

NUFFIELD FARMING SCHOLARSHIPS TRUST
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REPORT BY

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ANIMAL WELFARE

Originally my angle was to study animal rights organisations. I was quickly informed upon my arrival that there was "Animal Rights" which encompassed the more radical element which promoted revolution and the "Animal Welfare" faction who were more middle of the road and promoted evolution of current welfare practise.

I made the judgement to refine my study project to the wider issue of animal welfare. I felt that parading around interviewing the left-hand end of the spectrum may well have brought about a more focused look on our current welfare practises here in NZ. This would hardly have been useful to the cause!

As a study topic Animal Welfare came through as an excellent choice. The British have some very high standards as a nation however one can debate some of the practicalities of some of the legislation. The rising issue which really came to a head while I was there was the transport of veal calves across the English Channel to intensive finishing programmes in the continent. (More particularly in Holland and France.) These calves are the surplus from the UK dairy industry. The issue became very public due to the fact that they were transported on the same vessels as fare paying public. As the issue evolved many of the exporting ports and shipping companies become targets for a lot of picketing and riots of various degrees. Even personalities such as Spike Milligan got into the act and showed their displeasure at the live export of any livestock. As time went on the target widened from the veal calf issue and included the export of cattle. Some of which were trucked through to Italy and Spain, and the export of sheep. There is quite a high level of trade in finished lambs which are exported to France and killed there and then marketed as French product!! None of this trade is illegal as such. However there are now much more stringent controls on the transport of livestock, especially with regard to the shipping and further trucking of livestock. The big issue for the general UK public is that the livestock should be slaughtered before export. They see it as more welfare friendly, it would retain work in the UK and they believe that a greater marketing effort should go into marketing higher welfare UK animal products. The reality for the bulk of European consumers is that animal welfare is seen as far less important in mainline Europe than in the UK.

The average British consumer is now substantially removed/divorced from the realities of food production. Their understanding of animal production means and practicalities is well removed from the average Kiwi.

The deal for many of the veal calves is that they go into a very basic crate system where they are fed a reconstituted milk mixture. It is low in iron to inhibit the production of red meat (true veal is white) and fibre, in any form, is with held so that rumen development does not take place. Many of these animals are held in this system for 6 to 8 months until point of slaughter at which time their dead weight can be 140 to 160 kg. The reality for the UK veal producer is that the veal crate system is outlawed in Britain and many of the UK public see the Dairy industry as exporting a problem. As time has moved on the European veal producers (or those who note consumer sentiment) have attempted to make adjustments to their production systems. Some of these systems now line up a little better with approved and legal veal production methods in the UK. The reality of veal

consumption in the UK is that it only accounts for 4% of all meat consumption and very little veal is exported back to the UK from some of the less welfare friendly production systems. At this point you will probably start to ask what all the fuss is about??

It is probably worth going back to the late 1970's when the issue of animal welfare became a political football at election time. From this point on the U.K. public have always been more aware and have felt they should have more say in animal welfare issue. The transport of livestock to the continent and in particular the veal calf saga gave the U.K. public a very visible welfare issue to attack.

"CASE STUDY ON MID-WEST CALVES"

This calf buying and selling co-operative was set up 14 years ago as a means of by-passing the more traditional livestock auction system. Early co-op members and the managing director, John Waine, recognised that calf welfare was going to come under the spotlight as time went on. Young calves sold through conventional systems tended to have a higher incidence of ill health and mortality (A practical problem). This was a cost for those involved and did not bode well for the public image of the industry. (An intellectual problem).

Mid West Calves has grown considerably faster than original expectations and the day I visited was the opening of a substantially upgraded facility. (70,000 pounds worth). On going pressure to decrease the density in pens and the usual array of calf health problems had seen shareholder approval for the major upgrade. Advice in design was sought from a wide range of advisors including the local district council who have substantial jurisdiction over animal selling facilities and MAFF. Under the revamped system all calves are fed 1 litre of electrolytes as they enter the system. In earlier times most animals were trucked on an empty stomach as the rearers found they had less problems this way. However the public view of good welfare dictates that calves must be fed. In the early stages most of the calves were on sold to calf rearers and finishers in the UK but as time went on up to 60% of the calves were being sold to exporters. The Co-op handles approximately 32,000 calves per year from 250 to 300 members. There are a number of agents employed by the Co-op to match in coming calves with potential clients.

John Waine described the UK citizens as "Television reared, double glazed, cavity wall insulated, vaccinated public". He made the comment that the likes of Walt Disney has a lot to answer for. Hyenas eat only meat and are always portrayed as baddies!! Nature has been sanitised to the extent that young are born but the old don't die. John believed that farming must be portrayed as an improvement on nature. "It is time that we took the high ground and got that message out".

