juice of green leaves and powdered root bark are generally used.—EDITOR.]



Linseed Plant and its Poison

BY

G. S. BHATIAGAR,

Veterinary Assistant, I/c, Veterinary Hospital, Drug, C. P.

Linseed is sown in the Chhattisgarh Division of the Central Provinces during the month of October. It blooms in December and is reaped in the following March.

During the month of December when linseed blooms, a sort of poisonous insect appears on it; this insect is a crawler of a greyish colour and about quarter of an inch in length. Whenever cattle eat the insect they fall victims to a form of intoxication, feeling extreme thirst. They drink large quantities of water and stop feeding, rumination is also suspended. Urine is suspended, constipation is followed by hoven. The animal falls to the ground and quickly dies. I had six cases of linseed poisoning during December and January last; four of which were cured.

The treatment adopted by me was as follows:—By means of a trochar I gave creasote 1 dr., carbolic acid 1 dr., linseed oil 1 pint, 1 pint simple oil, was given every four hours until recovery. I have always found the above treatment efficacious in the early stages of the disease, and the passing of the trochar in the later stages. Once the animal has fallen, no treatment is of any avail. Cattle eating the insect, if not treated at once, expire within one or two hours. I hope this will be interesting to readers.

[It is not quite understood how the prescription, containing creasote and carbolic is given, whether by the mouth or by the trochar direct into the rumen.—EDITOR.]



The Sorghum Plant Poison. Urdu—Jowar, Tamil—Cholam

BY

M. HASSEN ALY SAHEB, G.B.V.C.,

Veterinary Inspector, Madras.

History of the Case.—A few years ago a village in Velkore Taluk, in the North Arcot District, reported that a large number of cattle were suffering from multiple abscesses on their body, and the hoofs elongated like shoes and a large number of animals died from this disease. The natives called the disease Paposviyadi, meaning the hoofs elongated like shoes. I was ordered to proceed to the village and diagnose the disease. When I reached the place I actually saw a number of cattle in the various stages of the disease.

Causes.—On investigation I found that some acres of land was cultivated with sorghum jowar, and on account of the failure of the monsoon the crop withered after growing to a height of about one foot; and the ryots not knowing the consequences took this opportunity to feed their cattle with the withering jowar crop, and invariably all the animals that were fed were attacked with the disease. The jowar plant when it is about one foot in height is always rich in hydrocyanic acid, and together with the highly nitrogenous substance contained in the plant, the disease manifested in its aggravated forms.

Symptoms.—I found a very large number of cattle unable to walk owing to the elongated condition of their hoofs. Cattle were suffering from Villitis, all the coronary bands were inflamed and very painful to move on its legs. The animals preferred lying down. Multiple abscesses were found on the various parts of the body, very hard to the touch, and on incision, hard cheesy matter could be pressed out with difficulty.

Treatment.—The animals were given internally an oleaginous purgative, the abscesses were opened and dressed antiseptically, and the over-grown hoofs were pared out and bran poultices applied to the hoofs. The patients made speedy recovery.

Note.—My object in putting this article is to bring to the notice of the profession the poisonous effects of jowari plant when

it is a foot in height. Several cases of choking among cattle are reported by eating jowari plant (1 foot in height), and several cases prove fatal, in my opinion paralysis of the pharynx is caused by the hydrocyanic acid contained in the plant. The ryots apply lint soaked in castor oil to the tips of the horns, and burn them. In the treatment of such cases, it remains to be verified by practice.



Nyctalopia (Night-blindness) in Animals

BY

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This is a disease very commonly met with in our domesticated animals, more especially among draught bullocks, and very rarely taken notice of by the Veterinarians; hence probably this disease does not find a place in any of our textbooks. This disease is also called horse gram-blindness by villagers.

History.—I shall illustrate a case that came under my notice a few months ago, before proceeding to give the causes, and treatment of the disease.

Case I.—On 15th November 1910, Rev. Anderson of Tirukoilur sent one of his bulls to the hospital with the following history regarding feeding. The animal was fed on horse gram soaked in water. The animal has been with him for the last one year. When he bought it a year ago, he used to drive it during day time as well as night time. The animal was going very well.

Cause.—Feeding with horse gram.

Symptoms.—The feeding of the animal was not known before he purchased the animal. After six months under this new feeding, the animal began to tumble during nights, and at the time it was sent to the hospital, it was not able to move even a step further during nights, and if at all pressed by external force it did so, with a very-high action characteristic of blindness, and at times knocking its head against trees or any obstacle that may be in the way, thereby indicating that the animal is completely blind during night time.

Treatment.—I kept the animal in the hospital under my observation, and examined the eye for any disease, but cannot discover any. Immediately I gave a purgative and stopped horse gram given in any form, and then tried zinc sulph. lotion, boric lotion, silver nitrate lotion (1 gr. to 1 oz.) each for three days both morning and evening, but no effect whatsoever is noticed.

By the time, I was talking to a friend of mine who is an experienced medical officer, who asked me to try Ol. Recini or Ol. Morrha,

which he said had been successful in his hands in human patients. Immediately I began to try Ol. Recini, by dropping two drops into each eye, both morning and evening for a week, but to no effect. Then I tried Ol. Morrhae similarly, which to my astonishment, in a period of eleven days completely cured the case. I myself drove the animal on a pitch dark night, before it was discharged, and I found the animal had completely regained its sight. By adopting a similar treatment another bullock was cured in a fortnight. I, therefore, now strongly recommend to the profession to give a fair trial to this medicine and record their experience for our guidance.

Observations of the Disease.—From my own observation of the above case, I am able to say that the disease is brought on by dietetic causes, and more especially overfeeding the animal with horse gram. This disease is more common in bullocks and not so in horses, though the latter are fed chiefly on horse gram can be explained by the fact that cattle are of more phlegmatic temperament than horses and milch-cows are very seldom affected, because they are seldom fed on horse gram; hence it may be easily deduced, that cattle if fed on horse gram are liable to get nyctalopia.

Note.—Few drops of Ol. Morrhae into the eyes both morning and evening, and at the same time, the administration of a purgative and change of diet afterwards can bring about a recovery.

It has been the common practice of the cattle owners of Southern India to give green leaves of Agati Glandiflora to cattle that are blind from the effects of horse gram feeding. The leaves are said to possess good chologogue properties.—EDITOR.



“The Importance of Live-stock for an Agriculturist”

BY

ASUDUR LALL,

Teacher, Veterinary Science, Lyallpur Agricultural College, Punjab.

For an agriculturist in this country the maintenance of domestic animals like horses, bullocks, cows, buffaloes, sheep and goats, &c., is a necessity as they form the back-bone of agriculture. All major works of agriculture are carried out through them, namely, ploughing, hoeing, threshing, working of wells, transport, flour and oil mills, &c.

Apart from this, they supply us with the most wholesome and nourishing diet in the shape of milk, curd, butter, ghee and whey which form the most integral part of the life of man in this country and especially of the cultivators.

The least important of these, *i.e.*, whey is a desideratum for a cultivator, and in fact, he considers his life a misery if he cannot afford to have its draughts every day. It is not only a habit that has made whey a necessity, but you, belonging to the Zamindar class here best know what a useful article it is. This is now being admitted in scientific circles that whey is in reality a nourishing, cooling and refreshing draught. It subsides the thirst, it reduces the advanced bodily temperature and removes fatigue, in other words, it is a cheaper and convenient substitute for the present-day Lemonade and Lime Juice used in towns and among higher classes.

Even the refuse of these animals, *viz.*, dung and urine are not devoid of benefits in one way or the other for the Zamindar. These form valuable manures greatly useful in agricultural and gardening pursuits. Moreover, the dry dung is used in this country as fuel to a large extent, also fresh dung is employed in *leaping* dwelling houses.

After death the dead bodies of these animals are of great commercial value and of general utility yielding hides, bones, hoofs and horns, &c.

I do not wish to dilate at present on the uses and bye-products of these articles, but what I really aim at is the importance of breeding of these beasts by Zamindars and the commercial advantages resulting therefrom.

This is very important matter, and is worthy of very serious consideration. In this way they will not only be saved from the inconvenience of emptying their pockets on the purchase of animals to meet their requirements, but on the contrary, will have the pleasure of filling their coffers by the sale of surplus stock. The reason is not far to seek, as you know that a Zemindar can have a sufficient fodder of their own, he has little to spend over it in comparison to other people. It is a plain fact that an average Zamindar in this Province generally keeps 8 to 10 cows, 4 to 5 buffalo-cows, 3 to 4 mares for his own requirements.

From this small stock he can make a sufficiently satisfactory start, and after 2 or 3 years will be able to earn by issuing the young stock about Rs. 2,000 a year, nowadays when an average cow or bullock, buffalo-cow and horse fetches as much as Rs. 100, 150, 250, respectively. I dare say that by proper management of feed and keep one can earn as much, if not more, as by cultivating a given plot of land.

