AGR/DOG/1#11

C.S.

Live Stock

Miscellaneous

No. 109/29

~~1928~~ 1929.

C Inspector of Stock

1929

11th Mar

SUBJECT.

Innoculation for canine distemper

Previous Paper.

MINUTES.

1-3 Minute from C.I. Stock 11/3/29.

G.S. Submitted. This article is certainly of considerable interest and I will thank Mr Fastolph and Mr [illegible] for thus bringing it to the notice of Govt..

2. Action as suggested but better perhaps await the arrival of the newly appointed Veterinary Officer? [illegible]

14.3.29.

Hon C.S. Please. Put up again after he has seen it. [illegible]

Subsequent Paper.

Inspector of Stock & Agriculture

Dr W.B.R. Jones (thro' Hon. Col. Secy)

According, please.

15. 3. 29.

Hon. Col. Secretary

Thank you, seen.

12/4/29.

P.A. 15/4/29. E.K.S.

(3)

STOCK DEPARTMENT.

STANLEY.

11th March. 1929.

Sir,

The attached pages from The British Medical Journal were brought to my notice by Dr.Jones. The article on Prevention of Canine Distemper is very interesting and I would like to suggest that if possible some of the vaccine be obtained, with particulars as to method of innoculating,quantity to be used, age of dogs and part or the body to which it should be introduced.

I am,

Sir,

Your obedient servant

R Faithful.

Inspector of Stock & Agriculture.

THE HONOURABLE

THE COLONIAL SECRETARY.

STANLEY.

respectively with the internal secretion of the genital glands, experimental sexual biology, relations between the function of the sexual glands and the sexual impulse, the clinical results of experimental sexual biology, the biological principles of the influence of the central nervous system on the genital function and sexual impulse, and the psychical structure of the sexual instinct. A voluminous bibliography is appended.

The *Transactions of the Ninth Quinquennial International Homœopathic Congress*,[8] held in London last year, has been issued in two paper-covered volumes. The first contains public addresses, correspondence, and reports. The second (no fewer than 832 pages in length) gives the full text of original communications and discussions.

Dr. C. ENDERLE has made an Italian translation of Economo's excellent book on the cell structure of the cerebral cortex of man,[9] of which the French translation was reviewed in the *British Medical Journal* of October 6th (p. 616).

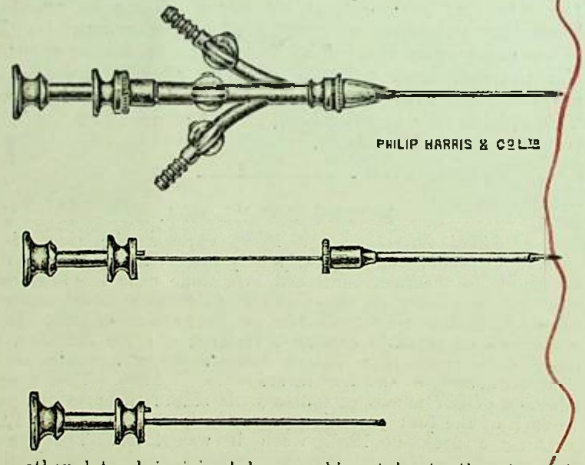
[8] *Transactions of the Ninth Quinquennial International Homœopathic Congress.* London: J. Bale, Sons and Danielsson, Ltd. 1928. (6¼ × 10; Illustrated. 31s. 6d. net the two volumes.)

[9] *La Citoarchitettonica della Corteccia Cerebrale Umana.* Da Constantino Economo. Edizione Italiana curata dal Dott. C. Enderle. Con prefazione dal Professore G. Minguzzini. Bologna: L. Cappelli. 1928. (Sup. roy. 8vo, pp. 192; 61 figures. L.30.)

PREPARATIONS AND APPLIANCES.

A NEEDLE FOR USE IN GAS REPLACEMENT.