One of the other groups which has arisen due to the threat to the transport of livestock into Europe is an organisation called L.I.S.T. (Livestock Industry Support Trust). It has been set up to support British livestock farming in a positive manner. It is a non-charitable trust established to counter the false information and propaganda published by extremists whose sole objective is to put the livestock producer out of business. The industry needs professional help to redress the media imbalance. L.I.S.T. are extremely concerned at the

threats to legitimate and legal trade of livestock to the continent. In its own words "The general public must be made to understand that the British Livestock Farmer is the most compassionate in the world. Funding for L.I.S.T. comes from a wide front but most would be from set charges on some classes of stock at auction centres and in the case of Mid-West Calves there is a compulsory levy of 1 pound per calf.

The Pig Industry.

The pig industry has come in for its share of public scrutiny as some of the production methods and systems commonly employed around the world are now outlawed or due to be outlawed in the U.K. As from 1997 sow crates and tethers will be illegal. In contrast the rest of the EC (most of Europe) does not have to make this change until 2005. There has been a strong push for U.K. pig producers to radically adjust their production systems. It is now common place to see free range pigs on some of the free draining soils (especially sand country). As long as the weather is reasonable there is little doubt that the pigs have a happier existence however during the winter of 1995 ground conditions on even the free draining soils were less than ideal and many pigs would have been happier inside. The capital cost of setting up these outdoor systems is substantially less than conventional housing methods however the land area required is considerably greater for a viable breeding and finishing unit. The down side of outdoor pig production is the higher maintenance cost of feed in nearly all situations. Disease implications seem to be harder to control. There is also a slightly reduced average litter size due to higher mortality. Some outdoor pig farmers have also had to change the composite breed to find a type that is better adapted to outdoors. Most of the progeny from these outdoor breeding operations are then finished in barn type systems or in conventional fattening pens with the latter not usually matching the concept of high welfare pig production.

From a pig product consumption point of view it is interesting to note that 35% of all the U.K.'s pig meat requirements is imported from Europe anyway where the legislation for pig production is not as welfare friendly as the U.K. model. During the 1995 season and the previous few years the returns from pig farming were very meagre. There was an expectation that a reasonable percentage of UK pig producers would exit the industry. Low profitability may well have been the prime reason but there was also considerable concern about where the "Welfare goalposts" would be shifted to next. A number of UK pig producers have moved into a loose stall barn type operation which is fully enclosed and where for most of the time the sows are kept in large groups of up to 50 with computer controlled feeding systems so the diet matches the individuals stage of gestation. Farrowing and rearing to weaner stage is under taken on an individual unit basis and sows are returned to the main mob post weaning. The capital cost of making the transition from conventional sow crates and stalls is quite considerable especially incorporating sophisticated computer operated feeding systems. Estimates range from 225 to 400 pounds per sow with a total cost to the UK pig industry of 90m pounds. This equates to needing an additional return per pound of pig meat of anywhere from 2 to 17 pence. Will the consumer be prepared to pay the differential to justify this capital upgrade??

The reason I mention "Welfare goalposts" is that a number of pig producers consider that the rules may change again before they have recouped the capital cost of the Mark 2 production system.

CASE STUDY 1 CLEATHAM FARM (Lincolnshire)

This unit was owned by my host family whilst I was in the UK. Their entry into pig farming had been for a variety of reasons. They had not made an adjustment from a large scale indoor operation to the outdoor model although they had always had a small operation which would have been very uneconomic if it was continued. Outdoor pigs offered a number of opportunities. Firstly a wider income base than reliance on arable only. Secondly a chance to enter the production of higher welfare pig meat earlier on than the average pig farmer and hence a chance to capture some premiums at an earlier stage and Thirdly the incorporation of outdoor pigs and the addition of valuable organic matter to their sand country would become an important part of a rotation with potatoes being grown after a few years of pigs. Housing was cheap but effective and pigs were contained in groups or individually at farrowing by temporary electric fences. Despite the free draining nature of these soils and the relatively low annual rainfall (by our standards) these pigs were very muddy when I first met them. Their owner was asking some serious questions about whether their welfare was in fact worse at that stage! Weaner piglets from this system were put in outdoor enclosures with straw bedding and grown for a period then sold direct to finishers with only the poorer or off types remaining to go into their conventional finishing unit.

