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Veterinary Diagnostic Services and Primary Production

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IN this paper I would like to try and give you some idea of the part played by the veterinary diagnostic services of the Animal Research Station at Wallaceville in helping primary production.

The functions of this section are complex, but fall naturally into two main groups. The first and very large part of our work is concerned with the handling of a large amount of material sent in mainly by veterinary surgeons and inspectors of stock. Associated with this work there is the important sphere of extension which, in this instance, is made easy by our daily contact with field officers. The second part of our work consists of trying to analyse certain main industry problems into their components, e.g., Abortion in cattle into Brucellosis, Trichomoniasis, Vibrio, etc.; Calf Scours into Coccidiosis, Worms, Infections, etc. In this analytical work we use the large number of techniques which are necessary for the proper conducting of our routine handling plus any new techniques which are thought to be useful.

I would like to enlarge somewhat on the two groups which have been mentioned. Our routine diagnostic material, that is the material which is sent in and not solicited by us, is very important for many reasons. Material so submitted generally comes from properties where serious illness or death of livestock is occurring, and the local veterinary surgeon or stock inspector is not satisfied with, or requires confirmation of his diagnosis. For this reason we believe it necessary to examine such material as completely as is reasonable and that the submitter is informed of the findings as soon as possible. Material submitted to us in this way provides us with an opportunity of discovering the occurrence and distribution of major and minor diseases in New Zealand. It may be felt that there is a limited chance of discovering new diseases or of recognising for the first time, conditions new to New Zealand. This is far from being so and in fact in the last four years the Diagnostic Section at Wallaceville has recognised or confirmed the existence of some thirty conditions previously unconfirmed in New Zealand. Most of them have naturally been described overseas, although in one or two instances we can claim world priority. No claim is made that the conditions so discovered constitute a major hazard to primary production. Most of them do not, and few of them would appear to be even in the important category. Nevertheless, it is important that their incidence should be recorded. Some of them, although of no obvious importance in New Zealand, have proven in other countries to be of considerable importance, and our knowledge of disease processes shows that it is impossible to state, why, when or where a condition currently of relatively minor importance will become one of major importance.

Another important aspect of routine material is that it may be the first warning of an occurrence of an important exotic disease or of a known mild condition becoming more destructive in character. Two examples of this might be given: In recent weeks we have discovered in an aborted goat on Somes Island, a disease due to an organism related to that causing epidemic Typhus and Scrub Typhus, and which has been shown in Australia and America to be responsible for the disease of man called Q Fever. We cannot be sure that Q Fever does not already exist in New Zealand, but it is obvious that the careful examination of animals in quarantine is necessary not only to protect the health of our stock, but to protect the health of human beings.

The second example is a disease called Fowl Cholera. The organism causing this has been known to exist in New Zealand for many years, but it has always appeared in relatively mild forms. Some year or two ago specimens sent in by a veterinarian from the Christchurch area showed the fowls to have an acute epidemic form of this disease. Such epidemic forms of Fowl Cholera have been of very great importance to the Poultry Industry in many countries. Early diagnosis and energetic control measures imposed by the Livestock Division of the Department of Agriculture, limited this outbreak to the property on which it first occurred.

Earlier on I emphasised the importance of our daily contact with field officers. This enables us to carry out extension and disease control measures. We can suggest to them the possibility of certain conditions occurring in their area and we can assist them in submitting the best material in the best way. This last point is one which cannot be over emphasised. Our ability as laboratory workers to help the man in the field depends to a very large extent on his ability to give us the best material in the best way.

Apart from such solid good as may come out of our mutual services, it appears to me to be very important that a strong bond of goodwill is built up between the laboratory, the field worker and the primary producer. Such goodwill ensures the most efficient use of our services and further when, as will be pointed out later, it seems advisable to conduct a survey, the goodwill so created is one of the most important means of getting results.

Before passing to the second function of the Section, I would like to mention briefly two points of interest:—

Firstly, I would like to discuss how the existing diagnostic services can be used with the greatest efficiency, and secondly to examine briefly the desirability of establishing in other centres subsidiary diagnostic laboratories.

There are many aspects to the most efficient use of diagnostic services. One thing about which we are quite certain is that material submitted by trained field officers, that is, Veterinarians of the Department, Club Veterinarians and Stock Inspectors, is far and away the best material we get. These officers by virtue of their specialised training can obtain a good history. They know the correct material to submit and the correct way in which it should be submitted. In this way when the material arrives, our job is greatly simplified and further the field officer is able to take our report, generally of a rather technical nature, and interpret it in the light of his local conditions. Submissions by owners are generally poor. The history is inadequate, it omits much that we want to know, and we find it extraordinarily difficult to reply to a stock owner in such a way that he will be able to use the information available. I think then that it may be given as an axiom that the first step in the most efficient use of the diagnostic services, is to ensure that there is a preliminary screening in the field by a Veterinary Surgeon or Stock Inspector.