But the best results can only be obtained by following scientific lines and Hygienic principles, as regards the breeding, feeding and housing of animals. This is the main thing which I am sorry to say that our Zamindars have entirely ignored, even at considerable personal inconvenience and losses.

A little foresight and adherence to ordinary scientific principles in such important matters is very essential. I note here few main points to be kept in view for breeding purposes, the first of these is that the breeding stock whether cows, buffalo-cows, mares, sheep or goat should be of a good type, well shaped and healthy, and they must be mated with a high class suitable sires. Their progeny in this way would necessarily be of a good order.

The expenses of the maintenance of a good stock is quite the same as of inferior animals, but the difference in their sale proceeds is enormous.

Another thing that the young foals and calves should not be deprived of the milk of their mother and avoided the practice of keeping the young stock tied. These objectionable practices result in rendering the young stock weak and misshapen.

As far as the human being, so far the young animal, ample wholesome food, plenty of exercise and freedom in early age contribute to their rapid growth and development of shapely bones.

Proper attention should also be paid to the care and feed of pregnant animals, and should be protected from unfavourable conditions such as excessive cold, heat, hard work and starving.

The second element to cope with in respect of domestic animal is contagious disease which generally inflict heavy losses on Zamindars. Instances are not wanting, where entire herds have been utterly destroyed by these pests to the utter dismay of a cultivator.

When a contagious disease makes its appearance, the best course to be adopted is to immediately segregate diseased animals, and not to allow them to have any connection with healthy ones. Moreover, the pastures where diseased animals were seen grazing and the fairs reported to harbour such epidemics should be avoided as far as possible. The carcasses of diseased animals should carefully be buried or burnt.

Proper heed should also be given towards the disinfection of stables, sheds and houses as the germs of contagious diseases exist in the 'excreta' of infected animals, and if a healthy animal is tied at the places where the diseased animals have been standing, the former is sure to catch the contagion.

Thirdly is the adoption of hygienic principles, and is a very important matter. Plenty of fresh air, good wholesome food and clear water should be regularly given. Disregard of these simple matters leads to diseases of different sorts and results in heavy losses.

Fourthly the storage of fodder is another thing to be borne in mind. In seasons of plenty it is a wise policy to store for future use, in time of scarcity, when very dear and valuable animals had either to be parted with or allowed to die for want of food.

Finally I draw your attention to another defect among the agriculturists of this Province that they look down on sheep and goat breeding as befitting only to lower and poorer classes. This is a mistake against the principles of enterprise. I would strongly recommend you in your future agriculturist life the importance of sheep breeding industry. It is both an inexpensive and profitable job and forms an important part of agricultural trade of the world.

The last but not the least is the importance of poultry breeding and which can advantageously be taken by a cultivator as a profitable industry.



Strangles.

BY

ABDUL RASHID G.P.V.C.,

Central Provinces.

A country-bred chestnut pony aged five and a half years, belonging to Ramkrishna Malguzar of Ganiari, was brought for treatment to the Bilaspur Veterinary Dispensary on the 15th January last. On a careful examination, the following symptoms were observed :—

Symptoms.—The animal seemed to be in a great distress and in a pitiful condition. He was dull and weak. The appetite was impaired, temperature was 103° , bowels were constipated and the animal had a staring coat, and he was coughing also. There was a hard tumour in the sub-maxillary space. This much went to show that the animal was suffering from Regular Strangles.

Treatment.—The following prescription was given first internally :—

R.

Solution of acetate of ammonia ... 3 iii

Spirit Aether nit. ... 3 i

Bicarbonate of potassuim ... 3 iv

Water to one pint.

Nitrate of potass. was also administered in drinking water.

As the tumour was a hard one so fresh, hot poultices were applied and renewed every hour, which made the tumour soft in two days, when it was opened by Syme's abscess lancet which was made antiseptic beforehand, and the wound was washed with carbolic lotion 1 in 25 of water.

The animal began to show better symptoms and the same treatment was continued.

Lodging.—As regards lodging I may add here that he was kept in a clean, moderately warm and well ventilated stable.

Diet.—The diet consisted of linseed gruel and good grass.

The patient showed signs of recovery day by day, was completely cured on the 25th January 1911.

Modern and Unani Medicine Contrasted.

BY

M. HASSEN ALI SAHEB, G.B.V.C.

Veterinary Inspector, Madras.

Yoke Gall or Tumour on the neck in Bullocks.

Causes.—When fresh animals are put to the yoke, or when more weight is thrown on the yoke, inflammation is caused and yoke galls or tumours are formed.

Symptoms.—Swelling pain and tenderness of the neck, and the animal is unable to bear the weight of the yoke, and the formation of tumours or abscesses on the neck.

Treatment,—Scientific.—Applications of astringent lotions made of zinc sulph. and plumbi sub. acet., and a paste of Creta preparata acetic acid and sodium chloride are applied until the inflammation subsides and the removal of the tumours or accumulated blood or pus by means of operation and treatment of the wound by antiseptic dressing.

Treatment,—Native.—Throughout India there exists a common plant called A'g or Binmole Booti in Hindustani, and it belongs to the natural order Asclepiadaceæ, called Calatropis Gigantea commonly known as Mudar plant, and the application of the juice of this plant to the tips of the horns soaked in cotton lint for three or four days. This method of treatment cures the inflamed neck, and tumours are absorbed, in fresh cases in a week or two without the necessity of an operation. It is observed that the tips of the horns with lint containing the juice are rubbed by the animal on either side of the body and small circular blisters are formed. The thickness and tumours of the neck are absorbed, and the neck becomes perfectly natural. The Therapeutic action of this drug is wonderful. It is also used in cases of obscure lameness of horses by internal administration of its root bark. It is commonly used in the treatment of many diseases for man and beast by native doctors and has been highly spoken of by Dr. Watts, in his "Economic Dictionary of Indian Drugs."

I have found that in fresh cases of inflamed neck mere application of the juice of Mudar plant to the tips of the horns, as

stated above, is quite enough to effect a complete cure without any application on the neck.

For the convenience of practitioners I give the Therapeutic action of the abovementioned drug as follows :—

"The leaves are given as a stimulant in combination with Sodium Chloride in indigestion and flatulence. The flowers and root bark are used as a tonic and alterative. The succulent stalks are given to cattle suffering from Hoven. The juice is used in skin diseases. In large doses the juice acts as an emetic and an irritant poison. It is used in criminal cattle poisoning. Castor oil acts as an antidote." *Bazaar Medicine* by Major J. D. E. Holmes.



CLINICAL NOTE.

A case of Poisoning by Charcoal Fumes

BY

CAPTAIN E. P. ARGYLE, A.V.C.

The subject was a dachshund dog, nine months old which had been placed in a small room, without any ventilation, together with a bitch and three puppies of three weeks old.

The owner had put them there the previous night to keep them warm, and about midnight he added a bucket of burning charcoal to prevent them from catching cold. He then closed the door and went to bed. In the morning the bitch and one of the puppies were dead, the other two puppies were dying and the dog was very ill.

Symptoms.—The dog had no power in his forelegs and kept pushing himself forward with his hind ones. He kept his head on the ground and scraped the skin off his nose and lips. He howled continuously, and at intervals had chronic spasms of the muscles of the neck and hind limbs. The pupils of both eyes were very much dilated, and he appeared to be quite unable to see anything. If handled at all, he howled much more, and the convulsive movements became intensified, distressing him greatly.

A large shallow box, containing a straw bed, was brought for him, and on being placed in it, he pushed himself into a corner, burrowing under the straw with his nose and howling loudly.

His pulse was 170°, but very weak.

Temperature normal.

Respirations irregular and very shallow.

If left alone he became quieter, but any movement excited him immediately, and the convulsions came on again. There was a peculiar faint, acrid smell about his skin. He remained in this state for three days.

Treatment.—The dog was kept outside under a tree and covered with warm clothing.

A cold pad and later an ice bag were applied to his head.

Frequent rectal injections of oil and warm soap suds, which brought away a quantity of hard faeces. For two days he passed no water at all, but on the third day he urinated freely, after which he lapped milk and began to take more notice. The pupils of his eyes were still widely dilated.

Two days later he got on his legs and walked about, but he was blind and ran his head up against everything he met. His mucous membranes were very anæmic. He still had convulsions, but at longer intervals, and, as he now has less objection to being handled, sedatives were given to steady him. But as he remained in this condition and the owner became distressed about him, he was destroyed after about a month.

The Antiseptic Power of Tincture of Iodine— Its use in General Surgery and Veterinary Medicine.

According to Bucholtz 1 in 5,000 solution of iodine is capable of arresting the growth in cultures of micro-organisms, and Kock stated that such solutions destroyed anthrax spores in 24 hours.

