

# British Cattle Veterinary Association Annual Congress— “Cattle Production and Medicine”

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Many aspects of cattle production and medicine were reviewed during the latest British Cattle Veterinary Association conference, which this year was held at the beginning of April in the Lancashire Agricultural College, Myerscough. Veterinary surgeons from all parts of the British Isles congregated in the very pleasant surroundings and the first presentation was by **Dr. Rodney Purnell** (Pfizer Limited) who discussed “Tick Borne Diseases of Cattle.” He said two ticks present in Britain, namely *Ixodes ricinus*, which was found in the western parts of England, Wales and most of Scotland and *Haemaphysalis punctata* which tended to be found in the coastal parts of North and South Wales as well as South East England. *I. ricinus* was the vector of the protozoon *Babesia divergens* which results in red water and the rickettsia *Cytoecetes phagocytophilia*, the cause of tick borne fever. *H. punctata* carried *Babesia bigemina* and *Theileria sargenti* infection.

**Dr. Reynolds** then discussed experimental work with *B. divergens*. Australian workers had diluted blood from infected calves one hundred fold and inoculated the parasites into cattle. Subsequently it has been shown that diluted infection in this way just delayed the onset of parasitaemia and it was better to use Cobalt 60 to change the characteristics of the parasite. Subsequently a field trial was undertaken with blood from cattle on a farm at Piddletrenthide. This was inoculated into splenectomized calves, given differential chemotherapy to remove tick-borne fever and then it was re-injected into other calves. 20 ml of blood containing  $10^9$  parasites treated at 28 kilorads was injected into 40 animals and compared with 28 susceptible heifers and 31 immune animals. Following exposure 27 out of the 28 controls showed disease signs, whereas 29 out of the 31 immune cattle were unaffected. Unfortunately despite the promising results obtained on this work with the vaccine, further study has now ceased.

“Pasteurella Species Associated with Respiratory Disease in Immature Cattle” were described by **Alison Gibbs** (Glasgow Veterinary School). Following the first paper published in 1878 which isolated pasteurella from wild ruminants and boars, initial descriptions of the various syndromes which occurred were made after the First World War. Not much information has been produced in Britain since the 1950's, although much effort has been concentrated on the disease in America. Consequently, since 1981, Glasgow Veterinary School has been investigating the condition. They considered that outbreaks could be divided into three main syndromes. Firstly, there was sudden onset, low morbidity, high case fatality in suckling beef calves due to *P. multocida*. The second group was of sudden onset, high morbidity, low case fatality in weaned beef calves from which was isolated *P. haemolytica* and it was wondered if viruses were the primary agents. Thirdly, there was

sudden onset, high morbidity, low case fatality in weaned, dairy-type calves caused by *P. multocida* or *P. haemolytica* with often a virus or nematode as the primary agent.

Only one incident of the first group had been seen and this was during January in housed single suckler calves, four months old. It involved sudden onset of dyspnoea and death in two calves within twelve hours. Although the rest of the herd was seen within forty-eight hours of the outbreak being reported, no other animals were ill, and no coughing or abnormalities were noted on auscultation. *Mycoplasma bovis* was isolated from two nasal swabs and a serological rise in titre also occurred in five of the thirteen animals tested. A *P. haemolytica* serological rise occurred in one animal but none was presented to *P. multocida* although the latter organism was cultured in large numbers from the lungs of the dead calves. The second syndrome was typical shipping fever and occurred in two incidents. A typical case followed buying-in of weaned single suckler calves three weeks previously; 78 percent of the animals were ill with high temperatures and increased respiratory rates and deaths. The third condition had been seen in five outbreaks. One case involved housed calves in October which became reluctant to eat, coughed and had increased respiratory rates and a few deaths. Post mortem examination showed a longstanding pneumonia with pleurisy. Another incident involved forty, three-month-old calves which had been poor doers in the rearing period and many had died. On examination all were ill and dull. Some showed a serological rise to respiratory syncytial virus as well as to *M. bovis* and *P. haemolytica* type A1. In conclusion, Mrs. Gibbs suggested pasteurella could often be found in respiratory disease on its own or in conjunction with other pathogens, in suckling, weaned or bucket-fed calves and it could follow movement between farms or on the same farm without any movement occurring.