Odd deaths and sick animals are generally not of major importance, but nevertheless use just as much laboratory time, so both owner and field man should use their judgment in submitting such material. Where numbers of animals are sick or dying, it is important to call in the field officer as soon as possible, so that he will be in a position to submit a wide range of material and obtain a full laboratory report. Recurrent sickness and deaths of small numbers of stock constitutes one of the more difficult and at the same time more important aspects of our work. Very often the farmer has come to accept those as inevitable and so does not report them, or else he feels that he has mentioned them so often and got so little action, that it is not worth while doing anything about it. It is important to the industry as well as to the field

veterinarian and to the laboratory that regionally recurrent problems should be put on record.

It might be well worth remarking here that for the primary producer and the field veterinarian, as much as for the research worker, the keeping of records is of very great importance. All of us who are interested in assisting primary production know how much easier it is to help the primary producers and field veterinarians who have kept records.

A final remark under this section may not be out of place. In our experience, the common fault in submitting is that not enough material is sent, and I would suggest that in every instance where there is even a shadow of doubt as to the diagnosis, a wide range of material be submitted, enabling us to carry out a more comprehensive examination. Very briefly we usually get too little too late.

In considering the usefulness of subsidiary diagnostic laboratories, there are many debatable points. This problem has been discussed fairly widely in New Zealand and there are many areas in New Zealand which feel they would achieve a greater efficiency in disease control by having a regional laboratory.

One of the main arguments that have been used in favour of the regional laboratory, is that the answer to a diagnostic problem would be obtained much more rapidly than at present. There is a certain amount of truth in this. Any veterinary or other officer who is within easy motoring distance of the laboratory could take his specimens in the day that they were collected, and subsequently could 'phone up the laboratory for the result without any serious discomfort. However, the number of veterinary surgeons placed sufficiently close to the laboratory to enjoy those facilities would be strictly limited and the laboratory would have the majority of its submitters outside such an area.

In examining the question of rapidity of turnover we are faced with two main causes of time consumption. Firstly, the travelling time, that is the time for the specimens to reach Wallaceville and the time required for the reply to get from Wallaceville back to the veterinary surgeon. In New Zealand, with somewhat irregular postal and rail services, this factor is highly variable and we have many examples of gross time loss due to the irregularities of postal or other transport services. The other factor is the time required in the laboratory for the handling of the material. This has been cut down to a minimum at Wallaceville and it is unlikely that regional laboratories would be able to reduce this time. The regional laboratory would be unlikely to be so staffed as to be able to conduct all the necessary tests, and clearly the submission of some material to Wallaceville would impose an even greater delay than would be experienced in direct submission to Wallaceville. My opinion is that the time saved by having regional laboratories would amount, generally speaking, to the difference in the post or transport as between the regional centre and Wallaceville. In many cases this would be a negligible saving.

Despite the somewhat critical remarks I have made, the Animal Research Division feels that the place of regional laboratories in New Zealand should be investigated and it is hoped that one or two regional laboratories will be established. From those it should be possible to assess the value of such centres and to discover what difficulties have to be overcome in establishing them.

As mentioned in the introduction, the second division of our work is that in which we use our existing and any other specially developed techniques to analyse main industry problems. At this stage it may be advisable to give you an idea of the five steps that are followed in the recognition and solution of existing problems.

1. The first step is that the problems be recognised and defined. This may be called the "primary analysis." An example of such analysis is the excellent work of Ward in presenting the main problems of the dairy industry. Longwill has commenced a similar type of work in relation to the pig industry. Apart from such obvious statistics, any good field officer and in our case that generally means the veterinary surgeon or stock inspector, can tell you for his area what are the most important problems. This seems to me to be a quite satisfactory form of primary analysis, and as an instance of this I would mention the work of Crawford, of Gisborne, in bringing to our attention the importance of diseases of the testicle in rams.

2. The second step is one in which one of the problems so defined is selected for further analysis. This selection may be made on the importance of the problem to the industry, or in some cases on the ease with which the problem may be analysed. This really is an attempt to resolve the problem into its components and may be called the stage of "qualitative analysis."

