

*THE WINSTON CHURCHILL MEMORIAL TRUST
OF AUSTRALIA*

*CHURCHILL FELLOWSHIP REPORT
BY
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2002/2 CHURCHILL FELLOW*

*THE JACK GREEN CHURCHILL FELLOWSHIP TO STUDY
CALF REARING METHODS OVERSEAS.*

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INDEX

	SUBJECT	PAGE
1.	<i>Definitions and apologies</i>	3
2.	<i>Introduction</i>	4
3.	<i>Executive summary</i>	6
3. 1	<i>Project description</i>	6
3. 2	<i>Highlights</i>	6
3. 3	<i>Major points</i>	8
3. 4	<i>Dissemination and implementation</i>	9
4.	<i>Programme</i>	10
5.	<i>Findings</i>	13
5. 1.	<i>U.S. of A.</i>	13
5. 1.1	<i>General</i>	13
5. 1.2	<i>Labour</i>	13
5. 1.3	<i>Colostrum administration</i>	14
5. 1.4	<i>Disease</i>	15
5. 1.5	<i>Disease spread in heifers reared off farm</i>	16
5. 1.6	<i>Bovine Johne's disease management</i>	17
5. 1.7	<i>Antibiotic use</i>	18
5. 1.8	<i>Vaccines</i>	19
5. 1.9	<i>Accelerated feeding</i>	19
5. 1.10	<i>Heifer body condition</i>	20
5. 1.11	<i>Housing styles for unweaned heifers</i>	20
5. 1.12	<i>Merits of housing weaned heifers v. free range</i>	23
5. 2	<i>Ireland</i>	23
5. 3	<i>Denmark</i>	25
5. 4	<i>Holland</i>	27
5. 5	<i>New Zealand</i>	29
6.	<i>Economic returns</i>	30
7.	<i>Conclusions and recommendations</i>	31

1. DEFINITIONS.

Colostrum is the first milking from a cow (and other mammals) which is essential for survival of the calf as it contains antibodies to any diseases with which the cow has had contact in her lifetime. Unlike some other species, calves do not acquire immunity to diseases through the placenta, therefore adequate colostrum consumption is necessary for the absorption of antibodies through the gut wall. This process is known as passive transfer. This must take place as early as possible, and certainly before 24 hours, as the permeability of the gut to these very large molecules is greatest immediately after birth, decreases markedly in the first 12 hours, and is gone by 24 hours.

IgG's are one of the proteins which can be measured in the calf's blood to assess the quality of passive transfer.

"wet" heifers - young calves still on milk.

calf rearer - someone who rears calves at least from birth to weaning and usually up to 12 weeks.

calf grower - the person who grows calves from post-weaning to immediately pre-calving.

Veal:-

"white" - milk fed only, slaughtered usually at about 20 weeks.

"pink" - milk and grain or silage fed, slaughtered between 20 to 28 weeks

"red" - weaned at 5-6 weeks and then exclusively grain fed until slaughter at about 10 months.

APOLOGIES

There are several people mentioned in my report whose precise academic qualifications I do not know as they were not printed on their business cards; I apologise for the absence of these qualifications from my report, and intend no disrespect by the omission.

2. INTRODUCTION.

In the past 20 years or so there have been several “boom and bust” cycles in rearing calves, particularly Friesian bull calves, for meat production; with each “boom” new calf rearers painfully and expensively gather information on successfully rearing calves, and when the “bust” comes the now skilled rearers leave the industry, and the information they have gleaned is lost. This repeated loss of skills and personnel from the industry has come at a sizeable expense, both in money lost by private individuals, new to the industry, struggling to rear calves with little or no advice, and also in government funding for calf rearing courses which are run periodically by government funded bodies such as TAFE, the Dept. of Agriculture, RIST, etc. As the industry has been such a spasmodic one, very few people ever get beyond the stage of being good calf rearers, and the chance to strive for excellence is something which is lost in the “bust” part of the cycle; this means that average calf rearers rarely become accomplished enough to question some of the calf rearing doctrines which have been around for many years and which scientific research has shown to be lacking in veracity.

An allied industry, that of rearing replacement heifers for dairies has been a family based and very unscientific industry since dairy farming began. In recent years, with the advent of many large dairies of more than 1,000 cows, calf rearing has passed out of the hands of “mother in her pinny”, and into the hands of hired staff, or sharefarmers. Some of these do an excellent job, but on many farms heifer rearing is a disorganised part of the farm’s activities, undertaken by whoever is free at the time, or by completely untrained staff, who have no knowledge of the anatomy and physiology of the newborn calf, nor of drugs and the way they work, nor of the benefits of getting well grown heifers into the dairy as early as possible. It may seem farcical to anyone not involved in the dairy industry, that some dairies most precious resource in terms of genetic merit and future earning capacity is entrusted to the care of completely untrained staff, sometimes even those with a total dislike of calf rearing.

In view of the above, I wanted to go overseas to examine better ways of rearing calves, including shed design, staff training, disease management, milk replacer composition, alternative markets for reared Friesian bulls and the outlook for our existing bull beef industry. My particular areas of interest were neonatal bovine immunology, natural therapy use to diminish reliance on antibiotics, and veal production.

My ambitions were made possible by winning the Jack Green Churchill Fellowship, which is given to someone involved in the dairy industry, to honour Jack Green and his lifetime of wonderful work done for the dairy

industry, particularly in Victoria. Unfortunately I did not meet Jack Green, who died at the age of 83 in April 2002.

My success in winning a Churchill Fellowship would not have been possible without assistance, and I would like to thank:-

- the Churchill Trust, and in particular the sponsors of the Jack Green Churchill Fellowship, for giving me this marvellous opportunity, with both its financial benefits without which I could not have hoped to make this tour, and for the high regard in which the Trust is held, which gave me access to people and places I may otherwise not have been able to visit;*
- my referees who had great faith in my ability to accomplish the proposed task;*
- my husband David and employee Sheree Treglown, without whose hard work and support I would not have been able to submit my application, organise my trip or leave the farm for 14 weeks;*
- the people in all 6 countries I visited for their generosity and free sharing of information.*

3. EXECUTIVE SUMMARY.

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3.1 Project description

To visit veal producers, heifer rearers, heifer growers, dairy farms, vets and scientists in America, Canada, Ireland, Denmark, Holland and New Zealand to investigate as many facets of calf rearing and its associated industries as possible.

3.2 Highlights

U.S. of A.

California – visiting many extremely large scale wet calf rearers, where rearing systems are very different from ours, very automated and very impersonal.

Oregon/Washington – being taken to large scale weaned heifer growers, plus some very large dairies.

*Minnesota – Talks with Hugh Chester-Jones, Gerald Wagner and David Ziegler, with whom I visited many farms, and toured the University of Minnesota (Waseca campus) dairy.
Three weeks in company of Dr Sam Leadley, who specialises in heifer rearing from birth to the point of calving.*

*Minnesota/Wisconsin – driven extensively around both states by two Alpharma reps.
Met the editor of "Hoard's Dairyman" which is possibly the best dairy magazine being published.*

Ontario, Canada

1.5 days with members of the staff of Delft Blue Veal, a division of Grober Animal Nutrition.

New York State

Spending an afternoon with Professor Mike Van Amburgh, who has done years of research into heifer nutrition, particularly from birth to 6 months.

Vermont

Meeting Christine Rossiter-Burhans, M.S., and V.D.M., who is a world renowned expert on the management of Johne's disease.

Georgia/Florida

Five days in the company of the national president of the Professional Dairy Heifer Growers Association in the U.S., visiting various dairies.

Ireland

Three days visiting the Grange Research Centre, which is a division of Teagasc, and also the Hillsborough division of the Agricultural Research Institute of Northern Ireland.

Denmark

Visits to the Biosens Agro Business Park at Foulum, where I spent many hours with the director of the facility; also visiting the Danish Agricultural Advisory Centre at Skejby, where I met two scientists who have both been involved in research into calf rearing and veal production.

Holland

Being hosted by the Van Drie Group, which is one of the largest veal producers in the world, and also gaining an insight into Denkavit's veal production system.