**Dr. David Bryson** (Stormont) said that calf pneumonia was becoming an increasingly severe problem in his talk entitled “Recent Investigations into Respiratory Disease of Immature Cattle.” He said it was due to a period of micro-organisms and environmental factors. He posed the question as to whether viruses were important. They were often hard to isolate and if a disease has continued for a few weeks they would have disappeared. The viruses isolated varied in different years, thus he had found respiratory syncytial virus (RSV) and parainfluenza III (PI3) were most common in 1979 to 1980 but mucosal disease (MD) occurred more frequently the next year.

Clinical signs did not definitely diagnose virus disease, but they could be helpful. Normally dyspnoea involved about 20 percent of cases. The calves were dull, coughing, and had tachypnoea and hyperpnoea with or without nasal discharge. In dyspnoeic calves

there was emphysematous crackling and palpable subcutaneous emphysema. In non-dyspnoeic calves there was moderate to marked tachypnoea, no emphysema and rhonchi were, or were not, detected. Virus infection was often not confirmed because excretion mainly occurred in the early stages of infection; many nasal swabs were of poor quality; some respiratory viruses were very labile; viral pathology could well become obscured; it was sometimes difficult to obtain prepared serum and to interpret serological results especially in young animals. To maximize the chances of viral diagnosis, samples should be collected early in the disease; nasal samples and blood should be of good quality; a range of animals should be sampled; and specimens as well as animals which die in the early stages of outbreaks being rapidly submitted to the laboratory and convalescent blood samples should be taken three to four weeks apart.

Three young Bristol graduates, **Rodney Fisher**, **Tony Wilkinson** and **Janet Frazier** described an expedition to the Himalayas. The area visited was around Zanskar which was about 12,000 feet above sea level. The livestock included the yak, *Bos grunniar*, and they took seven to eight years to grow to full height. They were of much economic use in providing manure for fuel, as well as use as draught animals and for food and clothing. The milk yield was between ¼ and 1¼ litres per day with a solids non fat content of 10.8 percent and butterfat content of 6.5 per cent and this was used in yoghurt, butter, cheese and buttermilk.

The second day began with **Professor Gordon Hemingway** (Glasgow Veterinary School) discussing the supplementation of poor roughage diets of cattle. The use of feed blocks was advertised as being advantageous as stock do not have to be given the supplement daily; each animal had the opportunity to take as much supplement as it required; the animal could increase its intake as supply of other feeds diminished; it reduced the number of feed troughs required and all the animals in a group did not need to be present at the feeding trough at the same time. The amount of block eaten depended on the type of block, the feeding behaviour and the stock. The block effect on consumption depended on composition, binding agents, shape, size and its container. The feeding behaviour depended on the supply of other feeds, the siting of the blocks, their number, frequency of replacement and weather conditions. The stock factors included breed, species, age, dental status, experience, individuality and bullying.

Blocks tended to be made so that they were not eaten too quickly. Consumption was influenced by the weather so that high levels were taken during wet weather but little was eaten in dry weather or at low temperatures. Consumption was low when animals were turned out on to a fresh pasture and this is the same when there were large amounts of herbage available. There was no way to predict how much animals were eating and in consequence work had been undertaken to look at a liquid additive for feed. The criteria required included that the liquids had to be a true solution; concentrated; free flowing; acidic; pleasant in use and to contain adequate amounts of calcium, phosphorus, trace elements and minerals and a minimum of molasses for palatability. When the liquid was applied to straw it increased its metabolisable energy and digestibility.

In referring to the "Nutrition of Dairy Cows," **Dr. Neil Ritchie** (Glasgow Veterinary School) said there were three basic points which had affected cattle in the last twenty years, namely herds had increased in size, their average milk yield had risen, and there had been a change from cow shed and individual feeding to milking parlour and self feed systems. In turn this had led to the use of silage

or haylage and there were two problems to assess and that was the feed value of the silage and how much was being eaten when fed on free access or self feed basis. Of the basic nutritional requirements, energy was unique in that increased intake resulted in an increased production, (milk or body fat storage). In the cow during early lactation producing thirty litres of milk there was an appetite limit of 16kg dry matter (DM) which meant an inevitable loss of weight. If this body weight loss was excessive it tended to lead to a drop in milk yield, acetonæmia and infertility. It was therefore important to reduce this reduction by improving the quality of roughage fed.