3. The next step after qualitative analysis is an endeavour to estimate with greater accuracy, the economic importance of the conditions found in Step 2. This naturally involves an attempt to assess the numerical and geographical distribution of the condition and the associated financial losses. Such work is largely a matter of conducting a detailed survey and may be called the stage of detailed "quantitative analysis." Before any accuracy can be achieved at this stage it is obviously essential to have an accurate primary analysis and in fact at this stage it may be necessary to re-use the survey techniques established to give us the primary analysis.

4. Having decided that any problem so defined is worthy of further work, the next step is to investigate the various ways and means of controlling the disease.

5. When control measures have been discovered it is essential that the measures so found be put across to the industry in the most efficient possible way.

The first point mentioned above, that is the primary definition, appears to me to be an industry problem and this has been accepted by the dairy industry and to a lesser extent by the pig industry. The meat and wool industries, despite their marked important economic position, have so far failed to define their problems and as indicated by Hamilton for this reason, probably as much as any other, the amount of research on their problems is smaller than it is for those smaller industries which have taken the trouble to define their problems.

The second and third points, those of qualitative and quantitative analysis of problems are the ones which in those problems where their techniques are useful, the Diagnostic Section is best fitted to contribute. When the problems have been defined in more detail and the economic importance of them has been established, the next steps of control and extension naturally become the work of the research and extension officers. Examples of the way in which the Diagnostic Section has contributed to the post-primary analyses can be given. In the spring of 1950 we had reached the stage where we were able to apply techniques which had been developed over the last three years to the analysis of calf Redwater and sheep abortion, two conditions which had been selected because of their known importance to the primary producer and because infective causes had been described overseas. We asked a small number of practitioners to submit a range of specimens from calves showing Redwater. We told those practitioners what we intended to do and how we intended to do it, and their co-operation was sought well knowing that to assist us in this way would mean a considerable loss of time and a lot of hard work by them and by the stock owners. However, when the specimens were forthcoming and

examined by the recently developed techniques, we were, without any difficulty, able to demonstrate the occurrence of an infective cause of Redwater, similar to that which had already been described in America and Australia. The work has now gone on to its next logical step and an officer in the research section is endeavouring to find means of prevention and treatment.

In the sheep abortion field, although sheep abortion had long been suspected, or in fact known to exist in New Zealand, no infective causes had been confirmed in the laboratory. We decided to develop the necessary techniques for diagnosis of the known infective causes of sheep abortion and to apply them as soon as we could perfect them to suspected outbreaks of abortion in New Zealand. As a result of this during the 1950 lambing season two infective agents associated with abortion were discovered. We as yet know very little about the distribution or importance of the two forms discovered by us. We do not know as yet whether any other forms exist. During the coming season one of our most urgent pieces of work is to try and find out how important the forms found by us are, and if possible to find out if any other forms exist.

A final example in this group is the result of a collaborative survey of ram fertility, where we co-operated with Crawford of Gisborne in the examination of some 11,000 rams. Laboratory examination of material from this survey showed the existence of a scabby condition of the purse which proved to be a Chorioptic Mange, a condition not known to exist in New Zealand previously and also that an, as yet, undetermined percentage of epididymitis cases are associated with a Rickettsia-like organism similar to that seen in sheep abortion.

In conclusion, I have tried to give you an idea of the functions of one small unit of the Animal Research Division of the Department of Agriculture and I hope this talk has helped you to appreciate where such work fits into the much larger field of improving or increasing primary production—an end we all serve. In my mind two points are outstanding. Firstly, as individuals wanting the help of the Diagnostic Section on a routine matter you will find that you get a very much better service by consulting a trained field officer first, that is a Club or Government Veterinarian or an Inspector of Stock. Secondly, as primary producing industries if you wish to see the most efficient use of limited research staff, it is essential that you should be able to present your main problems to research organisations in quite unequivocal terms.

Discussion

Mrs. BASSETT: At what time does the abortion occur?

Mr. McFARLANE: This form of abortion has been seen only on one property and only in one season. There it occurred in the last month of pregnancy. In the allied condition seen in Scotland, infection can occur before or after tupping, and in a susceptible flock some 40% of ewes will abort and do so early. In subsequent years only 5% may abort and most of these will be in late pregnancy.

Mr. GERRING: What influence has the location of the laboratory on the source of the specimens received?

Mr. McFARLANE: If one excludes backyard poultry, which make up a very large proportion of the specimens received, most of the specimens come from the most interested field officers. Distance from the laboratory does not seem to be, in itself a limiting factor, provided transport facilities are available.