New Zealand

Meeting with a large scale professional calf rearer and organic meat exporter, who gave me several other contacts including Tineke Verkade, who is the guru of animal homeopathy in New Zealand.

Spending time with Harry Wier, who is the inventor of the "Technosystem", a particularly efficient cell grazing system, and who is also a bull grower.

3.3 Major points

- *In the U.S. the contract rearing of wet heifers and of heifer growing is an enormous industry, which carries considerable agri-political weight.*
- *Continued educational emphasis on colostrum management is slow to translate into good on-farm practice, although some big farms I saw had sophisticated colostrum handling and administration procedures.*
- *It appeared that by mingling heifers in rearing establishments, particularly very young stock with undeveloped immune systems, diseases have the capacity to spread between dairies when heifers are returned to their farms of origin.*
- *Housing dairy cattle in the U.S. has caused many health problems, principally respiratory and foot/leg problems. The housed heifers I saw in the U.S. were almost all overweight; this can cause trouble, particularly at calving. In the free-range heifers I saw, these problems did not occur.*
- *The level of veterinary antibiotic use in the U.S. has the potential to pose a world-wide threat to the efficacy of antibiotics. Natural therapies and simple good nursing appear to be rare in the treatment of sick calves in America.*
- *The use of natural or non-antibiotic therapies in calf rearing is not common, but I did talk to people who are interested in this field.*
- *Veal production in America, Canada and Denmark is quite different from our infant industry, partly because the end products, although all being sold as “veal” are in actual fact quite different types of meat. Holland is the one country I visited with an end product similar in weight, age, colour and texture to ours.*
- *Staff relations and training can make or break an enterprise. Ensuring good communication is the responsibility of the employer.*
- *Bovine Johne’s disease in America is managed on a non-controversial practical footing accepted by dairy farmers, scientists and bureaucrats.*

3.4 Dissemination and implementation

As President of the Professional Calf Rearers Association of Australia, I am in an ideal position to talk to members about my findings overseas. I frequently get calls from prospective or novice calf rearers seeking advice and this is given freely; my continuing association with this group will ensure dissemination of the information I gained on my Churchill Fellowship tour. Some of my findings were presented at the annual P.C.R.A. conference in Werribee on 5th August 2003, and this report will be available on the P.C.R.A. website. My aim is to encourage professionalism amongst calf rearers in order to dispel our “backyard” image, and build an industry with credibility and some control over our markets.

I believe that dairy farms managers in Australia, particularly on the larger farms with employees rearing their replacement heifers, need to spend more time training staff, and should seek additional advice and supervision of their calf rearing from people with a proven practical record and demonstrable theoretical skill base. This complements the modern practice of employing farm advisers, nutritionists, agronomists, vets, etc to assist in the management of the dairy.

Replacement heifers are the most valuable resource on the dairy, but in many instances their treatment does not reflect this importance.

The dependence of U.S. calf rearers on antibiotics is at a frightening level, and is something we should not emulate. Educational field days, calf rearing courses run by RIST, TAFE, the P.C.R.A. and other institutions should emphasise the need for implementing good nursing practices before recourse to antibiotics, and rearers should heed this good advice.

It has become obvious during my time overseas that rearing replacement heifers from birth to first calving is an area requiring greater specialist expertise. It is my intention to establish a business offering heifer management advice to dairies, and to provide technical and marketing advice for our emerging veal and bull beef industries.

4. PROGRAMME.

California 27 March – 31 March

- 3 contract heifer and bull calf rearers, total 60,000 calves, southern California.
- 3 contract heifer and bull calf rearers, plus 1 veal producer, total 125,000 calves, central California.

Oregon/Washington 1 April – 8 April

- 3 dairies, 2 contract heifer rearers, 2 contract growers, and including 4 days with the N.W. pres of PDHGA (Professional Dairy Heifer Growers' Association).

Minnesota/Wisconsin 9 April – 23 April

- Hosted by various feed and drug company reps, and visited 6 heifer rearers, 9 dairies, 4 rearer/growers, 4 growers and met Dr Sandra Godden DVM, DVSc; Dr Hugh Chester-Jones, Ph.D., P.A.S; David Ziegler and Dr Steve Stewart; all scientists involved in calf rearing or dairy research. Met with 3 groups of feed company reps. Began travelling with Dr Sam Leadley.

Indiana 25 April – 27 April

- 1 heifer rearer, 1 rearer/grower, 2 dairies, plus an information night run by local feed company.

Ohio/Pennsylvania 28 April – 30 April

- 4 dairies and 4 “white” veal producers.

New York State 30 April – 15 May

- 8 dairies, 1 heifer rearer, 1 heifer grower, and spent an afternoon with Dr Mike Van Amburgh, an associate professor at Cornell University.

Missouri 10 May – 11 May

- Flying visit to Dr Drew Vermeire, Ph.D., P.A.S., Dipl. ACAN. Dr Vermeire has extensive knowledge of the veal industry.

Ontario, Canada 13 May – 14 May

- 1.5 days as guest of Delft Blue Veal, a division of Grober Animal Nutrition, which makes milk replacers for many different types of animals. Delft Blue rears “white” veal themselves and have other farmers produce “red” veal for them. Farm visits in the company of their nutritionist and an inspection of their packing plant made this a very interesting visit.

Vermont 16 May – 20 May

- 1 small, progressive dairy, whose owner/calf rearer is very interested in natural therapy. Met Dr Christine Rossiter-Burhans, MS, VMD; a world expert in Johne’s disease management.

Georgia/Florida 21 May – 25 May

- 2 heifer rearers, 1 heifer grower, and 3 dairies, all in the company of the National President of the PDHGA.

Ireland 26 May – 1 June

- Grange Research Centre, (a division of Teagasc) which rears bought in calves, and which has done considerable calf rearing research. Spent 1.5 days with Dr Richard Fallon, Ph.D. and was taken to a large dairy by Tom Farrelly, a dairy extension officer.
- Visited the Hillsborough Research Centre, run by the Agricultural Research Institute of Northern Ireland. Farm has its own dairy, and rears its own calves, on which it does various trials.

Denmark 2 June – 17 June

- 1 organic production company, 2 dairies, 3 “red” veal growers, 3 other visits and the research facilities at Foulum and Skejby. Here I met Jens Yde Blom, D.V.M., Ph.D; Rikke Englebrecht Pedersen and Kirstine Jorgensen, all scientists involved in dairy or calf rearing research. Also met with Lis Eriksen, D.V.M., D.V.Sc and Professor of large animal medicine at the Royal Veterinary and Agricultural University. Spent 14 days in the company of two vets, Dr Anna Ibsen and Dr Erik Træholt Thrane involved in animal production.

Holland 17 June – 21 June

- *Spent one day as the guest of Van Drie, one of the largest veal producers and processors in the world; this included 3 farm visits, a tour of their slaughter works and packing rooms, and talks with their Quality Assurance officer and nutritionist.*
- *Was a guest of Denkavit, which is another company which raises large quantities of veal. Spent the day with one of their farm supervisors, who makes regular visits to farms to ensure that calves are being well cared for by the contract rearers.*

New Zealand 23 June – 1 July

- *3 calf rearers, 2 dairies, 2 bull beef growers, including time with Harry Wier, the inventor of the “Technosystem” electric fenced cell grazing management system. Met Tineke Verkade, who is the acknowledged “guru” of veterinary homeopathic medicine in N.Z..*

Australia 2 July – 12 July

- *The time travelling from Sydney to home included visits to 2 TMR dairies and to Dr Peter Speck, a scientist formerly employed by the MLA, and the S.A Dept. of Agriculture, and a man with a knowledge of the bull beef industry and possible alternative markets for this product. Also visited an innovative stock feed manufacturer, Rob Riddell, Multicube, Yarrawonga and Graeme Pretty, the livestock manager of H.W.Greenham’s abattoir at Tongala, which is a major processor of bull beef in Australia.*

5. FINDINGS.

5.1 UNITED STATES.

5.1.1 General

Overall I thought that in Australia the average calf I see on the average dairy or calf rearing facility is larger, has better body condition and a better coat than the average calf I saw in the U.S.; of course there are exceptions in every system.