Although feed under the metabolisable energy system was based on the whole diet, farmers persisted in feeding their animals in terms of feed per litre (or more normally gallons) of milk. One litre required five megajoules (MJ) of metabolisable energy which was the equivalent of 0.48kg on a concentrate containing 12 MJ per kg DM. In fact most commercial concentrate mixtures contained about 11.5 MJ per kg DM and even "high energy" concentrates were at a level of 11.6 MJ whereas a barley/soya/mineral mix had a level of 12.1 MJ. This meant that most farms underfed concentrates, but to feed adequately would increase their concentrate bill by 25 percent. No farmer would wish to do this and so it was best to advise him to change the basis on which he assessed dairy rations and aim at a higher quality basic ration. Turning to protein, Dr. Ritchie said there was no need to provide undegradable protein up to a milk yield of seven litres, but above that level some might be required. The relationship of phosphorus to infertility was complex in that problems tended to occur when the mineral was in deficiency and when in surplus.

A topical controversial subject is the association of badgers and tuberculosis and **John Gallagher** (VI Centre, Gloucester) discussed the evidence. He reminded the audience that fifty years ago tuberculosis was at a devastating level, affecting 20 percent of cattle and many humans. Britain became attested in 1960 and subsequently there was an excellent decline in the disease except for some parts of the South West. In 1971 seven out of a group of twenty cattle went down with TB on one farm and at the same time a badger was found in a field with tubercle. Externally, affected badgers had lost weight with a reduction in supra-orbital fat which gave the animal a "ghost-like look" and over growth of the front claws. Internally the lungs were badly affected with the kidneys often showing radiate necrosis and the adrenals involved. Following fights, bite wounds were often infected. In some areas, 40 percent of naturally dying badgers have TB. Infection was present in the sputum and urine and there was little immune response to the disease so that the tuberculin test was not positive even in grossly affected animals.

The disease was probably partly due to the infected area in the South West having the highest population of badgers in Britain and the condition tended to be self perpetuating due to fights, migration and the confined environment of badger setts. Lesions have been found in few animals other than cattle. Foxes and rats have become infected in areas of high badger and cattle disease levels but they do not show lesions. It might be thought that if infection was contracted in cattle by ingestion then the gut would first be affected. However the infective dose for the gut was many times greater than that for the lungs and it has been shown that some ruminal gas entered the lungs, thereby transmitting infection. Control of tuberculosis could be achieved by the gassing of affected badgers with anhydrous sodium cyanate and preventing re-population for a considerable period (usually years).

"Cosreel Computer Health Recording" was described by **Dr.**

**Alec Russell** (Institute for Research in Animal Disease, Compton). Cosreel was an abbreviation for computer system for recording events affecting economically important livestock. It was used to record management and veterinary events in 3,150 animals kept at forty-four locations at Compton. Information which could be stored included pregnancy diagnosis, post mortem examinations, tests on animals, progress, diagnosis, vaccination, etc. It had been decided to computerise previous records because of the time involved in typing, the expense of storage and the impossibility of searching the records. The coding system was based on numbers and letters.

The system might have applications outside Compton and so two veterinary practices each had a client involved. There was terminal access to the computer and a large data bank could be built up which it was possible to search for research purposes. Solar ulceration tended to appear at a certain age and it was seen in the offspring of some animals rather than others. Work on the heritability of longevity was also being undertaken and showed differences between some bulls. Associations were seen between various conditions and those cattle with mastitis were 2½ times more likely to have a retained placenta than those without mastitis and those animals with a retained placenta were also more likely to have ketosis. **Brian Wicks** (Chippingham) was one of the two practitioners using Cosreel and he considered it much better than other computer systems. Action sheets were produced and these were of great use and included lists of cows to be pregnancy detected, cattle with three or more services, and those not seen on heat or as Brian called them "KYBEO'S" (keep your bloody eyes open).

A few years ago, **Dr. A. Marr** asked whether there was an association between coliform mastitis and the use of mastitis control methods. Two members from the same practice in Sevenoaks, **Drs. Eric Jackson** and **Trevor Robinson** discussed "The Effects of Mastitis Control on Environmental Mastitis." Six herds were divided for within-herd comparison. One half received no teat dip and dry cow therapy only in infected quarters, and the other half had teat dip and dry cow therapy of the whole udder. Treatment was based on the use of ampicillin and cloxacillin or streptomycin and penicillin, and dry cow therapy involved cloxacillin or penicillin and streptomycin. One herd used a chloride dip and streptomycin dipped with iodophors. All herds had no teat lesion problems, no *Strep. agalactiae* infection and no history of summer mastitis. 296 mastitis cases were seen in those using the full control programme which gave an infection rate of seventy per hundred cows per year, whereas 346 infections (82 per hundred cows per year) were seen in those using the partial control programme. *Strep. uberis* infections amounted to 15.7 percent and coliforms to 13.8 percent respectively in the partial control group. Levels of the two infections were such that in five herds there was more *Strep. uberis* in the partial control group and in one herd the level was very high (52.7 percent) compared with 16.7 percent in the full control group. With coliforms the level was less or similar in the partial control group in five of the six herds, however higher levels of coliform infection were associated with those cattle where full control measures were undertaken. After the trial three of the herds went back to using dry cow therapy and one did not, as the results were not good enough to encourage herds to drop control measures completely. One farm which started as heifers had little clinical mastitis, although cases of *Strep. uberis* were greater in the full treatment group.