CASE STUDY 2 MATTHEW & CATHERINE ATKINS (Yorkshire)

This unit had been set up specifically for high welfare pig production. It was not supported by being part of a larger arable unit. Marketing arrangements had been made that ensured a slight premium for all the outputs as long as there was strict adherence to negotiated but achievable welfare guidelines. Periodic visits by a nominated veterinary surgeon gave an independent assessment of the operation and was seen as positive by the farmers and not just an act of policing.

The 600 sow herd was run in two separate locations on 80 acres of long-term lease land. The system devised for mating management, subsequent rotation during gestation and farrowing was quite complex and had overtones of a highly organised military operation! This couple had won the Pig Farmer of the Year Award in 1989. Their innovation and very high production for an outdoor unit were obvious features. They had formed the Yorkshire Natural Pig Producers Group some years earlier along with a number of other farmers. As time went on a some found it difficult to maintain the standards and make sufficient cash returns. There are now only 2 left in the group and they supply 20% of Sainsbury's High Welfare pig products.

A typical months statistical data is as follows: 144 litters born

1629 born alive	11.31 per litter
15% mortality	
144 litters weaned	
9.75 piglets per litter weaned	

142 sows served. 21 returns to service. All weaned piglets went into semi closed outdoor pens with deep straw bedding and at a later date they went into free range finishing barns. There were strict rules on space allocation for any given size of pig to ensure the welfare standards were met.

Matthew had some concerns about the pig industry. In particular the cost of the housing upgrade in the UK. The change in competitiveness between UK and European pig producers and will the consumer be prepared to pay a premium for the higher welfare product. Evidence would suggest that few really are prepared to pay prices commensurate with the increased cost of production.

The pig industry was an interesting study with the dynamics of change and the very low returns whilst I was there.

The Poultry Industry

Most of the focus on poultry is on egg production. One of the most intriguing facts was that since 1988 the production of free range eggs declined from 18% of shell egg production down to 5%. I mention "shell egg" because much of the egg used in the UK is described as liquid egg and this is, for the most part, imported from the continent where welfare standards are generally seen as less relevant. In 1993 the RSPCA set out to have battery cages phased out within 5 years as well as a complete ban on the construction of any new battery systems. This mission was clearly not succeeding as when I visited the poultry unit at Harper Adams College they were running an older battery system, they had just done a major upgrade to new cages in one sector and they also had a free range unit. The reality of true free range egg production is that the real cost of production is up to 50% greater than the conventional battery system. The big determinant is what people are prepared to pay. In most situations price will rule. Much of the debate at consumer level has centred around the appropriate labelling of eggs to properly reflect their management regime. This debate is really very much the same as we have seen in NZ over the last year or so.

The production of chicken seems to gain very little media comment or focus. For the most part it is undertaken in enclosed and almost secretive conditions. Since 1950 the real price of eggs and chicken have fallen by 2/3rds as opposed to beef which has increased in cost. Perhaps the consumer is driven more by his or her wallet than the desire to buy welfare friendly animal products.

The Sheep, Beef and Dairy industries.

Most of the debate during 1995 centred around the transport of livestock rather than the on farm factors. Certainly the regulations that UK farmers work under are more onerous than ours but in part that is a reflection of the increased profitability. Vets are often brought in for what many of us would take for granted as routine tasks. Especially at lambing time. The cash returns justify this in many situations. I quickly came to appreciate the work that NZ has done on breeding functional sheep that are designed not to need a high level of interference (economics strikes again!). What did seem very restrictive to me was the issue

of "Casualty Slaughter". There are handbooks put together by a number of organisations dealing with the legal requirements of casualty slaughter. Even the on farm disposal of an ailing sheep requires a veterinary certificate and supervision while the deed is done. The more typical NZ shepherd would have to make some considerable adjustments in a weeks work to conform strictly with accepted UK protocol. Often I wondered whether it came down to a matter of the "political verses the practical". In terms of prosecutions in the welfare arena the most ludicrous I came across was that of a farmer who was prosecuted for transporting an ailing sheep on the wrong trailer. He had used a flat-deck sprung trailer with a gambrel restraining device on the sheep instead of a proper livestock transport trailer. He had taken the sheep some 600 yards and just happened to be spotted by a member of the public.

The beef cattle industry has some issues to deal with. Most of them revolve around the winter housing of animals and the requirement for adequate dry bedding. Definition of the term adequate can be varied. The dairy industry tends to have more problems with herds spending a high percentage of their time on concrete with foot problems being quite common. Vets and farmers spend considerable effort and energy on feet with handbooks and video guides being produced to help lessen the problem. I would have to say that average cow condition in the UK is substantially better than our own. Any thinner herds we saw were readily labelled as being more NZ in type. More often it came down to inadequate feeding and poorer management.