A watery solution destroys the virulence of fresh black—quarter material ("Charbon Symptomatique," Arloing, Cornevin and Thomas), and 1 per 15,000 solutions kill anthrax bacilli and destroy the virulence of pus. Iodine penetrates deeply into the tissues and is not toxic except by continued administration. These render it undoubtedly superior to mercurial compounds, which coagulate albumins, may produce trouble through absorption, and are only superficial antiseptics.

In 1908 Grossich found in the case of wounds the use of iodides not only prevented contamination, but caused healing by first intention. As a result of his observations he used tincture of iodine as an antiseptic in preparing the seats of operations.

Döderlein and Quener also adopted this plan.

Walther and Touraine placed on record the value of this plan as a result of their histo-bacteriological examinations. Sections of skin that had been treated with tincture of iodine showed that it penetrated through the epidermis into the superficial layers of the dermis and produced a considerable leucocytosis.

Numerous cultivations made from scrapings and fragments of skin proved that disinfection was complete in ten minutes or so. It requires twenty to thirty minutes to complete disinfection by washing, drying, and washing with ether and alcohol, and such disinfection is only temporary.

Iodine, on the other hand, soaks into the tissues readily, enters the intercellular spaces by way of lymphatics, and penetrates into the excretory ducts of the glands and destroys any organisms there.

It is not advisable to wash first with water; as this retards the penetration of the iodine. All that is necessary is to clip or shave the area and swab it with a tampan of cotton wool soaked in tincture of iodine.

If local anæsthesia is used the seat of operation should be dressed with iodine after anæsthesia is complete and again after sutures have been placed. If the skin be greasy or dirty it should be washed with alcohol or ether and dried.

Tincture of iodine should not be used pure on mucous membranes, but should be diluted with a solution of potassium iodide. Berard and Chatiot advise iodine as a disinfectant for the Surgeon's hands, and suggest that the hands should be washed for several minutes with soap, dried, on antiseptic gauze, and a little tincture of iodine rubbed over the hands and arms with a tampan of absorbent wool soaked in 60 per cent. alcohol. The brownish discoloration is easily removed by washing in water containing ammonia.

Chassevant states for very delicate skin 1 in 20 iodized chloroform should be substituted, as it keeps the skin supple, and does not cause pain or desquamation—*Donville Rec. de Méd. Vét.*



Nuclein in Fistula and Poll-Evil

BY

Z. W. SEIBERT.

This may not be new to most Veterinarians, but is new to me. I had never heard of nuclein being used in fistula or poll-evil when I began using it.

Case 1.—A 1,100-pound, three-year-old black horse was brought to me 13th November 1909, with history that for three weeks he had carried his head to one side and seemed listless and dull. Then the owner noticed a lump between the ears and brought him to me. I took the horse under my care, opened the abscess, gave good drainage and treated him under the old line of treatment. Not succeeding at first, I used first one thing and then another, until I had used everything I had ever heard of from A to Z. But the longer I treated the worse he became. I suppose I am not unlike most Veterinarians in that when my resources have failed will try any old thing. So I continued until 17th December and the treatment was still doing no good. I wondered what next to do. The horse was so bad. I thought the best dose would be one of lead, but the thought struck me to try nuclein, which I did by way of experiment. I gave my patient 10 c.c. of nuclein solution in 10 c.c. of saline solution every day, and to my surprise on the sixth or seventh day, I saw some improvement. I kept up the same treatment until 19th January 1910, skipping only four days in this time, and therefore giving in all fifteen doses. The horse went home all healed up and has remained so to the present time. I kept the wound drained well and dressed it daily with hydrogen peroxide.

Case 2.—A grey horse that was brought to me on 22nd November 1909, with the following history: He had been brought out of a cartload of western horses which were sold at Shelby, Ohio, in June 1909. The owner said the horse had a small lump on the poll when purchased. This lump was there until one month before he brought him to me, when it had opened. I operated on this case and secured good drainage on 23rd November 1909. I guess I used all the medicines in the materia-medica ("and then some") on this case, but nothing seemed to do it any good. On 17th December 1909, I began to use nuclein as in Case 1, giving in all

sixteen doses. The horse went home 5th January 1910, all healed up, and was later sold for \$225.00.

Case 3.—A grey six-year-old 1,300-pound mare was brought to me on 23rd May 1910, with a well developed case of fistula. I gave it good drainage. You can see by the dates there was nearly one year of difference in these cases. In this year bacterins had come to life, so I decided to try this treatment here. I gave five doses of bacterins, four days apart with no result whatever. I then began the nuclein as before and noted improvement in six or seven days. She was sent home on 15th July 1910, nearly healed up and is at present working every day. (27th October 1910).

Case 4.—On 22nd July 1910, I was called to see a case of fistula, near Tiro, Ohio. This was a grave case; for some reason there had already developed a septicæmia of the withers. I told the owner that the outcome was doubtful. On tapping the swelling I found a small amount of pus but much foul-smelling, sour gas. I had the horse brought to my hospital and gave the abscess a perfect drainage. Two of the spinous processes were diseased. They were removed by means of bone saws. I pushed the bacterins every five days for a month with no improvement. I then discarded the bacterin treatment and began to give the nuclein every day, and on 10th September 1910, the horse went home, doing well but not entirely healed up. With local treatment he continued to do well, and is at present (27th October 1910) all healed up.

I have been using a 5 per cent. nuclein solution and make my own saline solution from tablets prepared for the purpose, using one tablet to four ounces of boiled water. I report these four cases because I exhausted all other means of treatment I knew of without success. I have used nuclein on other cases, but the forementioned were the worst ones.

The use of nuclein in poll-evil and fistula has convinced me that it is a good treatment for these conditions. I warm my solution in a 20 c.c. hypodermic syringe to body temperature to prevent shock.—*American Journal of Veterinary Medicine.*

EXTRACTS.

Guinea-Worm in Domesticated Animals, with a Note of Its Discovery, by Mr. Charles Grey, in a Leopard.

BY

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Helminthologist to the London School of Tropical Medicine.

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One of the most curious anomalies in the geographical distribution of dracontiasis has been the absence of the disease in Africa, south of the Equator, although endemic northwards from the Line to the Tropic of Cancer. It has been suggested that possibly the particular species of *Cyclops* essential to the development of the parasite may not occur in the southern half of the Continent. Quite recently, however, a mature guinea-worm has been found by Mr. C. Grey at Broken Hill, North-West Rhodesia, in a leopard, I am indebted to Sir Patrick Manson for the specimen, and for kind permission to record it. In a letter dated November 27, 1909, Mr. Grey says: "The leopard appeared to have Guinea-worm. I killed it the night before last near my house, but could not get at it till yesterday morning. On skinning it I found pieces of worm visible in eight or nine places in the connective tissues, and appearing to come from beneath it. The first worm I noticed was sticking out of the bullet-hole in the shoulder. The leopard was in good condition, and had a very good coat. I have never heard of the guinea-worm being found in man here. The doctor here has never had a case. I send a piece of the worm and some films."

The piece of worm sent resembles exactly the guinea-worms found in human beings on the West Coast of Africa. In appearance it is white and glistening; in length, 45 cm.; breadth, 1.5 mm. Both extremities are missing unfortunately. The body is filled by a single uterine tube crowded with embryos, which correspond exactly in size and structure with those of *Dracunculus medinensis* from man.

There are a number of records in literature of the occurrence of Guinea-worm in the lower animals. They may be divided into—

(1) Those based on common report. Under this heading are to be grouped the references to the presence of guinea-worm in cattle and dogs in the writings of Avenzoar, 1490; De Marchais, 1727; and Pruner-Bey, 1847. Hussem (1771) states explicitly that Doerssel found a guinea-worm in a dog at Buenos Ayres, and at another time in a dog at Curacal. Kuchenmeister (1855) is of opinion that the parasites may even be met with in aquatic birds! Heckenroth (1906) is quoted by Bartet as authority for the statement that the disease occurs in sheep and cattle in West Africa.

(2) Papers describing actual cases. These record infections in the horse, dog, wolf, jackal, hunting leopard, and monkey. Smyttan (1825) says: "I have never heard of quadrupeds being subject to *Dracunculus*, but an instance of it occurred here (in India) last rains in one of the officers' dogs. After being lamed for a few days in one of his forelegs, he was observed by several officers (some of whom had had too painful experience to mistake the thing) to pull a guinea-worm out with his teeth."

Forbes (1838) relates that "A tattoo¹ was exhibited at Dharwar (Bombay) having a worm protruding from the right hind fetlock; it was of the usual size, and made its appearance as a boil. I examined it before and after extraction, and could perceive no difference in any respect from the human *Dracunculus*. My friend Dr. Walker gave me a specimen of a guinea-worm extracted from the neck of a dog, and I have undoubted reports of a similar occurrence at this station."