"The Role of Therapy in Mastitis Control" was discussed by **Dr.**

**Frank Dodd** (NIRD). He looked at the influence of the therapy on infections and future new infections. Infections could be measured in different ways such as the number of infected quarters at any one time or the occurrence of clinical mastitis. It was possible to reduce infection but not lower clinical cases, just as it was possible to reduce cell counts and not clinical disease. Factors determining infection in a herd depended on the new infection rate and its duration and antibiotics could affect both these factors. Thus with staphylococcal problems there was a low infection rate but it was of long duration. The infection in older cows was harder to treat and with staphylococci more successes were obtained when there had been no previous lactational/or dry cow therapy. Some staphylococcal infection was not cured, however, with other cases there was a good cure rate.

Using various methods of therapy different results were obtained. Thus with blitz therapy it was best for streptococcal infections although an effect could not be detected a year later except in the cases of *Strep. agalactiae*. However, in staphylococcal infections, a result was still apparent three years later. Lactational therapy of staphylococcal mastitis produced a poor cure rate whereas dry cow therapy was more effective. There then followed a film by Gloxovet entitled "Milk for all it's Worth" which put over in a light hearted way the message concerning the importance of mastitis, in that 100,000 cows were affected with clinical mastitis on any one day and from which 33,000,000 litres of milk were lost.

Myercough College is concerned with horticultural as well as agricultural education and a pleasant hour was spent surveying wooded areas and glass houses. The expertise of the audience was then tested by **Dr. Hal Thompson** (Glasgow Veterinary School) with a pathological diagnosis quiz. The questions soon found all of us wanting in knowledge, particularly ones such as "Your holiday to the Falklands has been cancelled. Thompsons have re-routed you to Mexico City and you are sharing a room with three marines, a man called Nott and a pathologist. The pathologist asks your advice about a cow's heart." Other questions produced answers such as selective traumatic cerebral haemorrhage in Charolais calves, a tennis ball oesophageal obstruction, a combined diagnosis of pyelonephritis and enzootic haematuria and typical signs of EBL without a positive serological result. Luckily the quiz was not taken too seriously and put us in the right mood for the annual dinner. This, I think, provided the best mass catering meal that I have ever had at either hotel or institute. Suitably refreshed we sat back to listen to **Don Haxby** in good form. We are lucky in the profession to have such talented and witty men amongst our leaders.

The final day began with **Angus Carmichael** discussing the joint Open University/Royal Veterinary College dairy farmer's course. He reviewed the progress over the last year when nothing tangible had taken place because they were awaiting funds. However, at a recent meeting of the Management Committee for the project the cash needed to prepare the material had virtually been assured with £75,000 coming from the open university and this would allow the programme to commence. The likely uptake in the course was being assessed by a questionnaire posted to 3,000 dairy farmers. When the scheme was in operation the project was for the tutors to respond to enquires from the farmers and secondly to develop preventive medicine expertise and promote its uptake by clients.

The rest of the morning was taken up by an in-depth look at the disease problems of a local dairy herd, White Carr Farm. The scene was set by **Bryan Jeffrey** (Preston) who described the 325 acre farm which was split into two by the new Blackpool motorway. The farm is mixed with cattle, pigs, poultry, corn and hay being produced.

The herd was gradually being changed to Holsteins. Between 1973-75 there was an increasing number of lame cows and at the time there were 200 cows housed in cubicles of different sizes. **Dr. David Weaver** (Glasgow Veterinary School) investigated this problem of lameness and found that about half the cattle were affected annually and it was the hind lateral claws which were involved. In most cases there was considerable overgrowth of the heel horn with under-running and infected laminae leading to solar ulceration. Dr. Weaver postulated that the condition was due to uncomfortable cubicles tending to head to prolonged standing and then sub-clinical laminitis with separation of the heel. Prolonged standing in slurry allowed a septic lesion to develop and it was suggested that paring the feet would lead to resolution of the lesions. He had also suggested a foot bath using 5 percent Formaldehyde, but it had been found to be irritant to the skin and so copper sulphate had been used to harden the hooves.