DR. ALFRED G. CAMPBELL (Birmingham) describes a simplified technique of replacing pleural effusions with gas, involving the use of a needle he has specially designed for the purpose. He writes: The needle consists of a central stem about 2½ inches long, having a packing box in its upper end, and terminating in a male screw end, to which may be attached any size of hollow needle or cannula that one desires to use. From this two laterals branch off—one on either side, and set at the most acute angle consistent with strength and efficiency to the central stem. Both the laterals and central stem are controlled by stopcocks. When a cannula is employed I have found it useful to have the top of the trocar made about 1½ inches longer than necessary and with a button end. This lies in the palm of the hand and gives the operator better control of the instrument when puncturing the chest wall. For this reason when a hollow needle is preferred I recommend a short "plug-in," with a top similar to that of the trocar, to be fitted into the upper part of the central stem. Once the pleura has been punctured it is advisable to withdraw the trocar or "plug-in" completely, and to close its stopcock. The lateral whose junction to the central stem is nearer the needle point is joined to the aspirator by means of a rubber tube;



the other lateral is joined by a rubber tube to the stem of a Y-shaped metal junction; the branches, both of which have stopcocks, are connected by means of rubber tubing, the one to the gas bottle, the other to the manometer. When performing the operation I have found it of great advantage to have the two laterals lying in a vertical plane, the one carrying off the fluid being the lower. While the fluid is being withdrawn it is essential that the stopcocks controlling this channel should be the only ones open. Similarly, when gas is needed to replace the fluid the stopcocks controlling this channel should be the only ones open, and they should be opened only after the others have been closed. The operator can find out if the fluid has fallen to the level of the needle by closing all the stopcocks, and then opening only those which control the way between the pleural cavity and manometer. When this fall has occurred the manometer responds in the usual way, and a pleural pressure can be obtained. In brief, there should be only one avenue communicating with the pleural cavity at any given time during the operation. The chief advantages of the instrument are that a replacement can be carried out by means of one needle, and the operator has complete control over the parts leading to the aspirator, gas bottle, and manometer. The needle has been made for me by Messrs. Philip Harris and Co., Birmingham.

PREVENTION OF CANINE DISTEMPER.

THE study of canine distemper initiated jointly five years ago by the Medical Research Council and the *Field* Distemper Fund is by no means completed, but Dr. P. P. Laidlaw, F.R.S., and Mr. G. W. Dunkin, M.R.C.V.S., the investigators, in a report issued on November 29th,[1] show that not only have considerable advances been made in our knowledge of the causes of this disease, but that it is now possible safely and effectively to protect dogs against its ravages.

Breeding Susceptible Stock.

When the Scientific Committee of the *Field* Distemper Fund commenced its work there were two views of the pathogenesis of distemper demanding special investigation: one that it was due to infection by the *B. bronchisepticus*, isolated from the majority of distemper dogs by M'Gowan; the other, suggested by Carré, that the infecting agent was an ultramicroscopic filter-passing virus. Unfortunately, the early research workers never knew for certain whether the dogs used for their tests were actually susceptible to the disease, or whether they had at some time suffered from a mild attack of distemper, recovered, and become immune. Thus an experiment in which no typical result followed the inoculation of an alleged causative organism could be explained away by supposing that the animal was immune from the first, leaving only the successes to be considered. Moreover, the mode of spread was so little understood that it was difficult to guard against accidental infections during the course of crucial experiments. Dr. Laidlaw and Mr. Dunkin decided, therefore, that for accurate research it was important to breed experimental animals under conditions that would guarantee that they had never come in contact with distemper infection. In their report they describe how they bred dogs within a ring fence in the strictest isolation; how they removed the parents from the ring as soon as practicable, and did everything possible to prevent infection from gaining access to the susceptible stock. A ritual of disrobing, bathing, and donning sterile clothing had to be performed by everyone entering the isolated compound in which the dogs were bred, and the number of persons allowed to enter was strictly controlled. A small hatchway was the only means of communication between the building containing the sterilizing room and a storehouse for food, and the interior of the compound; and, apart from the cod-liver oil ration, all food was boiled or autoclaved before being passed through the hatchway. In this way a clean stock of dogs has been maintained for four years without distemper appearing, a fact which may be taken to show that the disease does not arise spontaneously, but that probably all cases are due to transference of infection from one animal to another.