Clarkson (1844) records "A case of *Filaria medinensis* in a horse of Australian breed at Katagherry, India, in 1837." He says: "A small enlargement on the lower part of the large pastern, in the centre of which, from a peculiarly irritable sore, a guinea-worm was seen hanging out about the length of two inches. It had somewhat the appearance of a small tendon, being about one-sixteenth inch broad, and half that in thickness; the portion that had been most exposed to the air was withered and shrivelled. On pulling gently at the worm, two inches more were drawn out, and it then became fixed. Fomentations were directed to be tried. On

¹ A country bred pony.

the next morning two inches more of the worm were readily withdrawn from the opening. In this state it continued for three days, when the worm was no longer visible."

Cobbold (1881) showed, at a meeting of the Linnean Society, a specimen of a guinea-worm that he had received from Veterinary-Surgeon F. Smith. The worm was taken from a pony at Secunderabad, India. Dr. Cobbold remarked that "the occurrence of *D. medinensis* in the horse is extremely rare, so much so that some authorities, including Fedschenko, have altogether denied its presence in solipeds. A comparison of the embryos from Mr. Smith's specimen with some of the young from an ordinary human guinea-worm recently sent by Dr. Macallum, of Bombay, showed, however, that the embryos are in all respects identical."

Griffith (1888) saw a guinea-worm in a fox-terrier bitch belonging to an officer in Cairo, Egypt. "The worm was situated along the front of the forearm, extending from the elbow to the foot. It could be distinctly felt underneath the skin, coiled up like a piece of twine. The dog appeared in good health, but an abscess had formed in the region of the foot at the extremity of the worm." The worm, when extracted, measured two and a half feet in length. It was submitted to Dr. Osman Bey Ghalib, a well-known naturalist, who confirmed the diagnosis.

The Editor of the *Veterinary Journal* (1888), commenting upon this case, wrote: "Whilst at Tientsin, North China, we found the mature *Dracunculus* in an abscess on the outside of the tarsus of a horse, which had been brought from India. The specimen was sent home to Professor Dick, and is now in the museum of his school in Edinburgh."

Piot (1889) describes six cases in Egypt in—

(1) A European dog, in which the worm made its appearance on the inner surface and in the upper third of the right fore-leg. The owner had already extracted a fragment 18 cm. long, and after some days Piot removed 30 cm. more.

• (2) A native dog, in which a worm presented on each of the four limbs, viz.:—

(a) On the middle of the internal surface of the right fore-leg.

(b) On the lower third and posterior surface of the left fore-leg.

(c) On the middle of the outer surface of the metatarsus of the right hind-leg.

(d) On the lower third of the inner surface of the left hind-leg.

(3) A jackal, killed at Aboutig, in Upper Egypt, in which there were three worms. One worm lay coiled up on the inner surface of the left knee-joint, another on the inner surface of the right leg, stretching as high as the upper third of the thigh. A third, situated in the upper third of the left fore-leg, and of which a fragment 12 cm. in length was extracted.

(4) A native dog, which had a number of subcutaneous tumours in the right hypochondriac region, on the sternum, and on the inner aspect of the left fore-leg.

(5) A dog from which Dr. Sonsino and Mr. Walter Innes extracted a piece of guinea-worm about 40 cm. long from the hind-foot.

(6) A wolf, in which a guinea-worm was found lodged in the subcutaneous tissues of the left thigh.

Batliwala (1893), a Veterinary Inspector in Burma, described a case in the horse at the Bombay Veterinary Association: "The animal was previous to date in perfect health. On examining him, I found him lame on the near hind-leg, but there was nothing to account for the lameness except that a small ulcer of about the size of a four-anna piece was found on the outer side of his fetlock-joint, with a little swelling around it. The swelling was painful to the touch. On pressure a few drops of pus, together with a thread-like white structure, came out of the ulcer. On pulling it out gently, I was able to draw forth a few inches of this thread-like structure. As it looked very much like guinea-worm—which, I may say, is very common in man at Katyawar—I tied up the end of the worm with a piece of thread and wrapped it round the fetlock. The next morning I was again able to draw out about an inch more of the worm, and kept it tied round the fetlock. On the third day, however, while pulling it out as usual, the worm gave way, and the whole thread now measured, in its dry state, about 5 inches in length."

Cinotti (1906) quotes a case of guinea-worm in a bitch that had arrived in Italy from Egypt five or six months previously.

Cazalbou (1909) found a dog at Timbuctu, where the worm was escaping between the interphalangeal articulations of the fore-leg.

Cazalbou (1909) saw also three guinea-worms in monkey (*Cercopithecus callitrichus*), one situated in each of the lower limbs and the third presenting in the neighbourhood of the umbilicus.

Of special interest in connection with Mr. Grey's find is a paper published by Valenciennes in 1856 describing a number of filariae that were coiled up in the connective tissues under the skin of the legs and abdomen of a hunting leopard (*Felis jubata*) from Kordofan. One of these parasites had made a perforation on the inner aspect of the limb a little above the lower extremity of the tibia. Valenciennes named these worms. *F. aethiopica*, as the head appeared to be more slender than that of the *F. medinensis* preserved in the Paris Museum, but Blanchard considers them identical.

To sum up, most of the above records give sufficient detail to enable one to acquiesce in the diagnosis. We have the authoritative opinions of Dr. Osman and Professor Railliet upon the parasite in the dog, and of Dr. Cobbold for that from the horse, so that there seems little room for doubt that the guinea-worm is able to infect and attain maturity in these, if not in all of the domesticated mammals.



Filaria Medinensis in the Dog

BY

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In the *Journal of Tropical Medicine and Hygiene* for March 1910 page 65, appears an article by Dr. Leiper in which he reviews the literature to date, on guinea-worm in the domesticated animals.

The literature reviewed contains only two references to guinea-worm in dogs in India, namely, Smytton in 1825 and Forbes in 1838.

Referring to the dog and horse, Lieper concludes "there seems little room for doubt that the guinea-worm is able to infect and attain maturity in these, if not in all of the domesticated mammals."

This note is to place on record five cases of *Filaria medinensis* in the dog, two cases occurring in the Dog Hospital, Punjab Veterinary College, the other three cases occurring in the Veterinary Hospital, Simla, and found by Ghulam Husain, the Veterinary Assistant in charge.

In all cases the worms were identical with the human parasite and contained a white fluid in which were the coiled up embryos.

Four cases out of the five were dogs which had lived in Lahore but nothing could be found out about the history of the fifth case, one of the Simla cases.

All the cases occurred in 1909.

Case I.—A brown water spaniel, brought to the Lahore Veterinary College, suffering from distemper. The dog's condition was very bad and he was covered with bed sores. There was a suppurating wound at the left elbow which on probing was found to extend to the knee with no inferior opening.

Maggots were present in the wound and at the dog's first visit these were all removed, and the wound dressed but no guinea-worm was observed. The wound and adjacent parts were much swollen and inflamed but no particular pain was noticed in the wound. On the dog's second visit more maggots were removed and the end of

a guinea-worm was seen and caught up in a pair of forceps. By gentle traction with two pairs of forceps the entire worm was removed and then a smaller worm from the same orifice.

The smaller worm after removal was about a foot long, and the longer about one and-a-half feet long, but exact measurements were not taken before preservation of the worms.

The dog was so exhausted from distemper, bed-sores, and insufficient attention by his owner, that he was incapable of showing signs of pain when the worms were being extracted, and the wound dressed. He was taken home and not brought again to hospital, so most probably he died.

Case II.—Was a mongrel dog, belonging to a native, which had a deep subcutaneous wound on the hind leg in front of the tibia. It was brought to the Lahore Veterinary College for treatment. A guinea-worm five inches long was drawn out with forceps, no great pain being shown during the operation. The wound was dressed and the dog taken away and not brought back again for treatment.

Case III.—Was brought to Ghulam Husain at the Simla Veterinary Hospital for treatment. The right hind leg was much inflamed and too painful to put to the ground.

Swelling extended from above the hock down to the paw and a ripe place was found near the hock, which was opened, and discharged pus and blood. The wound was dressed that day and again the next, and in four or five days healed. Another ripe swelling developed near the left elbow and healed in a few days under treatment.

A day or two later, the wound near the hock again gave trouble and another ripe boil formed, on opening which the end of a guinea-worm was seen. By careful traction the whole worm was removed unbroken.

Examination showed a small swelling above the paw of the left hind leg. After incision, a worm was found and drawn out for about two feet when it looked like rupturing, so it was wound on a stick and bandaged to the dog's paw.

Six or eight hours later the worm was wound out six inches further, when the dog gave a sudden jerk and the worm broke.

Six days later the remainder of the worm was extracted from a swelling which formed higher up the leg, and the wound healed.

A few days later two more blisters were found, one on the left hock and the other near the left elbow; both were opened and guinea-worms removed.

The same trouble as before was experienced with the worms breaking in removal, but both were extracted in pieces by winding the worm round little pieces of stick, after which the wounds healed rapidly.

Ghulam Husáin says, "the other two dogs also showed the same symptoms, and three or four worms were removed from each from different parts of the body, limbs, chest, scrotum and sheath."