The American calf rearing industry has to contend with many more virulent diseases than Australians have at present. To a large extent these problems have been brought about by the close confinement of cattle which the industry seems to consider necessary, even in warmer parts of the country. This proliferation of diseases has led to overdependence on antibiotics, which is costly and sometimes ineffective.

The climate in the U.S. is so much harsher than ours, and has such a large seasonal temperature variation, that it causes problems which we do not suffer to such a great extent.

One of the greatest problems confronting the U.S. dairy industry currently is what could be termed a fertility crisis amongst Holsteins. This difficulty getting cows back in calf is severely elevating the number of cows culled for reproductive reasons, and is thus raising the cost of every cow in the dairy, as so many more heifers are needed to replace the culls.

This greater need for replacement heifers has provided a stimulus for the development of a strong and efficient heifer rearing industry.

The labour problems amongst white Americans are similar to ours, but the American dairy/calf rearing industry is saved by the large number of Mexicans willing to work with animals.

5.1.2 Labour

As labour is the factor with the greatest potential impact on the success or failure of a calf rearing/dairy enterprise I have placed it first in the summation of the findings of my Churchill Fellowship.

Many white Americans share with many of the inhabitants of other sophisticated nations, a dislike of work which is dirty, outdoors, uncomfortable, or physically demanding. This disaffection for hard work has made America a Mecca for Mexicans, whose main desire is to work as many hours as possible to earn the maximum amount of money to send home to their impoverished families. On almost all the dairies and rearing facilities I visited a high percentage of the labourers were Mexicans. The majority of Mexicans are extremely eager to please, and if they understand what has been asked of them, will generally do their utmost to comply.

There are two types of difficulties encountered when communicating with Mexican labour; one is the language barrier, and this is dealt with fairly well

on many farms, particularly the larger farms with more staff. Even on smaller farms there are often protocols for various procedures written and prominently displayed in both English and Spanish. The larger farms often have a Mexican who is fluent in English as a foreman, or one of the Caucasian staff has learned to speak Spanish.

The other, and more damaging difficulty in communicating is the difference in social mores between the two races; these differences cause relationships between employers and employees to fail because neither side has a good understanding of the customs and cultural values of the other. An example of these differences is the way in which the two cultures show respect to a figure in authority.

This failure of communication does not exist solely between Caucasian employer, and Mexican labourer; it can be as bad between native English speaking employer and native English speaking employee, because the “boss” assumes that his garbled instructions thrown over his departing shoulder have been heard and understood.

Having written protocols displayed in dairies and calf housing does not excuse the employer, wherever in the world his business is, from ensuring that each new employee has sufficient training time to become familiar with these protocols; this time should be tailored to the individual employee, rather than being a standard time spent with each.

Failure of communications is the main cause of employer frustration and staff dissatisfaction, because often expectations of how a job should be performed, or the standard to which it should be performed are not adequately communicated.

5.1.3 Colostrum administration

The high incidence of disease in the dairy cow population has had a disastrous effect on the levels of morbidity and mortality amongst young heifers, particularly where heifers are transported long distances to a rearing establishment.

In the U.S. there is no bar on transporting or selling calves as young as 1-2 hours old; normally the person collecting the calves will choose not to transport a calf which is still wet, but if they are willing to do so, there is no legislation to protect the calf. Because there is no age bar on selling or transporting calves in America, colostrum management practices are sometimes totally different from those where calves are not sold until they are 4 days old. Although, in general, U.S. dairy farmers are more conscious of ensuring adequate colostrum intake for calves than Australian farmers, some dairies which send their heifers away to be reared do not administer colostrum before transport, but rely on the rearing farm to do this vital job. On the subject of moving calves there are pros and cons from a colostrum administration angle, notably, against early movement,

1/ that if the calf is moved at only hours old, it is being stressed at a time when it has absolutely no immunity; this obviously leaves it very susceptible to disease at a time when it is exposed, during transport, to a range of virulent pathogens.

2/ that if fresh colostrum is not available, and dried must be used, the quality of this dried colostrum is not as good as high quality fresh colostrum, and that it is not farm-specific, and therefore does not give such good protection as good colostrum from the calf's farm of origin.

3/ that colostrum and then transition milk (2nd to ≈ 8th milkings) are ideal food for a calf as the fat and protein content are so much higher than that of the hospital milk (milk contaminated with antibiotics, mastitis milk or with high cell counts) or powdered milk which replace them. If a calf is moved to a rearing farm it is likely that there will not be transition milk available. By changing a very young calf onto "ordinary" milk at 1 – 2 days old there is a high possibility of the calf using up its brown fat, which then leaves the calf with no body reserves to use if it becomes ill.

The benefits of this early movement are,

4/ that if a calf's immunity is measured and found insufficient at the time of transport, it is still possible to administer powdered or stored colostrum and therefore convey some level of passive immunity.

5/ that if the calf is born in a very contaminated area it may do better if it is removed early and transported in a clean truck to a pen which has been cleaned thoroughly, disinfected and left to dry.

6/ that if the calf moves straight from colostrum to powdered milk there is no stress caused by changing the calf's diet at 4-5 days as many bull calf rearers do, and which sometimes results in scours.

I believe that the long-term survival and development of the calf is more likely to be compromised using the U.S. system; this theory is supported by what appeared to be lower body weights at 12 weeks, and the obvious difference in condition score and coat condition compared to that which is achievable with a system of calving in clean paddocks and of not transporting calves until they are at least four days old.

Studies in Australia show that around 40% of calves left to suckle their dams are immuno-compromised due to inadequate passive transfer. These figures are similar to findings in the U.S. several years ago; since then dairy education campaigns have made American farmers more aware of the importance of adequate colostrum intake, and have encouraged them and their staff to follow written protocols on colostrum administration.

5.1.4 Disease

Many of the problems which beset both the dairy industry and the calf rearing industry have been brought about by the increased intra and interstate movement of mature dairy cows which have either been sold, or which have moved as part of a whole dairy relocation. This has happened in

many areas, but particularly in California, where former country towns have been engulfed by areas of urban development, thus markedly affecting land prices; this means that it can become uneconomic for a dairyman/ heifer rearer to remain in an area, or impossible for him to afford to expand his operation. It can also force compliance with new environmental protection policies regarding timing and siting of effluent disposal, movement of farm machinery on roadways, noise emitted by animals and farm equipment, odour emission from animal barns and/ or effluent lagoons, and disposal of dead stock; the cost of complying with these new regulations has been high, and many farmers have chosen to relocate to areas with less stringent regulations and lower cost land.

In recent years there has also been greatly increased traffic of dairy cows as low milk prices have forced the closure of smaller dairies; many cows from these dairies have been bought by start-up dairies, or by expanding dairies; most of the traffic has been from east to west, but movement of stock from California has led to the wide distribution of *Mycoplasma bovis*, particularly in the mid west, where it has entrenched itself as a major problem for calf rearers, especially those rearing multi-source calves on contracts. This movement of mature cattle has exacerbated the natural spread of diseases such as mycoplasma, BVD (bovine viral diarrhoea), Johne's, IBR (infectious bovine rhinotracheitis) et al.

Whilst many of the serious health problems in the U.S. do not affect Australian dairy herds, there are parallels between the two industries, particularly at the moment with dairy stock moving between dairying areas because of drought, environmental pressure (i.e. the Murray River flats at Jervois), lack of irrigation water availability and amalgamation of herds.

5.1.5 Disease spread in heifers reared off farm

In America it seems to be an accepted fact that if a farm sends its heifers off to be contract reared, that they will be mingled with calves from other farms in the area, and often with calves from several states away. Many contract rearers not only mingle calves on the trailer bringing them home, but also mingle them in the pens, and share vaccinating needles between calves from different farms. Having seen many contract rearers operations, I do not believe we should adopt this model for contract rearing heifers which will eventually be returned to their farm of origin. There is the potential to develop an industry in Australia, but I believe that Australian dairy farmers would need to have far greater confidence in the likelihood of having healthy heifers returned to them than the American model would allow.