Livestock farming in the UK is under real pressure from the expectations of the very urbanised population. Most Brits are now substantially divorced from the realities of livestock production and arable agriculture. Their interface with mother nature is at the supermarket!!

THE WELFARE AGENCIES.

RSPCA

In terms of funding and general effort the RSPCA is the dominant animal welfare organisation in the UK. It is seen by most as advocating evolution in welfare matters as opposed to revolution. I visited their headquarters in Horsham for an interview and couldn't fail to be intrigued with the level of security. When I probed further about the tight security it was revealed that the threat is more from the more left wing organisations who feel that the RSPCA is too allied to the farmers' cause.

Much of their funding comes from monies left by estates and annual donations. Their guarantee of income comes from a strong media presence which has every chance of convincing the public that they are a cause worth supporting.

They have put a lot of work into analysis of modern farming systems and tend to draw attention to the downsides of the higher technology involved in many of these systems. One of the more recent initiatives of the RSPCA is the creation of "Freedom Foods Ltd". This scheme has been devised to give consumers the choice of purchasing products that have been produced in a more welfare friendly fashion. Standards have been set down for

different classes of livestock and producers must become accredited before produce can be marketed under the Freedom Foods banner. Initial effort was put into the pig and poultry industries with later initiatives for other classes of livestock coming into force in 1995. A wide range of animal welfare agencies felt the initiative would result in enormous benefit to farm animals on a scale that could not be achieved quickly by any other known methods. Retailers are the prime target with restaurants hopefully being supportive of the concept. From my point of view I was encouraged that the RSPCA had taken a commercial approach to solving an issue as opposed to a legislative line.

A country such as the UK has a wide diversity of ethnic groups. One of the issues which arises from this is the problem of slaughter for religious purposes. The RSPCA is concerned about some aspects of this and is always lobbying for changes to some methods so that they better conform with what we regard as good practice.

The RSPCA is also concerned with the ethical implications of emerging technologies in the breeding of farm animals. They believe that suffering can result from breeding for a particular trait without long term regard to the welfare impact on the animals involved. Examples of areas of concern are : The very fast growth rates of broiler chickens. Research shows that up to 77% of slaughter weight birds may show abnormalities in the way they walk. One bird in 5 experiences chronic pain.

The use of BST in dairy cattle is seen as a big negative by the RSPCA. Evidence suggests that its use is associated with a 15% to 45% increase in clinical mastitis.

Embryo transfer also poses concern and the RSPCA believes that it should be restricted to specialist breeding programmes. History suggests that many recipients in the cattle industry have later needed caesarean section to deliver live calves.

The use of A.I. is seen as positive because it reduces the number of bulls that have to be kept on farm but from the point of view of genetic diversity both A.I. and E.T. have some question marks over them as to whether they are for the long term benefit of the species.

In short the RSPCA considers that the genetic manipulation of animals purely for human dietary reasons is ethically unacceptable. Consumer research has also demonstrated a public mistrust of this novel technology.

An ethical review of animal breeding technologies should be based on aims, needs, alternatives and impacts.

The HUMANE SLAUGHTER ASSOCIATION.

The HSA was founded in 1911 and was initially established to improve methods of slaughter. It has attempted to achieve this through training, education and practical demonstrations encouraging those involved to take a more humane and responsible attitude. It is the only welfare agency to provide instructional material on improving systems and lowering/avoiding stress. A recently produced video covers general animal welfare

standards, the behaviour and handling of livestock and the principles behind all major stunning methods.

The HSA have been strong advocates of the concept of mobile slaughter houses. The underlying aim is to reduce stress to livestock. Apart from one facility for slaughtering deer they appear to have made little headway in their efforts with the logistics of transporting the animal whole beating the transport of many parts!

For their efforts they receive very little support from fellow welfare groups who see the slaughter of animals abhorrent. They have been the subject of attacks and vandalism in more recent years. As a group they should be seen as an ally of the farmer as they actively seek ways to provide better solutions. Their funding base comes from a similar cross section to the RSPCA.

The more radical end of the welfare groups starts with Compassion in World Farming and gets progressively more militant. The over riding desire is to stop the commercialisation of animal agriculture in any of its forms.

Take for example the group called "VIVA" (Vegetarians International Voice for Animals). This lobby group is aiming much of its material at the children in the hope to sway their life's habits early. They talk of plans to broaden the campaign of protests "by children for children".

Another group called "Animal Aid" issued a report titled "Silence of the Lambs" in which it claims that 15% or near to 4m of each years lamb crop die soon after birth from disease, malnutrition and exposure within a few days of birth. The same group are also out raged at standard farm practises (they describe them as mutilations) such as castration, docking and the use of drugs in breeding programmes.