I have examined the worms removed by Ghulam Husain, and as far as I can make out they are of the same species as those found in the Punjab Veterinary College, namely, *Filaria medinensis*.—(LINNE).



Azoturia

BY

D. W. COCHRAN, *New York.*

Azoturia signifies an arrest of locomotion caused by paralysis of the limbs of either the anterior or posterior extremities, together with a morbid change in the character of the urine.

It is a well-recognized disease, peculiar to the horse. It may exist in the mule. I have never seen a case in my experience.

It is a disease of the well-kept horse. It does not occur in poor, neglected horses. It is a disease of plethora. It comes on in young, vigorous animals, when growth and development are proceeding rapidly; occasionally or rarely in horses of advanced age.

It is called by some authors a blood disease. Some a nervous disease. I think it is primarily a blood disease, for the physiological relations of the blood to the solid parts being so intimate, it is to be expected that pathological changes in the blood would give corresponding morbid phenomena in the organs and tissues of the body.

Our knowledge of the susceptibility of the nervous system to morbid influences derived from an abnormal composition of the blood, and especially of the "effects" of the toxic principles of the blood, due to an accumulation of poisons in the system, may be illustrated by the injection of some powerful nerve stimulant as strychnine and aconite into the blood. The nervous system responds very promptly to their physiological toxic action.

The history of one case is about the same for all. We get a great many cases in the cold weather. Almost in an epizootic form, about the Christmas and New Year holidays. The working horses have had a couple of days' idleness, they have been fed the same as though they were working steadily, very often less, but they get no exercise in the meantime. Here we have two factors—idleness and rich feed. The equilibrium between waste and repair is suspended and plethora is established at the expense of the various excretory channels, which seem to have become inactive through "engorgement."

This is a fact which we do not recognise, nor can we by any physical means, until the horse has been driven for about one hour, or the distance of five or six miles. He starts from the stable in the best of health and condition, vigorous and robust.

After being driven for an hour or thereabouts, a change is noted. He begins to hang back, begins to perspire freely, a cloud of steam arising from his body. We have now a period of great excitement. He exhibits a hurried respiration, an anxious look; he suddenly becomes very lame in one hind leg. He stops altogether, he trembles all over, looks around at his side, acts as though he had colicky pains, his back becomes arched. Inability or loss of control of the muscles of the stifle. He begins to knuckle at the fetlock. Stands in this position for a few seconds and then falls to the pavement; he again arises on his forward legs, drags himself along on his flexed posterior, knuckles and falls again prostrated. He will struggle violently. He becomes delirious and is uncontrollable. He often lays in the street in this condition for hours. He is all covered with mud and slush, often laying in piles of snow. The attendants are exhausted trying to keep him under control. About this time an ambulance arrives only to add to the existing excitement. He is pulled and hauled and loaded on a platform and dragged in and out of the ambulance before he can be put under treatment. The period of excitement through which he just passed generally leaves him in such a state that treatment is hardly of any avail. The treatment which is resorted to on the street is only palliative: generally a hypodermic injection of morphine.

In a few cases the driver of the horse will notice that his horse is becoming affected (and most of all of them at the present time know) and will hurry him off to the nearest stable and get him off the street. If immediate treatment can be administered, they often make good recoveries.

Pathology.—Under this head while the inquiry will lead to a confession of the imperfection of our existing knowledge, the *post mortem* does not reveal anything to base a conclusion on. The clinical symptoms are recognised by cramp or convulsive spasms of the muscles of the superior spinal region, the muscles of the gluteal region, paralysis of one or both posterior extremities. We have also one ever-present condition. A coffee-coloured urine

which he may expel himself if he will stand long enough on one leg, or we may resort to catheterization or to pressure on the surface of the bladder.

This coffee-coloured urine, while it is a constant condition, *symptomatic* of this disease, is also noticed in other diseases. In this disease it is a condition of plethora. In other diseases, that of *anæmia*. The history in both cases will be different. In the dark-coloured urine of azoturia we have a condition due to a plethoric state of the vascular system which is favourable to some form of hæmorrhage. This may be predisposed by over-feeding, sedentary habits or other causes of plethora. It occurs about the time when growth and development are proceeding rapidly. It has been supposed to be due to red blood corpuscles becoming disintegrated and dissolved, or to a nervous disturbance leading to dilatation of the renal vessels with the consequent escape of some of their contents without rupture, or it is probable some may break down and become dissolved. It may be due to an obstruction in the ureter or to a retention of urine in the bladder. A uræmic poisoning may occur due to an accumulation in the blood. The circulation of which through the nervous and muscular systems lead to cerebral symptoms.

As has been stated, a couple of days' idleness, rich food, and no exercise in a young, vigorous animal are the three factors which are the causes of the invasion of this disorder. While, on the other hand, a horse might stand in his stable for two weeks or two months, under the same conditions, and have no bad results. Two or three days seem to be more unfavourable than two or three weeks or months.

Diagnosis.—Generally very plain, occasionally very obscure. There are times when it will require some close attention and study to make a diagnosis. In a mild form, it might be taken for a case of colic; there might be noticed a slight giving away at the stifles, or a slight hardening of the muscles of the gluteal region. He may remain in this shape for half an hour or more. He will lay down and get up often, and then suddenly develop the pronounced symptoms of azoturia. We have also another type of horse to deal with, which may often mislead: a horse that is not in the habit of lying down while in the stable. If this horse falls in the street, he may make a

good many unsuccessful attempts to rise. Very often after laying in the street for a couple of hours and resting, he will get up with assistance and walk home. But in a genuine case of azoturia, the differential diagnosis is easily established. We have our history and the dark-coloured urine.

Prognosis.—Either satisfactory or very grave. A great deal will depend on the intensity of the invasion, the degree of excitement or delirium, and the rigidity of the muscular lesions involved. It is a disease of a great many presentations. Environment has as much to do with the successful treatment of this disease as almost any other disease. The style and temperament of the horse is also to be taken into account. The successful form of treatment of this disease in one locality will give negative results in another part of the country. In my locality a horse that is under treatment, if, after twenty-four hours subsequent to his arrival at the hospital, he shows no delirium, we can give a favourable prognosis. The main object is to control the delirium. If we cannot get this under control, our horse goes on to a rapid dissolution. If the delirium abates, we may have a complete or incomplete recovery.

Sequelæ.—In cases of complete or incomplete recovery, about one of the first things we will have to contend with, are bed sores of an extraordinary character. There will be great sloughs of muscular tissue at the angle of the ileum, at the coxo-femoral articulation, at the stifle, at the elbow, and injuries to the head. Another condition I have met with has been laminitis. I have had a hernia of the soles of both hind feet. I have had a malformation of both hind feet. The one which he has stood on, large and flat, the other small, *contracted*. I have seen large osseous deposits in the hock from the same causes. Then also we have a great wasting away of the muscles of the patellar region, due to nerve paralysis; he has absolutely no use of this limb. He may remain in this condition for an indefinite period. Some cases over a year before normal conditions are *re-established*. Nature does all the work. No treatment in my hands seems to be effectual in hastening a favourable termination. Another condition I have noticed in some horses: there has been a permanent structural change, horses with sway backs and long hips have changed to arched backs and dropped hips.

Treatment.—The plan of treatment which I have resorted to for over thirty years has given me some good results. I have never had a failure whenever I was able to administer the treatment quickly. On the other hand, I know I have lost many horses where prompt action was not obtained.

- The plan of treatment is symptomatic—treat the cause. As this is a disease of plethora or engorgement, the treatment should be by rapid depletion. I say rapid, for this disease runs such a rapid course; medicinal agents alone will not give results. If a horse will stand on his front legs or can be held in a standing position for a couple of minutes until I have extracted ten or twelve quarts of blood from the jugular vein, and then follow this up with a large aloetic bolus, I have the most of my work done. The copious bleeding seems to relieve cerebral congestion. My horse lies quiet and the medicinal agents act more promptly and urination is accomplished voluntarily. The supplemental treatment is warm water enemas, and a careful watch as to the comfort of the patient.

In cases of anterior azoturia, I would strongly advise the use of slings. In my opinion, slings do more harm than good in posterior azoturia.

One invasion does not give immunity to a second invasion. I have had a horse with three attacks.—*American Review*.



Two cases of acute Laminitis with favourable Termination under Adrenalin Treatment

BY

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CASE I.—The subject was a household Cavalry troop-horse (gelding), aged four.