It would be possible to develop a successful wet heifer rearing industry if we could assure the owner that his heifers will be collected separately from other calves; penned in different areas of the farm from other heifers; managed either by different people or that hands and boots will be washed between farm groups and that outer clothing will be changed, i.e. a different apron would be used for each separate group; and that needles, scallop

dehorning and oral drench guns would be changed or disinfected between groups. Once weaned it would be necessary to paddock heifers in separate areas. This type of bio-security would at least minimise the transmission of disease between farms.

Many of the infectious diseases currently troublesome to the American dairy industry appear to have been exacerbated both by the movement of adult cattle between farms, and the co-mingling of heifers at rearing establishments.

5.1.6 Bovine Johne's disease management

Currently in Australia huge controversy surrounds the control/eradication of Johne's disease (mycobacterium paratuberculosis), in both sheep and cattle. In cattle, this disease can only be contracted by young stock, and as such is an important part of calf management.

My discussions with Christine Rossiter-Burhans indicated that the U.S. has adopted a very non-aggressive approach to the control of the disease in dairy cows. Unlike Australia, where bureaucrats have implemented legislation which has driven the disease underground, and resulted in very acrimonious relationships with farmers, America has left the control of the disease to the discretion of the farmer, whilst supporting them in their attempts to either eradicate the disease or to bring its incidence back to acceptable levels. On every dairy farm there are diseases and management issues which impact on the profitability of the enterprise; if Johne's disease can be brought back to a very low level it may not be economic to continue to try to eradicate it at the expense of solving some of the other profit robbing issues, particularly as the disease only expresses itself in older animals and especially in America, where the average dairy cow is culled by the time she is just over 4 years old.

To enforce strict quarantine of affected properties and payment of dubiously calculated compensation, as Australia has done, engenders a loss of confidence in the very system which should be helping farmers, and encourages them to hide possible cases, rather than to have their animals tested.

In Australia inaccuracies in test results and use of tests which require months to give a result hamper our diagnosis of the disease. In the U.S. they have different tests, one of which looks for the D.N.A. of the Johne's bacteria, and which gives a definite result within two to three weeks; this speed and accuracy makes management decisions easier. The fact that many dairy herds in the U.S. are permanently housed makes control of the disease easier than where cows graze pasture, and where it may be difficult to find clean pastures for young stock (the only class of stock susceptible to acquiring the disease). Denmark has eradicated several diseases in the past 30-40 years, and to achieve this they, too, adopted a co-operative approach with the full support of the farming community.

5.1.7 Antibiotic use

The calf rearing industry in the U.S., both on farms of origin and on rearing farms, relies on antibiotics to prevent it from collapsing. The widespread use of CMRs (calf milk replacer) which include an antibiotic has the potential to reduce the efficacy of many of our commonly used veterinary and human use antibiotics. This practise is very common in rearing heifers, even on their farm of origin, and there is almost blanket use on farms rearing steer calves for feedlots, and in starter milk for bull calves destined for veal production; in some cases the veal rearers themselves have told me that if they have a high incidence of respiratory disease in a particular batch of veal calves, that they will continue the use of medicated feed right up to the day of slaughter. On many farms not using medicated milk powder, the metaphylactic use of a variety of antibiotics is common; this includes dosing all calves with oral antibiotics for a period of several days before bad weather to minimise problems with pneumonia, or the routine addition of antibiotic powders into the diet of all calves on milk; this is even more likely to develop strains of antibiotic resistant bacteria, as many farmers try to save money by administering a lower than recommended dose/kg bodyweight. Many of these veterinary pharmaceuticals are bought on the Internet. These may initially come at a considerable economic saving, but they come without the advice of a veterinarian trained in their use, and are often used without the benefit of culture and sensitivity tests, which will indicate the most appropriate antibiotic to use, if in fact the use of one is warranted. The indiscriminate use of antibiotics in rearing calves may in fact come at considerable cost, if they are being used in inappropriate combinations or when bacterial disease is not present.

In reply to my standard question of "what do you do if you see a sick calf?" the most common answer was "give her a shot of x antibiotic, and (often) some Banamine" (flunixin, which is an anti-inflammatory, anti-pyretic). Rarely would anyone add electrolytes to the list, even as an afterthought, or if prompted, and the use of muco-polysaccharides to slow progress of gut contents, and to adsorb toxins was unheard of. Only when a calf becomes visibly dehydrated does anyone consider giving oral electrolytes, and then never more than 2 x 2l feeds in one day. Some people use sub-cutaneous lactate of Ringer's, 150-250 mls/side, rather than tubing with oral electrolytes; this is highly effective, but once again, this use of this is often delayed until the calf is visibly dehydrated.

5.1.8 Vaccines

Within the U.S. there are many vaccines which can be utilised to minimise the impact of diseases which can have a severe financial impact on the profitability of a dairy operation; however, the efficacy of these vaccines is dependent on many things, including the handling and storage of the vaccine, the level of stress that the animal is subjected to at and around the time of administration of the vaccine, the health and nutritional status of the animals being treated, and the level of a particular pathogen in the animal's environment. The vaccine also will have no effect on herd/calf health if it is left unadministered on the refrigerator shelf – this comment may sound facetious, but many farmers mean to vaccinate their cows prior to calving, but somehow never find the time. Most calves I saw were given an intra-nasal immuno-modulator at birth; as I understand it, these “rev up” the calf's immune system by stimulating the production of interferon, without giving a marked or specific immune response. Another readily available vaccine in the U.S. is one for pinkeye; it would be wonderful in our hot dry climate, where pinkeye is a major problem, to have the opportunity to use a vaccine to help prevent its occurrence.

Unfortunately these and many other vaccines available in the U.S. are not available in Australia.

5.1.9 Accelerated feeding

This issue is a veritable “hot potato” in the U.S., but one which is worth following. Accelerated feeding is feeding calves on a large amount of high protein, lower fat milk powder than the average CMR (powdered calf milk replacer). This promotes rapid skeletal growth and has been associated with increased activity of the immune system. There are two diametrically opposed schools of thought on the subject, with the proponents claiming that it leads to healthier calves who grow into bigger cows with higher yields, and the detractors claiming that any gain in the first lactation is quickly surpassed by the slower growing heifer in her second and subsequent lactations, and that heifers who grow too rapidly will not develop the parenchymal (milk producing) tissue necessary for later milk production. At this stage there is much research still to be done to prove conclusively which side of the argument is “right”.

The question of what is really best for the heifer is likely to remain a moot point, but it does seem to me that many artificial feeding systems both in Australia and in America feed young calves to a budget.

It may seem that there is no problem with this, as all commercial operations have to operate within a budget; however often the only term of reference used when setting this budget is “what can we afford to pay for milk powder and calf starter NOW?” The costs of feeding calves a better quality diet, in larger amounts, can easily be justified if the terms of reference are

widened to take into account the costs of potential morbidity from calves being fed only maintenance nutrition levels; potential morbidity from calves having underdeveloped immune systems as a result of malnutrition; potential mortality as a consequence of the above; potential mortality as a consequence of poor nursing care of sick calves as a result of staff being overworked from increased morbidity levels; malnourished calves being forced to wean when their rumen development and immune systems are not ready; and lastly, but most importantly the cost of a late entry into the dairy, and decreased yield over a lifetime.

5.1.10 Heifer body condition

Almost exclusively the confined heifers I saw were overfat from 6 months to springing, and I heard of several dairies which had up to 50% dystocia problems in their heifers, as well as metabolic disorders in their first calvers. On the farms I visited the problem of fat heifers was a universal one in confined heifers, with growers concerned about the problem, but not taking the obvious step of restricting energy intake: perhaps the best way to achieve this, whilst still having feed in front of the animals 24 hours a day, is to add straw into the TMR. This would leave the bulk but would lower the kJ/kg DM thus preventing the bolder heifers gorging, and the shy feeders from missing out. This problem of high energy feeds is particularly related to the feeding of large quantities of corn silage, which is high in energy, and comparatively low in protein. The consequence of feeding this type of ration is that heifers' skeletal growth is retarded, and they remain short, chubby and fail to reach their genetic height potential; it also impacts on their lifetime milk production, as high energy/low protein diets can lead to the deposition of fatty tissue in the udder and possibly to lower levels of growth hormone, which both can have an effect on later milk production.