**David Hengill** (ADAS, Leeds) had looked at the soil chemistry and fertilizer input to the farm. The soil had a pH of 6.2 which was slightly above optimum, the phosphorus level of 56 mg/litre was relatively high, the potassium level of 209 mg/litre was all right and the magnesium of 112 kg/litre was well supplied. Although the soil analysis was satisfactory, the potash levels varied widely from field to field and on some they were very high when much slurry was applied. Calculations of the faeces produced by the 210 cows, 150 sows and progeny and 8,000 hens on the farm suggested that 15,700 kg of nitrogen, 7,770 kg of P<sub>2</sub>O<sub>5</sub> and 14,700 kg of K<sub>2</sub>O were produced. The requirements in the soil were such that about half the nitrogen was being supplied by the slurry and all the phosphate and potash. As the two latter elements were not being leached from the soil it was only necessary to supplement with limited amounts of nitrogen. The results of this policy were judged by soil analysis in subsequent years. They showed adequate potash and phosphate, the cut back in nitrogen fertilizer had stopped a build up of nitrate in the soil, and there was a reduced risk of leaching of nutrients by surface run-off or passage into water courses and silage quality improved.

The feeding of the cattle was examined by **John Hopkins** (Regional Nutrition Chemist, ADAS). Milk production when he was called in was at a level of 4,850 litres (not high) but of good quality, with 3.68 percent butter fat and 3.28 percent protein. Because of the history of lameness, concentrate feeding has been restricted. Analysis of the silage in 1975 and 1976 showed a high dry matter content as the silage was wilted before entering the tower silos. Crude protein and ammonia levels were low, sodium and calcium levels were good, but magnesium was marginal and the digestibility was low at 63 percent with a metabolisable energy of 10.1 MJ/kg DM. It was concluded that the diet played little part in the feed problems. Subsequently the silage analysis was undertaken and estimates of its value in terms of maintenance and milk production made, and also the amount of concentrates per litre of milk as calculated. This had resulted in an increase of milk yield by 1981-82 to 6,200 litres.

**David Stubbings** (Liverpool VI Centre) had prepared a paper on the herd's blood biochemistry, but as he was unable to attend his talk was given by Bryan Jeffrey. Following the work by Dr. Jack Payne on metabolic profiles Liverpool had undertaken evaluation of many bovine blood samples. These mainly involved a mini profile based on a system which could be easily incorporated into the routine running of the laboratory, which gave consistent results by careful quality control, provided a useful set of results for the

practitioner and was not expensive.

Samples were taken from six cows at peak production early in the morning and 2 x 7ml clotted blood, 1 x 10ml of oxalate fluoride and 1 x 10ml heparinised whole blood were obtained. During the lameness investigation total protein levels were high, but albumin and urea were low. Levels of energy were satisfactory but phosphorus was low and potassium was high. Subsequently, few samples were taken except from a group of heifers with low copper values. In June 1980 fertility became low and it was found that blood glucose levels were low with high globulin level, but they subsequently returned to normal.

Fertility on the farm was described by **Norman Johnson** (Preston). He entitled his talk "Fertility" or "How Can I Use Up the Prostaglandin before it goes Out of Date" or "Help". He considered it important to ascribe any problem to management so that the onus could be put back on the farmer! He said in most cases problems could be divided into those you could do something about such as cysts, etc., and those due to management, such as acyclic cows (often the result of feeding) and cyclic animals not observed in oestrus, a problem of oestrous detection. The calving index of the herd was about 401 days and was slipping by about five days per year. The poor fertility was due to weight loss at grass, AI technique, (natural service produced 60 percent conception rate, DIY AI 30-36 percent CR), and copper deficiency in the heifers during 1980.

In a group of 70 cows conception to first service was 44 percent with 11 (15 percent having a 90 + day period to first service); two served too early, both returned to service; 11 had repeat services not at 21 days or multiples of this, suggesting embryonic death, and 8 showed oestrus at 42 days, suggesting missed oestrus detection or foetal death. Serology had indicated earlier in the year IBR infection. During 1980, 170 cattle had calved and 20 percent had not been served by 90 days, with 45 percent calving to first service. 98 had repeat services, and of these, 34 (35 percent) did not have an oestrous period of 21 days or its multiple. However of those with a normal oestrous return, 43 out of 62 were seen at 21 days, giving an oestrous detection rate of 70 percent. As the fertility problem continued despite nutrition and metabolic profiles being satisfactory, it suggested the need to improve records; undertake more metabolic profiles; perform weighings; resolve the problem of natural service versus MMB AI and DIY AI; do milk progesterone levels and undertake serological testing.