The horse was under observation at the Infirmary on account of slight urticaria, and on August 3 last, whilst being exercised, led round the barrack yard he slipped and fell on the near side. He got up and was apparently none the worse. The following day there was slight lameness on the near hind. This lameness increased on August 5 and 6, and on August 7, the horse was exceedingly lame and putting little or no weight on the limb. He was therefore placed in slings on this date. The lameness was referable to the hock, which showed some general diffuse swelling, heat, and tenderness to pressure around the joint. On the morning of August 8, the horse was found cast and badly entangled in the slings, having apparently tried to jump out of them during the night. On being released he subsided to the ground and was found to be unable to rise. The horse was then seen by Mr. G. H. Williams, M.R.C.V.S., who had the slings again placed under him and endeavoured to haul him up. The horse made, however, no effort whatever to stand, and it was found necessary to let him down. He fed well during the day, and about 4 P.M., he got up by himself with ease. He was seen again by Mr. Williams that evening, who found the horse up but quite unable to move—"tied to the ground"—and he regarded the condition as one of acute laminitis affecting all four feet and ordered the shoes to be removed as soon as the horse lay down.

On the morning of August 9, I saw the horse with Mr. Williams. He was then lying on his side, having laid down about midnight and remained so. The pulse was slightly voluminous, full and frequent. Respiration accelerated; temperature 101·8 F.

Further ineffectual attempts were made to get the horse up and finally the slings were again placed under him. He was raised up with the chain and pulley block into a standing position and his limbs placed vertically under him, but he resolutely declined to make the very slightest effort to stand, and hung limp in the slings, precisely as though he was completely paralysed. He further gave no reaction to pin-pricks applied to the limbs, and the case had every appearance of one of complete general paralysis. There was, however, considerable heat in the feet and phalangeal regions, and very marked throbbing of the digital arteries all round.

The horse was now let down and 1 c.c. of a 1 in 1,000 adrenalin solution was subcutaneously injected over the internal and external digital arteries at the level of the fetlock joint, both fore. He continued to feed well, in the prone position. About 4 P.M., he got up of his own accord, and when seen at 6 P.M., he was standing up, but practically immovable. His attitude was not the usual one of a horse affected with laminitis. He stood with all four feet well under him and not particularly on the heels. He would frequently "paddle" with the hind feet. Aloes 3vi was administered.

August 10.—At 9-30 A.M. the horse was standing up. He was still more or less immovable, though less so than the previous evening, and on the whole he appeared to show a slight degree of improvement. It appeared evident that the horse was affected with laminitis in the hind feet as well as in the front. It was therefore decided to inject adrenalin over the digital arteries of the hind limbs, but owing to the constant "paddling" and to the fact that the horse was incapable of standing on three legs with one held up, it was found impossible to carry out the injections with the horse in a standing position. It therefore became necessary to throw him, and whilst being "pushed" into position to adjust the hobbles, he lay down of his own accord.

Adrenalin solution, 2 c.c. of a 1 in 2,000 of normal saline, was then injected on each side of all four limbs at the level of the fetlock joint (eight injections) and the horse was left lying down.

August 11.—The horse got up by himself early in the morning and could move more freely. He was purging, but fed well. Pulse and respiration showed improvement.

August 12.—Horse showed marked improvement. He could move comparatively easily and when led out of his box he walked round the yard quite comfortably, though still evidently lame, "all four." Pulse and respiration normal. Ordered ten minutes' walking exercise night and morning. Heat, pain, and swelling in the region of the near hock (referred to on August 7) had practically disappeared. Pulse and respiration normal.

August 16.—There was further improvement, and the horse capable of trotting, though still lame all round. Increased local temperature about the feet continued, and there was no diminution in the throbbing of the digitals. There was some general cedema around the fetlocks. I ordered half an hour's walking exercise night and morning and wet swabs applied to the feet and cold water bandages to the fetlocks and pasterns.

On August 19, there was further improvement and the horse trotted quite easily though he continued somewhat lame all round, 2 c.c. adrenalin solution 1 in 2,000 injected on each side of fetlock, all four (16 c.c.) cold swabs, &c., and walking exercise were continued.

August 23.—Moved "short" all round and digital throbbing continued, though less pronounced. He was shod, and walking exercise increased to an hour night and morning.

August 28.—Except for moving slightly "short" the horse trotted practically sound.

September 19.—The horse was doing duty and action normal. Digital throbbing no longer apparent, and surface temperature of the feet normal.

The horse remains sound up to the time of writing (October 12).

CASE 2.—The subject was a black gelding of the same class as Case 1. The horse marched from Pirbright to London, a distance of about 30 miles, on July 14 last, and that evening showed marked signs of exhaustion. Temperature slightly raised, pulse disturbed, respiration accelerated, complete, anorexia, &c. The horse spent the whole of the following day lying down, and the next day (16th) on being got up, was found to be showing typical signs of moderately acute laminitis, both fore. Shoes were removed and poultices applied. A purgative was administered, and the horse

was exercised for half an hour twice in the day and kept loose in the box. On the 17th, the severity of the attack had slightly increased, and 4 c.c. of a 1 in 2,000 *adrenalin* chloride solution in Aq. dest. were injected on each side of the fetlock, both fore. There was no perceptible change in the horse's condition that day.

On July 18, his condition was unchanged. Walking exercise continued.

On July 19, a slight improvement was noticed and maintained.

July 23.—Considerable improvement. There was scarcely any lameness and perceptible walking, and the horse could trot easily.

July 25.—Only a slightly lame trotting, and progressing favourably in every respect.

July 31.—No lameness. Discharged, recovered, for duty.

(*Veterinary Journal.*)



ABSTRACTS FROM EXCHANGES.

English Review

BY

PROF. A. LIAUTARD, M.D., V.M.

Bagelli's Treatment of Tetanus by Hypodermic Injections of Carbolic Acid Solution. (Lieut.-Col. J. Moore).

This is the record of the treatment of four cases according to the direction of bacelli, viz., the injection every two hours for the first thirty-two hours and less frequently afterwards of one drachm of pure acid in solution (five to ten per cent). The first horse received a purgation first and then the acid. After five days the animal grew worse and the treatment was changed for extract of belladonna. The animal began to improve at once and finally got well.

The second case was a mare. She also received a purgative in the shape of an aloetic ball and then Bacelli's treatment, which was kept up for five days. Chloral Hydrate per rectum and bromide of potassium were also given. The mare recovered in twenty-six days. In a third and a fourth case the result was different. Both animals died, and it was said that the fourth might have recovered had it not been for the carbolic acid treatment. Neither of these cases, however, ought to be considered as conclusive and further trials are to be carried out.

Notes of Clinical Cases, Hygroma.

BIER'S TREATMENT (PROF. O'CONNOR).

A five-year-old gelding has for twelve months had a swelling round the knee which has been growing. It had the consistency of a chronic bursal enlargement, with thick walls. It is fluctuating and situated below the knee at the postero-internal aspect of the limb. Painless to the touch it did not cause lameness although it is as big as a hen's egg. Pressure upon it did not cause distension on the outer aspect of the part, but above and behind the knee. It was diagnosed as a case of hygroma or subcutaneous cystic collection or perhaps a distension of the carpal sheath. Considering the various treatments that might be resorted to, the Professor

preferred opening, evacuating and injecting tincture of iodine as the one likely to have the best results. This was done under local anæsthesia and blood tinged serum allowed to escape. The cavity being then explored, it was found running three inches above the lower end of the radius with its lining infiltrated with calcareous material. Iodine was injected, but failed to bring a complete cicatrization. Sulphate of Zinc in powder was used with no better result. Finally hyperæmic treatment was tried. A rubber tourniquet was applied above the knee and left on three hours. This was repeated for two days in succession. Great inflammation and swelling followed. The bandage was left off and when after a few days the swelling had somewhat subsided, it was found that the cavity of the cyst was smaller, was closing and the discharge reduced. The treatment was followed more or less regularly afterwards by the owner, but the cavity closed entirely, and although there was considerable thickening remaining, the animal travelled sound.



The Incubative Period of the "Tetanic Poison" in Man and Animals

BY

J. DONALDSON POTTIE, M.R.C.V.S. (GREENOCK, N. E.)

From notes of cases of Tetanus in horses and from information received from medical practitioners attending cases of tetanus in the human subject with whom I have communicated, I find that there is a strange similarity. In almost all the cases I have a record of, the symptoms of the effect of the tetanic poison showed itself in ten days after the horse or human being had received the injury in cases of "traumatic tetanus." In all cases iron was present, and in most cases rusty iron or iron oxide played some part in this fatal malady. In none of the cases did the wounds suppurate freely, but assumed an unhealthy appearance with a gelatinous exudate in the surrounding tissues. I have noticed that in districts where iron is abundant in the soil and therefore in the drinking-water, tetanus occurs from very slight injuries, and animals docked or castrated in these districts are very liable to take tetanus. I do not infer that iron oxide or rust is the cause of tetanus, but I am of opinion that the tetanus organism develops more rapidly and favourably where iron rust is present. In the cases of "idiopathic tetanus" I am of opinion that the iron is in excess in the system, and undoubtedly the patient's system is in an unnaturally irritable state, more especially the nervous system, which favours its development. Although no wound is apparent, the poison forms at the seat of the jerk or blow, and keeps up a constant irritation of the nerves and nervesendings; this irritation gets greater as the poison is absorbed. The poison having a great affinity for the nerves, passes up the nerve trunks to the spinal cord to the brain. In the brain I am satisfied the medulla oblongata is the seat of this disease. If tetanus was only a blood poison it would pass into the system much more quickly, but being a nervous disease due to a special toxin, it develops at the seat of the wound, slowly passing up the nervous system to the brain. Serums or antitoxins should be used to all punctured wounds, even if no symptoms of tetanus are present; more especially where rusty iron is present. The difficulty seems

to me to be that it is impossible to remove, in most cases suspected of tetanus, sufficient of the surrounding tissue to remove the poison from the wound, and if all the poison is not removed, tetanus will result.