5.1.11 Housing styles for unweaned heifers

It is ironic, at a time when retention rates of cows in U.S. dairies is possibly at an all time low (av. lactations/cow \approx 2) and the consequent need for replacement heifers is very high, that heifer care on most dairies appears to be low priority; in many instances barns for rearing heifers are makeshift structures, including poorly converted milking parlours or old cow barns, often dark and/or badly ventilated; hutches inconveniently sited, sometimes in poorly drained or very windy areas; in some cases heifers from 3 months to post-breeding all living in the bottom story of cold, poorly ventilated, inadequately cleaned and dimly lit barns. Obviously this is not the optimal environment for any animal, least of all a young calf with an underdeveloped immune system.

I did see new barns for raising heifers, but in many cases these had come several years after the dairy was built, and spending money on rearing good

heifers appears to come after new tillage equipment and tractors, improvements in the dairy and the purchase of more cows; on most dairies heifer rearing is the one department which always has to “make do”. With a few exceptions, the only people putting money into calf rearing facilities were contract rearers, whose sole income was derived from heifer rearing. In almost all dairies I visited, the calf rearing facility was not designed in the initial start-up phase of the dairy, but was patched together when the staff realised that they had no-where to house replacement heifer calves, much less bull calves which have to be kept until the next collection day. This lack of foresight has had a deleterious effect on the survival rates of young replacement heifers, with high levels of morbidity and with the national average mortality running at 10%; with the value of an ordinary day old Holstein heifer being up to U.S. \$500, this lack of planning and management must have a significant impact on the net profit of a dairy. One of the main factors affecting the choice of housing style is whether or not the facility will be utilised all year round. Most American dairies calve all year round, maybe in part because they have such trouble getting their cows back in calf. This use level has an impact on how well a facility needs to be cleaned; if it is to remain empty for 6/ 12 of the year, desiccation aided by a little lime will sufficiently reduce the number of pathogens in most cases. If, however, the facility is to be used year round, then it must be able to be disinfected much more effectively. Many of the year round facilities I saw have just moved from gravel or sand based barns to concrete floors; this gives them the opportunity to pressure clean or to use a flame thrower. The common story seemed to be that the shed was fine for the first few years, and then the pathogen build up started to cause trouble, which was impossible to control while the manure could seep into the floor. The types of housing styles I saw varied widely, with one style being popular in an area, and other styles being favoured in other areas. In California the California hutch is almost universal. This is a timber structure which houses 3 calves in separate compartments, and which has a separate timber grating floor; this enabled the walls to be lifted off the base so that the gratings can be pressure washed, limed and left to air in the sun. This type of hutch is only suitable for a farm with a large labour force, as the calves need to be lifted in over the front of the pen, and when they are weaned, the whole pen needs to be tipped up, so that the heifers can be caught and moved to a trailer. The minimum number of staff required for this operation is 3, and 4 is better, 2 to tip the hutch, 1 to catch the calf, and 1 to restrain the other 2 calves; obviously this is not practical on most Australian farms. Most of these hutches are sited over concrete flush alleys, which are washed once a day to remove manure build-up, but I have seen these hutches on straw with a gravel base. This type of housing has the disadvantage that it gets very hot in the Californian summer, and some producers have shadecloth curtains which are suspended over the rows of hutches between two taut wires, and which can be pulled the entire length

of the pen row, thus providing summer shade, which can be dispensed with during winter when the sunshine is beneficial.

Once I was in the mid-West states, the housing style had changed to barns, some pole barns (timber framed sheds, often without solid sides) with side curtains and some cover-alls (steel framed greenhouse type sheds); both types often had electric fans in them to provide ventilation. I also saw some heifer calves reared in climate controlled rooms (some totally computer controlled), the type in which veal is commonly raised; these are completely enclosed rooms, often ventilated with tunnel ventilating fans, and are heated with hot water pipes or underfloor heating. Here, too, poly calf hutches began to be popular; these almost exclusively have a small yard out the front, but on a few farms calves are chained to the hutches. The better operations have the hutches on concrete pads, and one farm in N.Y State had a very novel and effective way of keeping the newborn calves off the freezing ground, using pallets and straw.

In many barns there are back-to-back rows of single pens, some made of wire and some of plastic; even in single rows, if the plastic is used it creates an area at the rear of the pen where air does not circulate. This is particularly so at 0"-12" (i.e. the level of the calf's nose when it is resting) above the level of the bedding. This lack of adequate ventilation contributes to repeated bouts of pneumonia, which can damage a heifer's lungs sufficiently that she will never be able to take her place in the milking herd. I am not convinced that single pens are necessary, but if their use can be justified, thought needs to go into designing a pen system which minimises calf to calf contact, maximises usage of the covered area, and attains optimum airflow into the rear of the pen.

There seems to be a conflict between the farmer's urge to keep the calves warm, and the need for adequate ventilation. So many barns I visited had the curtains closed up tight, even on nice spring days, yet whilst we were standing in the barn the farmer was complaining about the respiratory troubles suffered by his heifers. To adopt the simple expedient of increasing the number of kJ/day fed as milk, and by maximising grain intake, the heifers could be kept warm from the inside, rather than by decreasing airflow in barns. Many of the people in charge of rearing wet heifers did not increase the amount of milk fed in extremely cold weather, or did not increase it sufficiently, nor did they manage the grain to encourage dry feed consumption. If early weaning is not required, the addition of a little good quality hay in very cold weather would result in a higher production of the VFA (volatile fatty acid), acetate, which is the VFA which generates the greatest amount of body heat.

The climate in Florida is possibly the most variable in the whole country, with summer temperatures of 40°C and very high humidity contrasting sharply with winter lows of - 3° C and continued high humidity; this wild variation in temperature makes designing housing which is adequate for both extremes very difficult.

5.1.12 Merits of housing weaned heifers v. free range

A factor which has a serious effect on the health of both cows and heifers is the questionable need to permanently house cattle. Although I was in America in the early spring, and the weather had improved from the vicious winter they had endured, I have a good understanding of prevailing climatic conditions, but still question the need to enclose cattle as much as many farmers do. In weaned heifers the most common problem I heard about was coughing heifers, usually immediately post weaning, but often in heifers up to 12 months.

On the few farms I visited which ran their weaned heifers outside all winter, coughing was not an issue. A facility at Coloma, Wisconsin, was a perfect illustration; admittedly the owner had chosen his site well, in that he had very sandy soil, with thick forest bordering most paddocks, so the land was well drained and fairly sheltered, but the heifers here are outside all year round and spend many months a year walking around in thick snow, and yet were some of the healthiest heifers I saw in the U.S.. The only other growers whose heifers impressed me with their overall health and fitness were 2 contract growers, one in Oregon and one in Georgia and a large dairy in Florida. In these instances the heifers are outside either from birth or from arrival at the growing facility. Another facility which I visited in N.Y. State had beef animals and Holstein feeder steers which had outwintered through a particularly cold winter, and in which coughing was non-existent. Animals on these 5 farms had access to ad-lib feed and water, as did the barn reared heifers in other facilities, but they also had plenty of space to exercise, with the minimum pen size being several acres. I would expect that the mere fact of living in large open areas would not only have a positive impact on respiratory health, but would lead to development of stronger and healthier feet, joints, ligaments and muscles than I saw in confined heifers. I would expect that this increased muscle tone in unhoused heifers would contribute to easier calvings.

5.2 IRELAND.

The main purpose of visiting Ireland was to talk to staff, principally Dr Richard Fallon, of the Grange Research Centre, Dunsany, Co. Meath. This Teagasc facility has done considerable research into calf rearing and some into neonatal bovine immunology. I found Dr Fallon a fascinating man, who is very enthusiastic about his work and with whom I talked for many hours on a variety of subjects.

Discussion centred on vaccinations and immunity levels in young calves, including benefits of vaccinating calves whose dams have been vaccinated prior to calving, the differences in between killed and modified live vaccines, and the contentious issue of whether vaccines work when administered to very young calves.

