

Continental country can only be successful when the veterinary police protective regulations in neighbouring countries are also adequate and strictly executed. It is therefore urgently necessary that the action of the veterinary police in all countries, with regard to hydrophobia, should be based on the same principles.

II. Compulsory notification, hitherto held necessary only for cases of actually rabid or suspected animals, must henceforth be extended to animals bitten by rabid or suspected dogs. This obligation shall be incumbent, not only on the owners, and on all persons included under Section 9 of the law of Infectious Diseases, but also on all such persons as know that animals have been bitten by such dogs.

III. It is to be considered whether it be not desirable to extend the quarantine for dogs to a wider space than hitherto, and to a longer time than three months.

IV. It is desirable that a law, equally valid in all countries, and strictly executed, should be introduced, for the control of dogs; and that this law should contain the following provisions:—

1. Every dog in town or country, without exception, is to be registered, and entered in a list for assessment.

2. All dogs registered are to be provided with a badge on the collar, such badge bearing the name of the owner and the dog's number in the assessment list.

3. All dogs are to be provided with a well-fitting muzzle, so constructed as to render biting impossible, but not preventing them from eating and drinking.

4. Dogs without badge or muzzle are to be impounded, and, unless claimed within a certain period, destroyed.

RULES FOR JUDGING THE REACTION TO MALLEIN.

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IN the task of accomplishing a total extirpation of glanders in infected studs, and that in the shortest time and at the smallest material sacrifice, mallein, as a means of diagnosis, plays an important part.

It has been found by practical experience that concealed glanders may develop into the pronounced form in an infected horse within six months following the infection.

This circumstance, as well as the necessity of establishing a diagnosis for animals suspected of suffering from glanders, rendered necessary, in Hungary, the ministerial ordinance, whereby the mallein test must be made in the infected studs by employes of the State.

This decree provided, according to the circular ordinance of the Minister of Agriculture in 1900, No. 4000, that suspected animals, in case the mallein reaction were found to occur, were at once to be destroyed; while, in case it did not occur, they escaped quarantine, with this limitation, however, that they might not for sixty days be sold into any other district. The animals reacting uncertainly must, in extended quarantine, be treated with mallein a second time after sixty days, and eventually a third time after a further sixty. At present, however, a third mallein test is never undertaken, as animals giving the typical reaction are destroyed—seldom after the first mallein test merely,

but in any case after the second, while the uncertain or atypically reacting are released, under the restriction mentioned above, from quarantine.

The mallein test for animals suspected of glanders is always obligatory; on the other hand, those suspected of infection are treated with mallein only with the consent of their owners. But, save in some exceptional cases, owners usually make no difficulty about handing over animals liable to infection.

In Hungary during 1901, 1902, and 1903, 458 horses suspected of glanders, and 2818 suspected of infection, underwent the mallein test.

Of those suspected of the disease, 379 were destroyed in consequence of the results of the test; the *post-mortem* examination proved that 366 (93.9 per cent.) of them were glandered.

Of the 2818 horses suspected of infection, 1849, *i.e.*, 65.6 per cent., which were found at the first test absolutely non-reacting under mallein, were released from quarantine. At the second mallein reaction, 550 (or 70.8 per cent.) of the infected stock of 776 head were released from quarantine, on account of total absence of mallein reaction, or uncertain and atypical reaction respectively. At the third mallein test 31 head (43.6 per cent.) of an infected stock of 71 were released, likewise owing to uncertain and atypical mallein reaction, or to total absence of any, respectively.

After a thrice-repeated testing with mallein, 2441 head (86.7 per cent.) of the infected stock of 2818 were freed from quarantine.

On the other hand, 377 head (13.3 per cent.) in all, of the infected stock of 2818, were destroyed at the first, second, and third mallein tests. 344 head (91.2 per cent.) of these 377 were found, *post-mortem*, to be suffering from glanders.

On the ground of these data, the results of practical experience, it seems that in judging the results of the mallein test, as well as with regard to official regulations, the following principles should be kept in view.

I.—In Case of Suspected Glanders.—It is to be regarded as a reaction when the bodily temperature at the sixth, ninth, eighteenth, or twenty-first hour of observation, from a normal initial temperature, rises above 39° C., and this thermic reaction is associated with an organic one.

The presence of the following clinical symptoms is to be regarded as an organic reaction: A large and painful swelling appears at the point of inoculation within twenty-four hours; not infrequently other swellings as thick as a child's finger proceed from this one; the animal, when led from the place in the eighteenth to twenty-first hour of observation, is stiff, walks with great difficulty (so that although perhaps he was quite unmanageable at the time of the test, it is now necessary to urge him into movement), and limps, more or less, with the fore-limb of the side inoculated. With the rising of the bodily temperature, the depression, apathy, and loss of appetite increase, and the breathing becomes quicker and more difficult. (Quivering of the muscles forms no typical organic reaction.)

Without the organic reaction, the increase of bodily temperature is only to be regarded as a reaction when, with a normal initial temperature, it exceeds 39.5°.

Individuals showing the symptoms of mallein reaction here indicated are to be regarded as glandered, and their immediate destruction is necessary.

On the other hand, the outward symptoms leading to suspicion of disease are not to be regarded as originating in glanders when, in the absence of organic reaction, the thermic reaction, with a normal initial temperature, does not exceed 39.5°.

Such animals as do not react to mallein are to be released from quarantine if the external symptoms indicating disease have disappeared, or if it is established beyond doubt that the external symptoms indicating disease do not originate in glanders.

II. In Case of Suspected Infection.—(a) It is not to be regarded as a reaction when, in the absence of organic reaction, the temperature, originally normal, does not exceed $39\cdot5^{\circ}$; *i.e.*, in the circumstances just mentioned the animal submitted to the mallein test is to be regarded as free from glanders.