Mark Glover is a consultant working on behalf of "Respect For Animals" . His stated aim is a world where no one eats meat. He is credited with bringing an end to the European fur industry and is working hard to stop the export of live animals from Britain. These are the sort of people working against us in the market place. They gain a high profile in the media and in the street. Quite how we put the pads on and bat against these groups I am not sure but much of the answer must lie in education of consumers that what we are doing is acceptable. We must aim especially at the next generation of consumers.

Such is the diversity of the welfare lobby that while some would have farmers monitoring flocks 24 hrs per day with total endorsement of practises such as indoor lambing while other groups believe that the humble sheep was never designed to live indoors and deserves its freedom to wander the moors etc totally uncontrolled. It would appear that the welfare groups will struggle to find some sensible middle ground as a whole but as individuals they will pick away at various practises forever more. The antics of some operating over the 1995 period did much to erode the remaining faith the urban public have in livestock farmers.

It is intriguing that while the UK public are engaged in all sorts of debate on improving welfare standards over the Channel in France there is little thought given to some doubtful practises. An example of this is the force feeding of geese to provide a liver weighing up to

one kilo in 14 to 21 days. Force feeding of fermented grain (through a funnel twice a day) creates sclerosis of the liver and a long fancied French delicacy. Actions such as this confirm that the French live to eat while the British eat to live. It seems the Brits on holiday can ignore the differences in animal production systems as long as it suits them.

To its credit the NFU are mounting an educational programme to assist the public in their understanding of the issues surrounding food production. This is being done by small community groups within agriculture staging open days on representative farms. They are portrayed as a fun day out for the family with an underlying aim of getting the consumers closer to the producers and having a raft of questions and issues raised and answered by those at the practical front. Patronage at the one I was associated with near Reading was very high and almost oversubscribed. The concept is a bit of a rear guard action given the change in attitudes to welfare by the UK consumer but as a concept it must be kept going. To a lesser degree NZ is seeing aspects of the UK scene appear here. Luckily the NZ public are slightly more aligned to farming in part because of the importance to the economy (albeit diminishing) and also the better linkages between urban and rural sectors (once again this is diminishing).

What are the lessons from the UK welfare experience?

- NZ producers can not afford to ignore what is happening in our better paying markets.
- The power of the consumer has grown considerably and will continue to rise further.
- The power and speed of the media should never be under estimated.
- Images of sheep stuck in snow and high lamb mortality are common re NZ ag
- Approved welfare practises will become a pre-requisite to market access.
- The rise in QA programmes will demand minimum standards are adhered to.
- Importing countries will become more active in auditing our standards.
- NZ does not want to find itself fighting a rear guard action to maintain access.
- We must set up clearer education networks of our future consumers.
- Linkages with urban schools should be fostered.
- One off disasters such as BSE will continue to erode livestock producers' image.

Chemical Residues in Wool and the Health Issues Relating to Organophosphate Dips

Overview

The original intention was to focus on the dip residues in wool and the problems and costs associated with poor farm practice in NZ. I quickly came to the view that the issue was quite easily dealt with as long as some basic rules were adhered to. The voluntary limit, promoted by Wools of NZ, of refraining from treating sheep within 60 days of shearing for crossbreds, 100 days for med. micron and 180 days for fine wools simply needs to become mandatory with the relevant education programme running in parallel at the point of introduction of the requirement.

What I found far more intriguing was the whole issue of what product to use in terms of chemical base. The use of organophosphates in agriculture and horticulture is widespread world-wide. If we focus on the UK situation we find that the OP use in sheep dips accounts for only 10% of total OP use. The remainder is nearly all used in crop protection for field crops such as carrots. The UK Govt. has recently made moves to ensure that carrots get a maximum of 3 applications of OP based insecticides.

Media attention on the use of OP's in sheep dips would suggest that the ratio is around the other way! During my time in the UK it was unusual not to find mention of OPs and the health issues relating to their use in all the weekly farming journals.

A cynic suggested that the reason there was so much attention on the subject was that if farmers could prove beyond doubt that there were health problems arising from the use of OP dips then the Govt. could be held liable because it was written into legislation that dipping was compulsory on an annual basis.

I had to reflect on the fact that on a per farmer basis the average NZ farmer must have come into contact with more sheep dip (and its claimed health downsides) than their UK counterparts. This assessment was made after looking at flystrike problems and the average flock size of each country. Certainly the attention drawn to health problems from use of OP dips in NZ is minimal compared to the UK. Perhaps it is myself who sounds like a cynic regarding the level of health problems perceived in the UK.