An interesting observation Dr Fallon had made was that in one local dairy, where he was monitoring the IgG levels in every calf, at the beginning of calving 85% calves had adequate passive transfer, whilst by the end of calving only 25% had adequate IgG's. This could probably be directly attributable to the increased workload of dairy staff later in the calving period. This seems to be a readily recognised problem, particularly in seasonal calving herds, with many farmers acknowledging that the first calves are always the healthiest. This problem is a result of the fact that not only does colostrum administration decline as the calving proceeds, but this lowering of the levels of passive transfer corresponds with the build-up of pathogens in the calves' environment.

We discussed the widespread use in the U.S. of serum proteins for boosting calves immune systems. There is no question that these do improve the level of immune response in calves, but it appeared to us that as they contain bovine serum it is only a matter of time before the product is either banned or is responsible for an animal health disaster along the lines of BSE.

One way of assisting calves to remain healthy is to use a commercially available hyper-immunised egg protein powder. This serves to bathe the gut with antibodies, and although the antibodies are not absorbed through the gut wall, they do help to deter pathogens in the lumen of the gut.

Dr Fallon told me about the regulations controlling the movement of stock in Ireland. Firstly, all births must be recorded within 14 days of birth; the details recorded are dam, breed, DOB, sex, dead/alive. The calf is then issued with a "passport", which is a paper which must pass to the new owner every time the animal changes hands.

Dr Fallon arranged for me to visit one of the biggest dairies in the area. The farm milks 180 cows, which are all mated to AI, with non-pregnants being caught by a back-up Charolais bull. This seems to be a common practice in Ireland, where the EU controls how many cattle are run, and how much milk is produced. It is quite difficult to buy quota for extra milk, so the chances of increasing production to make more money are slim. The only way to generate extra income from milk is to feed it to calves, and even here one is restricted in the number of stock one can carry, and the amount of subsidy one receives for them. The lower the stocking rate, the higher the subsidy, so the maximum number of kilograms need to be in the minimum number of animals; therefore the European breeds are popular as back-up bulls, as the calves are large, and grow very fast on a diet of over-quota milk.

One of the interesting things to emerge from the talk with Dr Fallon was that introducing a quota system for milk production had the rather unexpected result of increasing the number of cases of Johne's disease detected. When the price of milk was high, farmers fed calves on CMR after the colostrum. Once quotas started governing how much milk could be sold from each farm, many farmers were producing surplus milk, which was then fed to the calves, some of which subsequently developed Johne's. I am sure that this was not a desired outcome of introducing a quota system.

Dr Fallon organised for me to see Dr Desmond Patterson, at the Hillsborough Research Centre, just south of Belfast.

Dr Patterson is an interesting man, who has worked extensively with veal production in the past, so our discussion focussed on the ideal veal production system, feeding regimes etc. Mike Davis is the farm manager at Hillsborough, and is passionate about the work that they do there. The farm is 1000 acres, of which 500 acres is forest; it milks 300 cows in a herd which is split between autumn and spring calving, as well as having several other enterprises. They run many feeding trials in the milking herd, which is partly Holstein, partly Jersey, and partly Norwegian Reds. This latter breed was introduced after the original herd had to be slaughtered because of brucellosis in about 1999. The dairy rears its calves in a new barn in group pens with automatic feeders. There seemed to be a fair variation in calf size, but given the combination of breeds in the herd, this was fairly predictable, and the small calves seemed to cope well with being housed with much bigger body weight calves; this is probably because despite the size difference the calves are grouped in age. Once weaned, they are moved to a free-stall barn, into which they settle without trouble, unlike the comments I heard in America about calves adapting to free-stalls.

By chance I talked with Dr Alistair Carson, a project leader at Hillsborough, principally about Dr Van Amburgh's work with accelerated growth in heifers. Dr Carson has published many papers on rearing replacement heifers and the work done at Hillsborough suggests that although accelerating the growth of heifers to achieve a higher weight at first calving does produce more milk in the first lactation, the slower growing heifer catches up and ultimately produces more milk in her lifetime. This is a fairly controversial area, but the variance in results could be attributable to the retention times of cows in the dairy.

5.3 DENMARK.

Organics in Denmark is a huge industry and public pressure plays a large part in a farmer's decision to become organic. I was interested to meet organic producers to see whether they had any organic remedies for sick animals, but their way of dealing with a sick calf is the same as many – call the vet, and give antibiotics! I was told by Danish farmers that on organic farms it is acceptable to feed milk from a cow which has had antibiotic treatment, to calves and the calves are still able to be sold as organic beef! As in Ireland, all calves in Denmark have to have a passport before they can leave their home farm. Dairies here are small, and the heifers are normally reared by the dairyman's family, while the bull calves are sold to "red" veal producers. This meat is normally bull meat, often from animals treated with injected hormonal growth promotants (HGP), and which have been grain fed to carcass weights of 160 – 200 kgs.

I spent 10 days with Dr Anna Ibsen, who had worked for Stormøllen, and who very generously accompanied me to many of my visits in Denmark. One of the most important of these was to Dr Jens Yde Blom is the director at the Agri-Park at Foulum (this is a privately funded research farm which leases a former government owned research facility). Amongst many other research projects the centre runs a dairy herd, which is split into 3 groups, which are milked by robotic milkers. The calves from this herd are taken away from the cow after they have had their first drink; this may change as they have found that many have failure of passive transfer; despite this the death rate of these calves is 1% of live calves; the Danish average of all births is nearly 15% with the breakdown being 5% still births, 5% pneumonia and 5% diarrhoea. All bull calves are sold at 8 weeks old for beef, even the Jerseys. Farm production in EU countries is measured in animal units, and all animals on the farm, whether housed or not have to be included in this total, including the children's ponies!

A visit to a veal producer at Skårup was particularly interesting. He raises 1,000 bulls a year, 700 on contract to Danish Crown, which is a very large beef/veal meat company. He prefers to do all the calf work himself, as then he is sure that it is done to his high standard. The calves are all over 14 days old at purchase, and he buys a new batch of 52 calves every 3 weeks. He buys from 14 different farms, and his mortality is 2%. All the barns were new, and the whole place was spotless. The young calves were in a barn with 2 solid walls, and a solid wall to 8' on the third side; the fourth wall was made of tightly stretched shade cloth on sliding doors. The overall pen and barn design was one of the best I have seen, and apart from the problems that straw use brings, the barns were hard to fault. Once calves are 150-200kgs they are moved to the other barn, which had slatted walls all round; here the pens are 12m x 5m and there are 15-20 calves/pen. Once they get to ≈300-350 kgs they are spread out to 9-10 bulls/pen.

This farm, along with many other people raising baby beef in Denmark, has a problem with calves developing liver abscesses as a result of sub-clinical acidosis. The owner feels that they don't eat enough straw to raise the pH in the rumen, even though they have ad-lib access to fresh, palatable straw. The use of ionophores is prohibited in Denmark, so monencin or lasolocid cannot be used to help prevent this problem.

At this farm I met Rikke Englebrecht Pedersen, who is a vet and researcher, and who gave me a prototype calf tube feeder which she and others have just developed. The next day, at Skejby National Research Centre, I met with her, Kirstine Jorgensen, who is working at Skejby on eliminating the problem of liver abscesses in grain fed cattle, and four other agronomists/researchers. They were interested in the way calves are reared in Australia, and the particular problems we encounter; they were also interested in the way we have lowered the death rate on our own farm, and overcome our salmonella problems. Rikke was particularly interested in the age at which calves could be transported, both in Australia and in the U.S. She feels that the Danish regulations of forcing them to be at least 10 days- 2 weeks

means that they are being moved at a time when their passive immunity was possibly starting to wane, and before their active immunity has really begun.

One of the very interesting things I did was to assist Erik Træholt Thrane dehorn heifers; by law in Denmark this must be done under anaesthetic, which must be administered by a vet. I had been sceptical about the practicalities of this system, but in fact it took only a little longer than we take to dehorn calves with scallop dehorers and would be far less traumatic for the calves.

Farming in Europe is a much more regulated industry than it is in Australia, and the fact that there are subsidies for many things, including letting land lie fallow, complicates trying to assess the profitability of an enterprise. The way farmers explained calf payments to me sounded rather complex, with an EU payment of \$700 being made for each calf, and then the farmer gets his \$/kg as well, but I understand that for every year an animal lives, there is another payment for that animal.