Excessive heat or cold favours its development, as do injuries to large nerve ganglia or collections of nerves, or nerve centres, causing slight shocks to nervous system. The constant irritation of weakened nerves, and increased shocks by tetanic poison, acting on weakened nerves, finishes the process. The development of this poison is due to the presence of iron oxide at wound centres or in the system. The disease once developed, as we all know, increases in virulence, and, if rapidly, the animal dies of spasm of the diaphragm or heart in a few days; but if the poison is limited in extent and the nerves injured not great or numerous, after a cycle of ten days the animal is past the height of the disease and generally recovers, though weak, exhausted, and emaciated from want and strain of constant excitement and spasms. The proper cause or causes direct and indirect or contributory in a specific disease should be looked to with an open mind, and if a remedy to alleviate, stop or cure the effect or effects of that cause is found, success is the result. Eliminate iron oxide from wounds and excess in systems of animals or counteract its effects, and I consider you will have no tetanus.—*Veterinary News*.



Equine Pneumonia.

BY

E. M. PERRY, F.R.C.V.S., EASTBOURNE.

I have recently been most interested in an outbreak of pneumonia in a large stud of horses in my neighbourhood, which has shown one of two points worthy of notice.

There have been some eleven horses in all affected, five of which have had double pneumonia, the remainder having recovered after more or less simple congestion.

The cases started in the usual way, dullness and lack of vitality being noticed by the grooms, and on examination there were very big temperatures, 105 to 106·5 deg. F., rapid, wiry pulse, dirty mucous membranes, and more or less stertorous breathing.

It is chiefly with the five horses with double pneumonia that I am particularly interested, as the others all recovered after the usual medicinal, and more especially hygienic, remedies had been applied. The first that was affected was, I am glad to say, the only case that proved fatal. This was treated in the ordinary way with febrifuges, heart tonics, etc., and as the horse was not feeding at all, artificial nourishment, in the form of whisky, eggs and milk, was given.

The second case, a grey mare, was exceedingly bad, and I informed the owner I had practically no hopes of saving her. The solidification process had involved the whole of one lung and by far the greater portion of the other, consequently the breathing was most distressing. The temperature remained 105·5 deg., and, in spite of all endeavours, I failed to get any improvement. No food had been voluntarily taken for about nine days. It then occurred to me to try Nuclein (Parke, Davis and Co.). That evening I injected 5 c. c., without any saline solution, hypodermically. The following morning the temperature was down to 103 degree. I repeated the same treatment at night, and the temperature on the following morning was 102 deg. The mare had during the night taken a little mash, and from that time gradually improved, until to-day, a month later, the mare is convalescent.

Since then the three other cases have been treated in the same way, and all have done well. In these four cases I had left the Nuclein injection until the crisis had been reached. In each case the temperature overnight had been 105 to 105·5 deg., and in the morning it was 102-103 deg., and the horses improved from this time.

In a further case, which I have now on hand in the same stud, I was asked to see a bay mare and found it exhibiting the usual symptoms, and with a temperature of 104 deg. It then occurred to me to give an injection of Nuclein at once, in order to ward off the attack. This I did, but found in the morning the temperature was still 104 degree. I repeated the injection at night, but still the temperature remained high in the morning. It will be interesting to know if any of your other readers have had any experience with Nuclein in the treatment of pneumonia, and if Nuclein is only of value at the crisis of a case.

There is one other point of interest in these cases, and one which I should like to hear if any one else has noticed. We had tried all these horses with the best green foods which could be obtained at this time of the year, but during the treatment of the third and the fourth cases I instructed the groom to go into the country and try to get some grass from the hedgerows or anywhere he could. This he did, but the horse refused to touch it. It was noticed, however, that in the grass was a piece of thistle, which, eventually, the horse picked out. The groom was then cute enough to go and get some more thistles. This was reported to me on my visit, and the horse that night, after over a week's refusal of everything that we thought would tempt him, ate quite a good bundle of thistles. The other horses were naturally tried on the same diet, and they all readily took to it. Is this a usual thing for a sick horse to take? I have never known of a horse eating thistles whilst out at grass in preference to rank grass. I might mention that these thistles were by no means young and fresh, but half dead, as one usually finds in early November.—*News*.

Canker of the Sole.

Pecus found in the veins of animals suffering from phlebitis and canker of the sole, streptococci similar to those which cause osteomyelitis, and thinks that they may be the cause of relationship between corneitis and osteomyelitis of the third phalanx.

In 1897 he treated a horse suffering from canker, after the usual surgical treatment had failed, by injecting the *anti-streptococci* serum of Marmoret and soon effected a cure.

In 1902 he treated a bad case of canker with the serum and iodide of potassium internally for the sclerosis of the veins, and tannic acid locally : the case was soon cured.

In 1909 he treated a mare, on which all treatment had failed, by subcutaneous injections of the serum, 20 grams daily with 5 to 10 grams of potassium iodide, and soon effected a complete cure. Pecus does not claim to have found a specific, but recommends this treatment as promising and scientific.—*Med. Vétinaire*.

Tetanus Antitoxin as a Prophylactic.

The beneficent action of anti-tetanic serum is but rarely capable of proof. An observation of G. Lentha Cheatle, communicated to *The British Medical Journal*, described the case of a boy admitted to King's College Hospital after receiving a wound in the thigh from a street accident. This was purified and antitoxin administered. Fourteen days later tetanus bacilli in large numbers appeared in the discharge from the wound. The boy, however, exhibited no symptoms of the disease, the antitoxin having effectually protected him. The author thinks that this safe prophylactic measure should be used more generally than is now the case on patients who have met with accidents in which dirt from field, garden, or road has come into contact with the wound.—*British Medical Journal*.



ABSTRACTS FROM FOREIGN JOURNALS

The Pathological Anatomy of Colic in the Horse.

The following observations were made by Pilwat at the Pathological Institute attached to the Berlin Veterinary College.

In three years 837 horses were examined post-mortem for colic. Of this number 428, i.e., 51.14 per cent. had died of colic, by which term is understood all primary affections of the stomach and intestines, which maladies can be classified in five main groups.

I. *Primary gastro-enteritis*.—This form was the cause of death in 29 horses, i.e., 6.78 per cent. Inflammation of the mucosa of the stomach and intestines was present in all cases, varying from simple catarrh to serious diphtheritis and gangrene. In only two cases could the cause be established without doubt. In one horse the fatal enteritis was caused by the animal having ingested a large quantity of sand.

In the other a huge mass of *Ascaris megalocephala* located in the duodenum had quite occluded the lumen of the intestine. It is worthy of note that out of the 428 cases of fatal colic only one was due to sand and one to worms.

Anatomically, primary gastro-enteritis may be divided into the following forms : 1. Simple catarrh 2. Haemorrhagic. 3. Diphtheritic. 4. Gangrenous.

II. *Occlusion of the Intestine*.—This occurred in the following forms : Simple occlusion or faecal stasis. This appears to be a very frequent cause of colic. The greater number of fatal cases of colic appear to have commenced with occlusion of the intestine, the situation of the stoppage causing various complications.

Simple occlusion was found in 76 cases, i.e., 17.76 per cent. of the fatal colic cases. The most frequent seat of stoppage was the colon (53 cases), the rarest, the caecum (12 cases). No case of primary occlusion of the stomach was observed.

The cause of simple occlusion is stasis of the intestinal contents, the softer and more fluid the contents, the less chance there is of stoppage, and *vice versa*. This accounts for stoppage occurring much more frequently in the large intestines than in the small.

A second cause of simple occlusion is to be found in the condition of the intestinal mucosa; in normal conditions this is a self-lubricating surface, and greatly assists the movement of the contents. The third and most important cause is the direction of the intestinal peristalsis, which is normally calculated to move the contents along the intestinal canal, but if this is prevented the movement may be in the reverse direction and the stoppage increased. The anatomical disposition of the intestine has an important bearing on the situation of the occlusion. In the duodenum, the accumulation of contents always occurs at the point where the intestine crosses the vertebral passing from right to left, at which point the mesentery is very short, a natural restriction of the intestine being noticeable.

In the ileum the occlusion occurs at the ileocaecal valve, the lumen of which in the horse is normally about 10 cm. In cases of impaction of the caecum the contents are much in excess of normal and very hard.