The picture painted would suggest that OP dips are the worst offenders of the 3 main dip families available in terms of human health issues. However if we look at wider issues we find that the synthetic pyrethroids (mostly applied as pour-ons) are much more toxic to aquatic life than OP's. Although one other pour on that is based on IGR technology (Insect growth Regulator) is seen as environmentally friendly in terms of water contamination there is evidence to suggest that some of the IGR's used in the Danish pig industry are entering the water systems and having adverse effects on the life cycle of crustaceans. OP dips require a reasonably high concentration of chemical and it tends to cut a large swath through a wide range of insects (pests or not) but there is a relatively quick breakdown of the chemical compounds.

The push is on to find a product that meets environmental and health requirements whilst still dealing to the problem of sheep scab, lice and blow fly control. To date the OP's are the only family that will deal to all 3 problems. Since compulsory dipping was dropped in 1992 the incidence of Sheep Scab has risen steadily. A Sheep Scab Action Group has been formed to plan a strategy for regaining control. Information from the National Sheep Assn (NSA) suggests that sheep scab was almost eliminated in 1952 and didn't publicly reappear until 1973 when 21 cases were reported. Today all main sheep areas have an incidence which is unacceptable. The NSA are further concerned that the requirement to be the holder of a "Certificate of Competence" before being allowed to buy OP based sheep dips will make the task of controlling Sheep Scab even more difficult.

Work that the British Wool Marketing Board have done on chemical residues in wool gives parallel results to what has been established here. That is that after 60 days 95% of chemical residue has gone and after 90 days it is almost unmeasurable. The scouring industry has some problems to contend with. For the most part their problems will become our costs. It is therefore in our interests to tidy up our act as best as possible. Water control authorities in the UK are becoming very strict about the quality of water re-entering the system post use in industry. Effective removal of all OP traces requires a high capital investment. Understandably some scouring companies are worried that if they invest heavily in the required technology they may suddenly find that the Govt. will ban the use of OP dips and the investment will be futile.

The scouring industry is attempting to achieve high standards but from time to time has to deal with the likes of substances which have been banned in Western agriculture for some time. An excellent example of this was the detection of Lindane in a consignment of Russian Merino wool. There is also a line of thought that other contamination of wool is happening from past environmental activity rather than current poor practise. I would have to say that often it is hard to prove or disprove some of the assumptions that were made on "outside" contaminants.

There has been much conjecture on the prospect of completely banning the use of OP dips on the basis of the adverse effects on health. I spent some time talking to different chemical company reps. and their logic was totally focused on the chemical family they were promoting. It was therefore impossible to treat much of the material offered as impartial or accurate.

The Institute of Occupational Health in Birmingham was commissioned to study 150 sheep farmers in the area of North Wales, Devon and Cumbria. The research indicated that long-term users of OP dips do perform slightly less well on recognised tests for reasoning and attention span. The report stated that "repeated exposure to OP pesticides appears to be associated with subtle changes to the nervous system. Measures should be taken to reduce exposure to organophosphates as far as possible during agricultural operations". The report went on to say "It seems reasonable to conclude that chronic effects on the nervous system have occurred in this group of farmers and that these effects are likely to be associated with long-term exposure to organophosphates".

It was added that "These effects are subtle in nature and although identifiable

with sensitive neuropsychological tests, they are unlikely to manifest as clinical signs". There was much debate in the rural sector after the release of the report with support and denial of the findings. A farming spokesman concluded that "Although the report was not as damning and conclusive as some feared it would still add to the concern relating to the use of OP dips and fully justified the need for further urgent research into the issue". The spokesman went on to say "We also believe that the Govt. should now consider the establishment of a compensation system for those farmers who can provide proof that their health has been affected by the use of these dips".

Focus on chemical usage in all aspects of agriculture will increase as time goes on. If we are to retain OP dips and chemicals as part of our armoury of weapons we must satisfy ourselves that they do fit within sensible safety limits. We must also display a greater level of commitment to using all these chemicals as directed. I have no problem in following the UK example of having to hold a certificate of competence or similar qualification before being able to purchase and use a range of products. In general our attitude to agrichemicals is blasé. It is not just their toxicity that we should be concerned about but our ability to make maximum use of the products as useful and justified tools in our businesses. As we have seen in the anthelmintic market the over use or misuse of product/s can shorten their life as a tool. This imposes costs upon us that more informed use may have negated.

Bovine Tuberculosis and Badgers as the feral vector

My interest in this topic stemmed from the Wairarapa's long running battle to try and get a lid on our ongoing problem. In our situation the TB was exacerbated by the opossum although over time we are now starting to look at other vectors such as ferrets and feral deer.