(b) The reaction is uncertain when, with a normal initial temperature, the thermic reaction exceeds $39\cdot5^{\circ}$ C., and does not reach 40° C., the organic reaction, however, not following.

The reaction is also uncertain when the temperature exceeds 39° and does not reach 40° , but at the same time the organic reaction appears.

Finally, the reaction is inconclusive when, with a normal initial temperature of over $38\cdot5^{\circ}$, the increase is over $\cdot5^{\circ}$, but does not rise to 40° , the organic reaction appearing at the same time.

In the cases of uncertain reaction here adduced, the presence of glanders cannot be determined, but is not to be regarded as finally disproved; it is therefore necessary to submit animals giving results of this kind to a second mallein test, under which most animals fail to react at all, or in the rarest cases give the typical reaction. If either the pronounced form of glanders, or the symptoms indicating disease, develop in the period between the two mallein tests, the horses should be at once destroyed.

(c) The reaction is atypical when the temperature within nine, twelve, fifteen, or eighteen hours rises from the normal to 40° or over, on a single occasion, but does not at the other times when the temperature is taken exceed the normal, or $39\cdot5^{\circ}$ at most.

The atypical reaction is rare, and in cases of its occurrence the presence of glanders may be regarded rather as disproved than as present.

In case of atypical reaction, the animal in question is also to be submitted to a second mallein test.

(d) The reaction is typical, when the temperature, from the normal or super-normal, rises to 40° or over, whether the organic reaction has shown itself or not. But the typical reaction is corroborated if the organic one also appears.

The typically reacting animals are to be separated as much as possible from those otherwise reacting, as the former are, in all probability, glandered.

The animals giving the typical reaction are to be submitted to a second mallein test, but should the organic reaction also have appeared their destruction would be advisable after the first test.

In the case mentioned under (a), that is, when the animals do not react in any manner under the influence of mallein, they should be released from quarantine immediately after the mallein test, but with the limitation, that they must not be sold into another district until sixty days have elapsed since their release, and then only if the competent veterinarian finds them sound at that time.

The animals mentioned under (b) and (c) should undergo the mallein test a second time on the thirtieth day after the first test. The animals described under (b), sub-division 3, as not definitely reacting, should be separated from those reacting in other ways, and placed in strict confinement to the stable. With regard to those animals which, according to (b), sub-divisions 1 and 2, are of uncertain reaction, the authorities can give permission for these, if strictly separated from other horses, to be employed for work in the district.

Horses giving the typical reaction are to be left in strict confinement to the stable till the second mallein test.

Of those animals submitted, on account of uncertain or atypical reactions, to a second mallein test, those which do not in any way react under the influence of mallein are to be released from quarantine, under the sale-restriction during the time specified for the animals mentioned as non-reacting under (a). On the other hand, those a second time found to give an uncertain or atypical reaction should be released under the sale-restriction of sixty days,

dating from the second mallein test. Those animals which are treated a second time with mallein on account of typical reaction, and are then found to give uncertain or atypical reactions, should be treated in a similar manner; while those found typically reacting a second time should immediately be destroyed.

PULMONARY GLANDERS AND THE OTHER NODULAR LESIONS WHICH MAY BE MISTAKEN FOR IT.

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PULMONARY glanders may exist as a secondary manifestation, but it frequently exists as primary glanders, or as the only manifestation of that malady, in horses which have lived with others which were openly glandered.

This glanders, having an evolution of a slow, insidious or latent character, cannot be suspected, unless use is made of the thermometer, of mallein injections, or the sero-diagnosis.

The proportion of horses suffering from this kind of pulmonary glanders may rise to 30 or 50 per cent. of the effectives of a group of horses.

It may be considered as a primary pulmonary glanders, in view of the sometimes total absence of glanderous lesions in the other parts of the horses' bodies. The evolution of this pulmonary glanders is slower and more benignant than that manifested by chronic glanders; and, as the lesions are very slight, we may suppose that it is curable.

Experiments and observations made up to the present have shown that pulmonary glanders, whether as the only localisation of this malady, or in co-existence with glanderous lesions in other organs, is often produced by infection through the digestive passages. But for the complete elucidation of the question it is to be desired that new researches should be made, employing, for ingestion experiments upon horses, cultures of the bacillus of glanders, such as are obtained from glandered horses; or, better still, using the excreta or other products of these horses, but only in small quantities.

The lesions of pulmonary glanders are many and varied; but the principal and as it were specific lesion is the glanderous nodule, with different aspects, dimensions, and transformations, which often co-exist in the same animal. These lesions undergo, rarely and in a slight degree, the calcareous infiltration. Glanderous lesions in the bronchial glands are most frequently found at the same time as these pulmonary lesions.

The nodular lesions may have resemblances to, or may be confused with, nodules originating from chronic lesions of bronchitis or catarrhal bronchitis, of peribronchitis, or bronchiectasis, by fibrous or fibro-calcareous nodules of pneumoconiosis, with metastatic centres of pyæmia, with tuberculosis, the metastatic centres of true neoplasms, but principally, and sufficiently frequently, with the translucent, fibrous, or fibro-calcareous nodules of parasitic origin. The nature of the lesions may be determined if there exist glanderous lesions in other parts of the body; but if there are none of these, we try whether there do not exist glanderous alterations in the bronchial glands; we make an attentive examination of the characters, localisations, and relations of these lesions with the pulmonary tissue; and, as the surest means, we employ microscopic examination, culture, and inoculations into experimental animals, for glanderous lesions have at times a perfect resemblance to parasitic ones.