The Arrangements for Experiments with Dogs.

In the investigation of such an infectious disease it was necessary to exclude all possibility of accidental infection occurring in the experimental animals. A fly-proof dog hospital was constructed, with arrangements for preventing the conveyance of infection from dog to dog by persons engaged in the experiments. Entrance to the hospital was possible only through a corridor, the floor of which contained constantly three inches of disinfectant solution, and special means were taken to sterilize the hands and clothing of persons entering the building or passing from cubicle to cubicle. By itself, however, this method of preventing accidental spread of infection to healthy controls proved inadequate, probably on account of air-borne infection from cubicle to cubicle. A series of kennels were therefore constructed around the laboratory buildings, each surrounded by fencing, and about fifteen or twenty yards from its nearest neighbour. In this way it proved possible to keep a susceptible dog for months in one kennel while experiments were carried on in adjacent kennels.

Experimental Distemper in Dogs.

Notwithstanding the protean nature and variable severity of the symptoms of distemper, the experimental work has

[1] The *Field*, November 29th, 1928, p. 855-858.

indicated that the disease is a single entity, a dog immune to one strain of virus being immune to strains from other sources. The variable symptoms are due in part to secondary infections, which are responsible for much of the sum total of the disease. Broncho-pneumonia, for example, is not an essential part of the distemper picture, but is due to the invasion of damaged lung tissue by a secondary organism. But under experimental conditions, in which the operation of secondary infecting agents is excluded, distemper develops in its simplest form and runs an uncomplicated course. Such experimental distemper is an acute infectious fever, characterized by an incubation period of four days, a coryza at the outset of the disease, a bi-phasic temperature curve, severe gastro-intestinal disturbance, inflammation of the respiratory tract, and occasionally by the development of encephalitis. It is a disease with a comparatively low mortality rate. The report gives no information as to the late results in the encephalitic cases, since whenever fits were observed the affected animal was destroyed.

Infection and its Spread.

The experiments showed that distemper is infective in its first febrile phase, even before symptoms are manifest; that the nasal discharge and the blood are uniformly infective at first, though uncertainly so later; and that air-borne infection occurs over short distances in confined cases. It is clear that the isolation of infected animals at the earliest possible stage would probably do much to stop the spread of infection. Moreover, since it is exceedingly probable that the crowding together of dogs is responsible for the spread of fatal secondary infections, ample space for animals must be strongly recommended to dog owners.

Distemper in Ferrets.

When the investigation was being planned it was deemed desirable to employ some animal other than the dog for certain phases of the work, and for various reasons Dr. Laidlaw and Mr. Dunkin selected the ferret. The ferret is exceedingly susceptible to infection and nearly always dies of the disease; it is therefore unusual to find a resistant animal in a batch bought in the open market. Furthermore, the ferret breeds rapidly and thrives in the rigorous confinement necessarily imposed on experimental animals and controls in the study of such an infectious disease as distemper. And finally, owing to the rarity of mild cases of distemper in the ferret, it is a useful test animal in those cases where the diagnosis in dogs remains doubtful. It was found that ferrets which did recover from an attack of distemper proved to be immune to infection not only by the strain of virus which caused the original disease, but also to all other obtainable strains of distemper.

The Nature of the Infecting Agent.

Quite early in the course of the experimental work it was clear that the weight of evidence was in favour of Carré's view that the infective agent was an ultramicroscopic organism. The disease can be transmitted to a healthy dog by injecting into it a minute amount of blood or tissue from a diseased animal; yet in the great majority of cultural experiments the infecting blood and tissue proved to be sterile. Moreover, infective filtrates were secured when employing filters known to retain all visible bacteria. The data available indicate that the organism is of the same order of size as the organism causing pleuro-pneumonia of cattle. Every effort to secure cultures of the infecting agent has failed, and though efforts to this end are still being made, Dr. Laidlaw and Mr. Dunkin believe it is now doubtful if any satisfactory result can be achieved.