I was aware that the badger had been the root of the UK's problem and believed there may have been some lessons to be learnt from a closer study. Prof. Roger Morris from Massey University provided some useful background information and some points of contact to set me on my way.

Establishing contact with the relevant person in the UK seemed easy enough but as the weeks rolled on I realised that extracting sufficient information was going to be like pulling teeth. Special approval had to be given from higher authorities before any formal meetings could be set up. I became jaundiced at the level of bureaucracy I seemed to be cutting through but after further discussions, once I had penetrated the armour, I realised that the MAFF are under extreme pressure especially from pressure groups who don't like to see the seemingly harmless badger implicated with the spread of TB. As time went on I learnt that the MAFF badger control units are often the subject of what could only be described as terrorist activity and therefore any requests such as mine need to be vetted very carefully.

I met with a Dr. John Kirkham who had had a long involvement in the TB control programmes and the evolving part that the badger played in the transmission of the problem.

It was recognised in the 1930s that a very real problem existed. At that stage 40% of dairy herds were infected and 20% of cull cows had clinical signs of TB. 5% of cows were excreting infection in milk. Around this time 5,000 people a year were dying of Bovine TB plus of course numerous from the human strain. Post WW 2 there was an active campaign in terms of testing and slaughter and by 1960 the infection rate of herds in the UK was 0.04%. By 1970 the South West was recognised as having rising problems. It was not until 1972 that the badger was implicated as a vector. Right through to today the maps of TB incidence in the UK and of badger population overlay each other quite tidily. Current estimates suggest a badger population of 350,000 with at least a 1/4 being in the South West. (Gloucester south). This means 25% of the Pop. on 10% of land area. Badgers main diet is earthworms (up to 4kg/day) but there seems to be a correlation between increasing amounts of maize being grown (for dairy prod. in Sth. West) and an increase in the badger population.

In the early 1970s farmers were allowed to perform their own badger control. By 1975 the gassing of badgers was being undertaken but not in a very co-ordinated fashion. In the same year a consultative panel was created to look at the tie up between badgers and TB. A research centre was set up at Woodchester Park (Glos.) where the first real research into the ecology of badgers took place. Collars fitted with radio transmitters allowed collection

of data on size of home ranges and migration outwards by individuals. There was a period of very intensive gassing in other areas. By 1976 major progress had been made and there seemed to be no other parallel action which could have had such a positive effect on the TB incidence.

The Thornbury experiment was undertaken from 1975 to 1981 where in a geographically isolated area there was an attempt at complete badger eradication. After this work there was no herd breakdown for 10 years. This really, in farmer's and MAFF's minds anyway, confirmed beyond doubt that the badger was the major if not only vector.

In 1979 the welfare lobby started building and the gassing of badger sets was the prime target for these groups. Some effort was made by officials to improve gassing techniques but in 1982 all gassing was stopped. The tide of public opinion favoured the wildlife over the domestic livestock.

At this point a "Clean ring strategy" was put in place. After infected herds were identified there was a formal badger trapping programme in surrounding land. It was an expensive and slow job and this really was the start of a period where control on the problem was being slowly lost.

In 1986 Dunnet (a leading vet.) gave a directive that a live test for badgers needed to be developed. There was also a push to find a suitable vaccine for the badger population. For some reason TB testing badgers is more difficult than cattle. Post mortems relied on the need to culture. In 1986 the infection rate of badgers taken in control operations ran at 14%. This was obviously in problem TB areas. Even road death badgers are post mortemed with an infection rate of 4%. Road deaths are estimated to account for up to 40,000 deaths per year out of a total population estimated at 350,000. This seemed very high and I was suspicious of the figure's accuracy. Even at half of that it is a big percentage of the population. The carefully controlled MAFF trapping operations currently take out 1000 to 1800 per year. The latter raises huge public concern while the road deaths go relatively unquestioned. There are some places where underpasses (for badgers) are put under motorways.

Farmers (and others) are encouraged to report badger deaths so that post-mortems can be undertaken. I spent a morning with a senior vet at the laboratory on the outskirts of Gloucester watching/assisting with this work. Badgers are weighed and measured for length, an estimate for age established and of course relevant lymph nodes etc are removed for culture. One beast dealt with was 1/3rd its correct weight for age/length, had all the hallmarks of severe TB infection, had been found dead in a barn and was from a farm with ongoing TB problems.