**Bill Grimshaw** (Pfizer) undertook a trial at the farm using the slow release intraruminal anthelmintic bolus Paratect. This took place last year and involved 22 cattle receiving the bolus with another 22 as controls. Following treatment with Dictol the animals grazed two adjacent pastures from the 15th of April. The aim was to keep them on the same pastures of the grazing season, but grass ran out and so they were transferred to aftermath for 11 days in September. Clinical disease occurred in the control animals on 24th September and affected ones were treated and housed. The remaining controls were treated five days later and both groups reduced to 15 in November. The reduced groups were put on separate aftermaths on 16th October where they remained until housed on the 5th November. In both batches the faecal egg counts remained low, and even in September there were only 270 eggs per gram of faeces in the control group. The pepsinogen levels were never very high and the larvae on pasture remained low until August, but they then increased to 9,000 larvae per kilogram herbage by October. Weight gain was 15kg better in the Paratect

group. A general discussion then ensued on the problems of the farm which also involved the farm owner, **Tom Cowell**.

Fertility provided the last topic to be discussed and current completed research into cattle reproduction was described by **Dr. Mike Ducker** (Reading University). Progesterone levels had been taken in herds and it had been found that the first normal oestrus cycle occurred about 24 to 30 days post calving, but the first recorded heat varied between 27 days and 76 days with the first insemination taking place between 55 and 118 days and successful conception being at 78 to 106 days. Examination of the progesterone levels at the time of insemination showed that in a herd with 20 percent mistimed inseminations, half occurred mid-cycle and only a few were during pregnancy; but in a herd with 40 percent mistimed inseminations over a quarter occurred in pregnancy and many were at a time prior to cycling. Looking at body condition score and pregnancy the relationship was at its optimum when the score was between 2½ and 3½, but it reduced as condition fell towards 0 or rose towards 5. Animals with fatty livers took longer to first ovulation, first observed oestrus, first service, and successful pregnancy, than those without a fatty liver. Diet affected fertility and those fed well before calving ovulated earlier, although conception rate was better in animals on a low plane of nutrition at the time of insemination. Recent work lasting a year on animals receiving high and low Beta carotene levels (the latter on maize silage) produced no difference in fertility. Using tail paint oestrus was found in 20 percent of animals without removal of the paint, but in 80 percent of those on heat, all or half the paint was removed. Alternative methods of heat detection were being looked at, including the use of dogs to detect pheromones and they were called by one of the audience "hot dogs."

"The Individual Infertile Cow" was described by **Dr. Hugh Boyd** (Glasgow Veterinary School). Such animals by definition were not a herd problem and so nutritional, infectious or major

management problems were not involved. Such an animal was probably best described as a cow which had been served three times but was not pregnant. The incidence of the condition was not high; those in one group with 60 percent becoming pregnant at first insemination, 20 percent and 10 percent would conceive to the second and third inseminations. The number requiring four services was usually therefore less than 10 percent. In another study 99.9 per cent of 878 cows were pregnant by the fourth service; and in this group the pregnancy rate at fourth service was 44 percent with 58.6 percent at the fifth, and a similar conception rate occurring at each subsequent insemination. Thus it seemed that in many cases there was little intrinsically wrong with the animal. In studies where abnormalities of the genital tract were detected, 38 percent of the slightly abnormal cases became pregnant as did 29 percent of the markedly abnormal, compared with 60 percent of the normal cases which were examined at their fourth insemination. Summing up, Dr. Boyd suggested that if a cow failed to conceive at its third insemination, but appeared clinically normal, then insemination should continue. If there was a clinical problem it should be treated or culled. Finally he turned to conception rates and suggested that in most cases it was dependent on herd size. Thus when 10-20 cows were present in the herd, conception rate was 60 percent, but it reduced to 50 percent when numbers approached 90-100 per herd. However there were some farms which had very good conception rates in large herds and he suggested these should be studied to ascertain why they remained so high. **With this suggestion for the need of more information, Dr. Boyd concluded a very successful conference where some questions had been answered but many more posed.**

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