The Immunization of Ferrets.

The first experiments in immunization were conducted on ferrets. It was considered probable that any method which proved successful in their case would also be applicable, with minor modifications, to the dog. The difficulty was to prepare standard vaccines in the absence of a technique of artificial cultivation of the virus. Experiments showed, however, that at the height of the disease the spleen of distemper ferrets contained sufficient infecting agent to make a vaccine which, though of variable and indefinite potency, was in practice effective. The method now adopted is to apply a potency test to a small quantity of filtrate from a 20 per cent. suspension of distemper-spleen pulp in saline, sufficient formaldehyde being added to the main bulk to yield a final concentration of 0.1 per cent. This formolized spleen suspension is tested for sterility, made non-irritant by the addition of enough ammonia to give a *p*H of 8.0 to 8.2, and used as a vaccine. It has been found that ferrets can be completely immunized to all strains of distemper virus by a subcutaneous injection of two cubic centimetres of vaccine, followed a fortnight later by an intradermal or subcutaneous injection of 1/4 c.cm. of living virus—that is, of approximately 100 fatal doses for an unvaccinated animal. Vaccination with formolized material alone is inadequate to ensure solid and lasting immunity.

Immunization of Dogs.

The use of ferret vaccine on dogs proved on the whole to be unsatisfactory. The amount of vaccine obtainable from a small animal like the ferret is not great, and more than a month was required to produce immunization. Efforts were therefore made to produce vaccine from the tissue of distempered dogs. While admitting that the conditions for the manufacture of vaccine of uniform quality are still inadequately defined, and that much has yet to be learned about the optimum time for the collection of the virus tissues to be worked up into a batch of vaccine, Dr. Laidlaw and Mr. Dunkin state that experience of a number of successes and failures makes it possible to form a good idea as to which tissues should be used for the preparation of vaccine in any given case. The results with a good batch of vaccine made from distempered dog tissue are most remarkable. A single dose of 5 c.cm. of vaccine administered subcutaneously will induce such a degree of resistance in the recipient that a large dose of virulent virus injected after one week produces very little effect. Moreover, dogs which have been immunized by vaccines followed by living virus resist large doses not only of one strain, but of all strains of distemper. They may be placed in contact with acute cases of the naturally occurring disease and remain uninfected. The results seemed so good that work with privately owned hounds and dogs was undertaken, with uniformly good results; 325 couple of hounds belonging to fifteen different packs were treated, untreated hounds of the same stock and age running with the immunes, acting as controls. On several occasions distemper has broken out in the kennels and attacked the uninoculated hounds, but none of the treated hounds have developed the disease.

Both for ferrets and for dogs the homologous vaccine has proved superior to the heterologous, a fact not without considerable theoretical interest. It may serve to prevent undue optimism regarding the use of complex vaccines of the kind under discussion. These may prove to be efficient with one species of animal, but it does not follow that they will be as efficient with other species.

The Future.

The complete conquest of distemper is bound up with the successful cultivation of the virus apart from the living animal. Meanwhile it is desirable that the present vaccination method should be made as perfect as possible and as generally available as can be arranged. Quite recently a serum with valuable protective properties has been secured by the injection into the recovered animal of some millions of infective doses on one or more occasions. This serum may prove to be of practical value either in the treatment of disease or in the development of a technique of prophylactic serum-virus inoculation. These two lines of investigation—virus cultivation and serum manufacture—have as their primary objective the benefit of the canine population. They may, however, shed light on the general problems of acute infectious fevers, and show a way to their correct method of study and to their prevention and control in other animals and in man.

[Questions on this subject were asked in the House of Commons this week, as may be seen by turning to our Medical Notes in Parliament (p. 1118).]