In the colon, simple occlusion occurs most frequently in the gastriform dilatation of the intestine, which in the horse is, from its position and anatomical disposition, most likely to cause trouble; the intestine decreases from its maximum to pass into the rectum, and at this point the constriction is most marked. Moreover, the rectum is connected with the duodenum by a large band of ligament which passes over the gastric dilatation. The gastriform dilatation is itself adherent to the pancreas and abdominal wall; also in this portion of the intestine the contents become more compact, and its forward position renders it difficult to come at with remedial measures such as clysters.

2. Occlusion of the intestines by faecal calculi: These were found to be the cause of fatal colic in only five cases, all occurring in or near the rectum.

3. Occlusion of the intestine due to cicatricial constriction: This caused fatal colic in 31 horses. The jejunum was affected in

four cases, the damage being due to the wanderings of *strongylus armatus* in the coats of the intestines. In 27 horses there was cicatricial constriction at the ileocaecal valve, probably arising from damage to the mucosa of the ileum, and the stenosis was caused by hypertrophy of the musculature of the ileum.

III. *Laceration of the Stomach and Intestine*.—Of the 428 horses which died of colic, 63 died of laceration of the stomach. Primary laceration of the stomach was found in one horse only, and this was probably due to repeated introduction of the gastric sound, the rupture was on the small curvature. No primary rupture of the stomach due to simple repletion was observed. The other ruptures noticed were secondary to occlusion or torsion of the intestines. There was no organic alteration of the walls of the stomach in any case. As a rule, if the intestinal occlusion is near the stomach there is a liability of rupture of that organ. In all such cases the rupture is on the great curvature.

2. *Laceration of the intestine*:—This was observed in 45 horses; rupture of the caecum was the most frequent, followed in frequency by rupture of the colon and rectum. In a great number of cases the walls of the caecum were hypertrophied at the same time. The hypertrophy was principally in the circular musculature. The rupture usually occurred at the base. In this intestine one observes occlusion, dilatation, hypertrophy and laceration.

IV. *Displacement of the Intestine*.—Torsion of the intestine was found in 59 cases in the jejunum and ileum, twice in the caecum and 65 times in the colon. The greater the movement of an intestine in the abdominal cavity, the greater the liability to twist. Twist of the jejunum regularly occurred towards its posterior part. The floating colon is very freely moveable in the abdominal cavity.

The free loop of the jejunum twists upon its mesentery, while the floating colon twists upon its long axis like a screw, and ordinarily from left to right as in the movement of the hands of a clock; the twist varies from 90 to 360 degrees and more.

There are serious alterations of the circulation of a twisted part of the intestine; venous circulation is stopped on account of the thin walls of the vessels, while the more resistant arterial walls allow blood to continue to flow into the part, so that a remarkable stasis

occurs and the blood accumulates in the veins, and there is so much extravasation that death may occur from hæmorrhage.

2. Invagination of the intestine was observed in two cases in the jejunum.

3. *Strangulation of the Intestine* :—In five cases a loop of the intestine had passed through the inferior abnormal ring. In five cases a loop of the jejunum had passed through the foramen of Winslow. In three cases a loop of intestine had passed through the diaphragm. In 15 horses pedunculate lipomata had involved the intestine in cords of the omentum.

V. *Embolism of the Intestine*.—Intestinal emboli are caused by verminous aneurisms of the ileocaecal colic arteries produced by the larva of *strongylus bidentata*.

Ordinarily the aneurism has a thrombus inside, from which small pieces are carried off to cause occlusion of the other arteries; ordinarily there is no particular danger unless complete occlusion of a large artery sets up necrosis. Verminous aneurisms were found in every horse examined in the Institute. Fatal embolism was found in only 21 cases.—*Zeit. f. Vet.*

GANGRENOUS PNEUMONIA.

Adrian, a French A.V.S., has had excellent results from the use of Creosote in gangrenous broncho-pneumonia: he adopts the formula of Masson and Vazeux:

Creosote, gm. 1.

Alcohol, „ 40.

Water, „ 40.

10—20 c.c. are injected daily in addition to any other treatment that may be adopted.—*Rec. Med. Vet.*

F. E. P.



Treatment of Fistulæ by Bismuth Injections.

This treatment is known under the name of the *Method of Beck*, and is very applicable to fistulæ of tubercular origin and to those consecutive to non-tubercular suppuration. With the object of diagnosing with certainty their extent, Charles Beck injected a mixture of sub-nitrate of bismuth and vaseline (1 : 3) into fistulous wounds that were difficult to explore. This compound penetrates the least crevice, and when it solidifies on cooling X-ray photographs show up with remarkable distinctness the minutest detail of these trajects impregnated by bismuth.

Beck also noticed that in many of his patients the fistulæ and abscess cavities so treated showed marked improvement, and that he had many recoveries that could only be attributed to this injection. Of 192 thus treated, he concludes thus:

Recovered	...	...	...	64 per cent.
Improved	...	...	...	28 „
Not notified	...	...	...	6 „
Death during treatment	...	...	...	6 „

Since Beck other surgeons have also had recourse to the bismuth paste treatment. M.M. Dugas and Clement have in their turn had success with two patients; but these gentlemen used a paste containing only 15 per cent. of bismuth. The injections may be made weekly. (*Revue de la Tuberculose*, April 1910, ex. *Revue Vet.*, Dec. 1910.)

Leshe, an American veterinary surgeon, recommends in the treatment of fistulous wounds and abscess cavities *Beck's method*. He injects by means of a metal syringe the following paste heated until it becomes liquid:—

Bismuth subnitrate	30 grammes.
White beeswax	... 5 "
Soft paraffin	... 5 "
Vaseline	... 60 "

After the cavity has been filled the opening is closed with sterilised gauze. The walls of the fistula quickly granulate.

[This *Method of Beck* should be tried in veterinary practice, where fistulous wounds are so frequent, and often so troublesome. There is in its favour over some other methods—that it is comparatively non-poisonous and harmless. Accidental intoxication from it is very slow in manifesting itself, and only starts after several weeks. It shows itself in man by the following symptoms: Stomatitis, a black border on the juncture of the gums and teeth, bluish patches on the buccal mucous membrane, constipation, salivation, foetid breath, weak pulse, and feeble respiration. This disturbance generally retrogresses after incision of the fistula and scraping away the bismuth. It is said this trouble can be prevented if only 20 c.c. of a 15-per cent. paste is used.

Bismuth poisoning is rarely recorded occurring in animals, although immense quantities are given, not only by veterinary surgeons, but by owners, especially to dogs and cats. One thing is generally noticed when it has been given for a little time, and that is blackening of the neck of the teeth, especially if they be coated with tartar. This by itself cannot be taken as a sign that an animal is suffering from poisoning, but it may give a clue when symptoms as given above for man are also present, and for which one cannot well account.—*Transl.*]

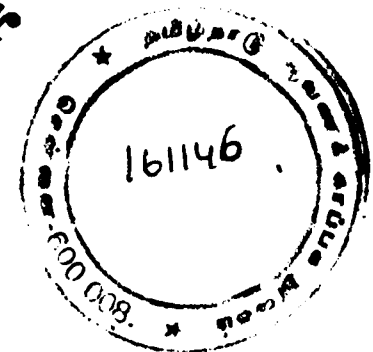


Sterilization of the Skin with Petrol or Benzine (or Benzoline) before Operating.

Zatti considers this has advantage over the tincture of iodine, which alters the colour and suppleness of the skin and, if the methylated tincture be used, causes irritation of the eyes and nostrils of the operator and his attendants. According to British surgeons this irritation of the eyes and nostrils is not seen where the tincture is made with rectified instead of methylated spirit.

The seat to be operated upon is rubbed with a tampon of cotton-wool as large as the fist, and soaked (not to excess) in petrol or benzine. Zatti has used this for three years on about 700 more or less important operations, in which union by first intention was the rule. (*La Presse Medicale*, July 2, 1910, ex. *Revue Vet idem.*)

[The Translator has seen, and has used, these agents in England; and in one case—a cryptorchid—the veterinary surgeon in attendance, having forgotten his supply of petrol, procured some from the tank of his motor.]

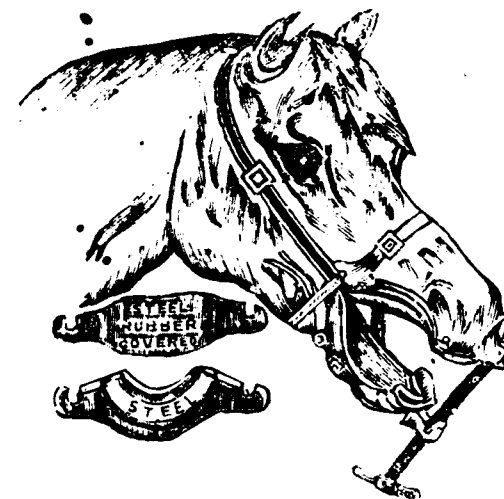


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