5.4 HOLLAND.

I spent a day as a guest of the Van Drie Group. They have an abattoir in Apeldoorn in central Holland, where they kill 300,000 calves a year. I was shown around the slaughter-house and packing rooms by the manager of the slaughter-house, who has been in the business all his life and who was very knowledgeable.

The carcasses are stripped of their hide and disembowelled and then assessed; if there is any problem with the carcass, or if it is a carcass selected for routine antibiotic residue sampling, it is channelled off that chain and onto one where the carcass is placed in a special chiller until it is cleared for further processing. Normal carcasses go on to be assessed by an independent assessor, who grades the carcass on colour (measured with a Minolta Chroma meter), on a scale of 1-10; fat depth; weight, and source (breed); the carcass is given a EUROP classification of either "E" for the most perfect carcass shape, down to a "P" which is a lean, not very well muscled carcass. Calves are slaughtered at 28 weeks at a LW of \approx 250kgs. The slaughter weight is set to maximise profit, given the high initial cost of the young calf.

Subsequent to this tour I was taken to 2 farms and after this I spent an hour talking to Jacques de Groot who is the chief nutritionist, who sets the dietary programmes for all the calves. He gave me a very comprehensive précis of the company's operations, and was able to answer the few remaining questions I had. 25% of the veal calves raised are Continental breeds or crosses of these breeds and Holsteins. The pure Holsteins have a little more time and effort put into getting them to the target weight, and most of the "P" carcasses would be Holsteins. A few poor doing calves are taken off milk and

are just fed maize silage to grow as much as possible; these will not be sold as veal calves.

Both suppliers and growers of calves are issued with a contract, usually every year, and at the end of the year both are supplied with a report, and a ranking of their performance, compared to the other suppliers or growers. Growers are closely supervised, with most farms having a visit at least every 10 days.

In Holland calves from within the country are not allowed to be transported until they are 10 days old, and have their "passport", and calves coming from other countries must be 14 days old before transport.

The better farmers get the bigger beef breed calves to rear, as they are more profitable, and also the company loses more if one of these dies. Calves spend the first 8 weeks in single pens, and then are drafted into groups of 8. All veal calves in Holland are on 3" timber gratings with a gap $\approx 1\frac{1}{4}$ ", these are over a manure pit which is pumped out when necessary, but no water is added to it as the farmer has to pay for the effluent to be taken away.

Sick calves are given electrolytes and no milk, and if there is a continuing problem the supervisor is notified and the vet is called.

All the calves in the veal barns I saw in Holland appeared much healthier than the veal calves I saw in the U.S.

After my day with Van Drie, I spent the day with one of Denkavit's farm supervisors. Denkavit has a similar system to Van Drie, in which the growers merely supply the labour and the facility, and the company supplies the calf, the transport, the milk, the hard feed, and the veterinary services and drugs. If a calf is ill the farmer can administer antibiotics, but if there is a herd problem, he calls his supervisor, and after they have discussed the problem the vet may be called. The average death rate of the Denkavit calves is 3.5-4%. The stables are maintained at 13-14° C in winter to minimise cold stress, hot water circulates through the barn to supply warmth under the calves (it travels in $\frac{1}{2}$ " pipes which run between the gratings, and towards the front of the pen, where the chest and abdomen would be when the calf is lying down).

All eartags are scanned with handheld electronic scanners by Denkavit employees; this saves human error, and as the ultimate responsibility rests with the company, they feel that it is their duty to provide accurate accounting of all calves in the system. Denkavit slaughters 3,500 calves a week and 95% of this, or 500 tonnes/week is exported to Italy, France, Germany, Russia and Israel.

The Dutch veal system is very controlled, with every cut of meat in a supermarket being able to be traced back to a particular farm of birth and of rearing. There is an enormous amount of money tied up in veal barns many of which are brick buildings with insulated roofs and overhead milk lines, and all the pens are made of stainless steel.

5.5 NEW ZEALAND.

My first visit in N.Z. was to a long term bull calf rearer, who has in the past reared up to 5,000 bull calves annually; in the last 12 months he had dropped his numbers to 1,800 calves, in part because he is concentrating on his meat export business, which exports organic grass-fed bull beef to the U.S..

The price in NZ \$ has been up to \$140 for four day old autumn calves (spring calves are considerably cheaper) and last year (2002) the sale price for 100 kg calves was NZ \$365. Some calves are sold at 70 to 100 kgs, but most are grown out on grass for sale through his company.

New Zealand slaughters about 600,000 bulls/year, and most of these are Friesians. There is no BYG classification in N.Z. (the Australian classification for young bulls before they have cut their 1st permanent incisors) and all bull beef is sold as manufacturing meat; bull prices are low for carcasses under 225 kgs and increase incrementally as the carcass weight rises.

This calf rearer was very interesting and helpful, and gave me a MAF (N.Z. Ministry of Agriculture and Fisheries) booklet on beef production, using various systems, which has some facts and figures on the comparative margins between bull growing and steer production. He also put me in touch with Tineke Verkade, in Hamilton, N.Z., with whom I spent 2 hours discussing natural therapy use in cattle; Tineke is the “queen” of homeopathic medicine in N.Z.. I bought her book, the remedies in which sounded rather odd to those trained in conventional medicine, but many dairy farmers swear that some of the remedies work. Homeopathy works on the principal of treating like with like; therefore a disease which produces a reddened, hot and swollen area would possibly be treated with a very diluted extract from beestings. For some reason which I don't understand, the more dilute the remedy, the more efficacious it is supposed to be. MAF has done some scientific trials of homeopathic v. traditional mastitis treatments. The treatment for calves with infected navels is to administer pyrogeneum, which is made from rotting meat. I have heard from several people that this remedy is particularly effective. A very successful rearer I spoke to treats all his incoming calves with ignatia, which is reputed to ease stress in cattle of all ages. All these remedies are available from homeopathic suppliers, over the internet, or from Tineke Verkade herself. I spent some days with two very innovative dairy farmers, one of whom I had met in Ohio; both these farmers are feeding a partial mixed ration to their cows, and both are very interested in the benefits of giving their cows supplementary feed. This is contrary to the normal industry practice in N.Z. where milk production is totally grass based. They were both stimulating to talk to on the subject of milk production and heifer growing.

I visited the farm of Harry Wier, who is the inventor and producer of the “Techno-system”, which is a well known rotational grazing system, and one which is particularly suited to intensive bull grazing. This extremely well

thought out system is, from my personal experience, an easy to use, efficient system of grazing animals, particularly bulls; although the initial set-up costs may be higher than a self-designed system, it appears that the ease of use would significantly reduce labour costs. Harry is very committed to the bull beef industry, and believes that Australia can make its struggling industry as successful as the N.Z. model.

After spending time in N.Z. it would appear that one of the factors hindering our bull beef industry is the lack of involvement of the major stock firms, which means that bulls are not regularly traded in weekly livestock markets, as are many uncontracted bull calves in N.Z.; for Australia, this means that there is a lack of competition for purchase of bulls of all ages. Another disadvantage of this lack of involvement of stock firms in Australia's bull beef industry is that graziers are not being encouraged to consider the significant economic benefits of an industry which has been ranked 2nd to dairying in earning capacity/Ha. In N.Z. the bull beef industry is a major agricultural enterprise, rather than a marginal one, and acceptability of bull grazing is high, and widespread, which is contrary to Australia, where it is a small industry confined mainly to Victoria and areas of N.S.W., with only a couple of operators in S.A.; this unwillingness of graziers to accept the challenges of a new industry is also hampering the expansion of Australia's bull beef industry.

A great number of bull calves are grown on contract in N.Z., but many of these are contracted to the growers, rather than to the abattoirs. Many calves which are contracted are sold at 70 kgs L.W., which is far below the weights calves are sold at here; however, there is no reason why experienced growers would not do a good job with calves this small.