Evidence suggests that badgers showing advanced signs of the disease are ostracised from their badger set (chased away to die). They tend to head for an easy feed source which in many cases is around farm buildings where in many situations there is now a large supply of maize silage which they seem to enjoy (along with the worms!). They also seek warmth/shelter and apparently are often found dead in barns. Many of which house

livestock. I mentioned earlier the link between increased badger numbers and the link with an increase in the use of maize, usually as silage, and it seems that this is one of the transfer areas of the disease from the badger to the cattle. It is known that badgers will excrete TB infection in urine. Also the male badgers spend considerable time fighting and often have severe and weeping war wounds on their rump and shoulder area. If they become emaciated and ill these can also excrete infection. The opportunities for herd breakdown in this scenario are high.

Before the pro badger groups became so vocal farmers commonly had their own ways and means to deal with unwanted residents. Trapping and destroying, gassing via exhaust fumes and the classic of filling badger sets with cowshed effluent (shurry) were all mechanisms for eradication or at least moving them on. All of this is totally illegal now and farmers who err are liable for substantial fines. Members of the urban public often keep an eye on individual badger sets. This is aided by the extensive network of public walkways that intersect much of the farmland in the UK.

The public's position and interest is summed up by the fact that there are 5 acts of Parliament protecting Badgers but only 1 protecting children! In recent years the badger has almost become a cult object. As I mentioned earlier there is huge antagonism towards MAFF badger control operations. MAFF employees involved travel in unmarked vehicles, usually using older Land Rovers and horsefloat type trailers to move around. The MAFF badger control unit I spent a day with (Aston Downs Wildlife Unit) is based within a military installation with all the drama of guards on the gate. Past incidences indicate this is not an over reaction.

Initially the pro-badger groups denied that badgers were part of the equation but as time (and evidence) has moved on there seems to be an acceptance that they are part of the transfer mechanism but questions are raised about the rationale of control programmes. In particular there is concern that disturbance of badger populations may in fact be helping spread the problem.

Current badger control operations centre around the trapping and TB testing of live badgers. After herd infection is identified the unit comes in to establish the number of badger sets in the area and more importantly their feeding range and potential contact with the herd. A feed bait based on peanuts and treacle is used. To this is added small coloured grains of plastic. This is fed close to the badger set with one colour being used per set. The critical part is observing the zone of influence that a particular badger set has in relation to the farm and herd contact. The badgers tend to mark their boundaries with faeces and the small coloured grains of plastic can be monitored to work out the individual territories. When this information has been established the sets having any influence on the infected herd are then trapped and subject to the live test. Infected badgers may be despatched at this point with the exception of sows who are lactating (regardless of infection!). There are no guarantees that all badgers in the set will be caught so it is far from a perfect mechanism but at least it allows some progress with vector control given the strong lobby against any of this anti badger work. I will reiterate that these carefully controlled/monitored control operations take out less than 2000 badgers per year while

road deaths are estimated at 40,000 per year. These MAFF caught badgers are confirmed with the disease and are therefore liable to adversely affect the ongoing health status of the remaining members of the set. I struggle with the logic that is so opposed to such carefully enacted work.

A Badger Panel has overall control on the operations of the wildlife units. This in part is similar to our Animal Health Board and is made up of:

- 1) RSPCA
- 2) Badger protection groups
- 3) Eminent scientists (knowledge impartiality)
- 4) NFU representation
- 5) British Vet. Assn.
- 6) MAFF representation (encompassing Field staff, Research and Chief Vet. officer)

This group gives approval for the badger control operations. This is a formality in areas of recent incidence of TB (Type 1) but involves extended periods of reporting and debate if it is outside common problem areas.(Type 2).

Testing for TB is done on a 4 yearly basis in most of the UK except in the high incidence area of the South West. Here it is 2 to 3 yearly although some parishes (small district council areas) may be on an annual basis given the severity of the problem.

In situations of herd breakdown there is a retest at 60 days. All initial testing is completed by ordinary practise vets but in the event of breakdowns the MAFF staff become involved until the problem is tidied up. This will be after 2 clear tests which in many situations will take 12 months. Confirmed TB infection will mean that herds are under strict mil trading restrictions for a minimum of 4 months. Rather than use the caudal fold test the UK preference is the Comparative cervical test which compares avian to bovine strains. Incidence of avian TB is high presumably because of all the grain based feed in the cattle industry

Since 1993 cattle identification, with all cattle having a unique number pertaining to the farmer's holding, has been mandatory. This has been for disease monitoring, trace back for residues and the claiming of subsidies. (Subsidy claims are made up to 3 times on fattening males and annual claims for suckler cows).

Material on Badgers and TB incomplete. I still have extensive information to pick relevant eyes from and conclusions to draw from what I saw/found.