6. ECONOMIC RETURNS.

The profitability of the various sectors of the calf rearing industry which I saw overseas was hard to assess. In the U.S. contract heifer rearing and growing appeared to be a lucrative industry, and there is no reason why it should not be as successful in Australia, so long as the responsibility for various costs are clearly defined. The veal industry in America appeared to be less profitable, but still one which provides a comfortable living. The Canadian veal industry was more complicated, as some provinces have a government subsidy, and others have grower funded floor price schemes which guarantee the return of the cost of production even when the commodity price is low. Ireland and Denmark's calf rearers were mostly very small scale; with the high cost of land and feed it seemed that the industry would not be profitable without the high subsidies paid for each animal. Holland's veal calves are owned by a very few producers, and here the economies of scale would make veal production a profitable enterprise. It was harder to gauge the benefits to the farmer who reared the calves, but given the large amounts invested in infrastructure, it would appear that

these contract rearers received a satisfactory return for their labour and investment. The N.Z. calf rearers I met indicated that they received a greater percentage of the ultimate sale price of the animal than Australian calf rearers do. In order for Australian rearers to continue in business, purchasers of weaned bull calves need to be prepared to pay more for their young stock; only if the division of profit is equitable will the industry thrive. Growing bull beef has been ranked second only to dairying in \$/ha, and unless the rearers are adequately compensated for their time and risk, the viability of the industry is in jeopardy, and the industry will decline to the stage where we can no longer supply our current markets and this valuable enterprise will be lost.

7. CONCLUSIONS AND RECOMMENDATIONS.

The most striking thing I noticed in the six countries that I visited is the amount of dairy research done in the U.S. compared to that done in other countries. Much of this research is done by university based researchers and is government funded, but there is also a large amount of research work funded by private companies. One would expect, with all this current and topical research information available, that U.S. calf rearers would be doing a far better job than their Australian counterparts; with a few notable exceptions, I did not find this to be so, and in fact, with the added disadvantages the Americans have in terms of much harsher climatic conditions and additional virulent diseases, many are not doing as good a job. Weaning and immediately post-weaning seems to be an area where many rearers lose control of calf health, and this comment would apply not only in America and Australia, but also in the other countries I visited.

Many health problems I saw related either to underfeeding pre and immediately post weaning, or to inadequate ventilation in the calf barns.

The most costly calves on a dairy are not the heifers which have the most milk and the best quality grain, but the sick and “failure to thrive” calves, who take hours of attention and may never make it to the dairy, or who may be early culls. Feeding calves to a budget only looks at the small picture.

Shed design often contributes to poor calf health, and very few people have actually “thought outside the square” to design the type of barn which would best suit their enterprise.

Rearing establishments which mingle young stock from different farms have the capacity to spread disease between dairies when heifers are returned to their farms of origin. This could be very expensive for the rearer, if a dairy farmer sued the rearer for the costs associated with acquiring the disease.

The Australian/New Zealand essentially outdoors growing system for weaned heifers appears to have far greater benefits than housing them.

To avoid following America in the overuse and misuse of antibiotics it would be sensible for Australia to consider only allowing veterinary antibiotics to be used by farmers who have completed a course in the administration of these valuable but fragile tools in our industry; our current “Chemcert” certificate is a similar idea which has already been implemented for agricultural chemicals such as “S7” pesticides and herbicides.

The use of vaccines in young calves is an area in which I need to do more research, but it would appear that the use of salmonella vaccine in calves

less than 1 week old is beneficial, and this would support my own observations. The other vaccines which would be useful are the pink eye vaccine and the immuno-modulators which are available in the U.S., and it may be worth approaching the companies which manufacture these products to see whether they could be made available in Australia.

I believe that the use of natural therapies in animal treatment will expand, and that even the use of good nursing practices, rather than “knee-jerk” administration of antibiotics, can be promoted as an aid to good animal health.

Our veal industry, although small, has the potential to grow and to become an earner of considerable export dollars, provided we can operate within a branded product, quality assured format for production. The current emphasis on low-fat food and customer satisfaction means that a guaranteed high quality product with the Heart Foundation’s tick of approval would sell very well at the top end of the market. The key to maintaining both export and domestic markets will be to consistently provide a premium product; this is particularly important because the majority of veal which has been marketed in Australia is of low or inconsistent quality, and often of unknown provenance and with pre-slaughter treatment not conducive to maximising taste and tenderness. This has, in the past, resulted in many dissatisfied customers, who would be reluctant to purchase veal again unless it was a quality assured brand. The Dutch industry has many management practices in place which the Australian industry would do well to adopt.

The key to good staff relations is communication and this can be facilitated by each side treating the other with respect. As many Australian dairy farmers have never been employees, they often have a poor understanding of the job requirements from an employee’s point of view. On many farms I visited in America it appeared that considerable effort had gone into making instructions for staff clear and understandable; this is very effective if it is coupled with practical, on-going training for staff members.

Eradication or control of various diseases has been achieved in America and Denmark in a manner which has ensured the co-operation of all parties. There would be considerable benefit to the Australian dairy and beef industries if we were able to adopt the fast and accurate Johne’s testing procedures available overseas, initiate an education programme to encourage farmers to voluntarily cull positive cows and to adopt management techniques to minimise transmission. Only then should we embark on an eradication programme.

This trip gave me the chance to establish an ongoing association with the international calf rearing community, which will form a solid base for continuing dialogue and exchange of information.

The object of my fellowship was to investigate and gain an insight into the many facets of calf rearing and its associated industries. One of the key impressions I gained was that many dairy farmers think of their calves only as a necessary by-product of the continued process of lactation, rather than the most valuable resource on the farm. While there is enormous attention paid to the technology of milk harvesting, the science of genetic improvement, the efficient use of irrigation and research into maximising milk production per unit of pasture and supplementary feed, little effort has been made to apply to calf rearing the great store of research findings available concerning the development of calves from birth to mating. It is my intention to establish a heifer management advisory service for dairies, and to provide technical and marketing advice for our emerging veal and bull beef industries. This, together with my ongoing involvement with the P.C.R.A, including my second term as president, will ensure that the knowledge I gained overseas will be implemented to benefit the Australian dairy and calf rearing industries.

To the board of the Churchill Trust

Prior to applying for a Churchill Fellowship I had done a considerable amount of research as to what information might be available overseas. After winning the Jack Green Churchill Fellowship I went to six countries expecting to find:-

- *people interested in the subject of calf rearing in general and willing to share information.*
- *very efficient calf rearers utilising the latest research to minimise disease and maximise growth.*
- *dairy farms in America and Europe aware of the worth of their replacement heifers, and thus making their care a high priority.*
- *veal industries in Canada, Denmark and Holland similar in end product to the small amount Australia produces.*
- *significant use of natural therapy on the organic farms in Europe and also in N.Z.*
- *extensive research into veal production and heifer rearing, particularly in the U.S..*
- *the perfect calf shed.*

In reality, what I actually found was:-

- *in America many people very interested in rearing calves, and who were overwhelmingly kind and generous with their time and knowledge. The amount of research done in the U.S. is amazing, and by comparison the industry throughout the rest of the world appears insignificant. Surprisingly, many Americans were not particularly interested in our farming systems, and asked me very few questions about how things were done here. In Europe and Ireland farmers and scientists were much more interested in our calf rearing industry in particular and Australia in general, but in these countries even some of the researchers and university staff were many years behind current research findings.*
- *contract heifer rearers achieving good results, but dairy farmers often fail to utilise the findings of research.*
- *heifer rearing on dairies not being accorded a share of the dairy spending commensurate with its impact on future earnings.*
- *veal production in Canada and Holland is very sophisticated, but calves reared for red veal in Denmark often live in much less impressive surroundings. I found only Holland with an end product similar to ours.*

- *natural therapy use virtually non-existent except in N.Z., where homeopathy is almost the only form of non-antibiotic treatment for sick calves.*
- *the amount of research done into calf rearing by Americans is enormous, but other countries have done only small amounts, and in some cases even university staff are quite backward in their thinking.*
- *that there is no such thing as the perfect calf shed (yet) and very few people have considered all the relevant factors when designing a shed.*

This was a wonderful opportunity, and one which made me aware of the need to physically see other countries' industries, and to have the chance to talk to people doing a similar job to myself. Despite the wealth of information available in printed form and on the internet, I learned far more by having this time overseas than I could ever have learned from home. Thank you again for this very rewarding opportunity.