MARKETING LIVESTOCK AND MEAT

INTRODUCTION

W.J.A. HALL* and W.R. SHORTHOSE**

In this section the term marketing is used broadly to embrace all physical and economic activity between the farm gate and the point of final consumption. Several factors characterise research and development studies in the livestock and meat industries. Firstly the resources being allocated to this field are abysmally low in comparison to those allotted to production orientated research. This issue is discussed in the papers below and some explanations are offered to account for it. A corollary of this lack of resources is that a variety of neglected projects exist which are likely to yield significant returns to industry and to the community. A third feature of effective research and development work in marketing is the wide variety of professional training and skills that are required. Such studies usually require a unique balance of the biological and social sciences. Further, as it is almost impossible to carry out definitive experiments under controlled conditions most studies entail detailed observation of commercial situations and results need informed interpretation. The papers included in this symposium attempt to analyse some facets of livestock marketing in this light.

YIELD AND QUALITY DIFFERENCES BETWEEN DIRECT AND INDIRECT MARKETING METHODS

W.R. SHORTHOSE**

INTRODUCTION

Whichever marketing method is chosen, product mass and product quality are likely to be affected only in a negative fashion by the marketing process. The extents of reductions in product mass and quality probably vary considerably. Proper economic assessment of alternative marketing methods requires that the magnitude of these changes are known. Such data as are available usually result from experiments with animals which represent a minute proportion of animals marketed commercially and in which the animals receive "better-than-average" treatment in actual, or simulated, marketing conditions. Careful interpretation of this kind of data is necessary to properly translate results into commercial situations. I suspect that "catastrophe theory" has a place in evaluating product losses. Given the probabilities of particular circumstances which individually affect product losses, and which acting synergistically in concert result in major losses, the probability of occasions of major loss can be estimated. Survey data are unlikely to demonstrate the difference per se between direct and indirect marketing as the types of animals so consigned to slaughter differ, at least in some respects, e.g. differences in incidence of deaths in transit (Q.M.I.O.M.A., 1981).

Of the approximately, 300 saleyards in Australia two-thirds are small (< 500 head of cattle/week), a quarter are intermediate (500-1500 head/week), and one-tenth large (> 1500 head/week) (B.A.E. 1981). To properly estimate the effects of indirect marketing this size spectrum should be considered. Experiments are often carried out only at 'convenient' saleyards.

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In theoretical terms, a **saleyard** is a location where animals, more or less disease free, from a relatively large number of sources are collected together, intermittently, in a, more or less clean, environment unfamiliar to them. Animals are held in this environment, exposed to cross-infection, for varying periods of time, sometimes without water and often without feed.

Simplistically, selling slaughter cattle through a saleyard, rather than directly to a meatworks, could be regarded only as increasing the time from farm to slaughter. I am unaware of any Australia-wide statistics on the spectrum of durations of this delay although I believe it is frequently between 12 and 48 hours and can be longer. Effects of this delay vary, depending on when it occurs in the marketing process. For example, the rate of liveweight loss is rapid early in a period of feed and water deprivation, and decreases with time from last feed. If animals arrive quickly, less than four hours from last feed, and are not given access to water liveweight loss/hr in the saleyards will be greater than that for animals which took three days to reach the saleyard.

For the purposes of this paper I will assume that the process of marketing via a saleyard takes 24 hours longer than that involving direct consignment of cattle from farm to abattoir. I will then consider known and possible effects of this on product yield and quality. Of necessity, information has been gleaned from papers reporting the effects of delay in moving animals from farm to slaughter, rather than from actual differences in experiments involving both direct and indirect marketing.

**WEIGHT LOSS**

(i) *Liveweight loss*. Liveweight loss is rapid in the first few hours of a period of feed and water deprivation and the rate slows subsequently. Access to water after feed and water deprivation restores live weight to near the pre-deprivation state (Wythes, 1981) although weight loss due to tissue catabolism is not prevented. If animals enter saleyards soon after mustering live weight losses in the saleyard will be greater, if animals are deprived on feed and water, than if they arrived there some days from their last feed or last drink. I have not, in this paper considered possible losses due to curfew and weighing procedures differentially affecting the live weights and, indirectly, notional killing-out percentages, or killing-out percentages estimated by buyers, of different mobs of sale cattle.

(ii) *Carcass weight loss*. I estimated that, after the first 24 hours and up to 4 days, cattle deprived of feed and water lost approximately 0.75% of their, calculated, on farm carcass weight per day (Shorthose, 1965). Other estimates, over 3 to 11 days from mustering, from Wythes (1981), indicate that rates may vary from 0.3 to 0.5% of, on farm, carcass weight per day. When such animals have access to water carcass weight losses can be slower, and if they receive water before slaughter, carcass weight can be increased, relative to similar animals that do not receive water pre-slaughter. Because intake of feed increases water consumption, it would be expected that allowing animals access to feed and water would further slow carcass weight loss. However, in a number of experiments, offering animals feed did not slow carcass weight loss more than that in animals offered water only. I will assume that carcass weight loss in the extra 24 hrs to slaughter of animals sold through saleyards is 0.4%.

(iii) *Organ weights*. Feed deprivation reduces liver weight. Neumann et al. (1974) reported losses of 18% in liver weight in animals deprived of feed and water for 96 hours at a meatworks. Liver weight losses gradually slowed from 9% (24-48 hrs), 6% (48-72 hrs), to 2.5% (72-96 hrs) of initial (24 hr) liver
weight. Liver dry matter and lipid content increase during feed deprivation. There are data on weight changes in other organs of cattle (e.g. Neumann et al. 1974) and sheep (Kirton et al. 1967). I estimated the loss in liver weight for a 24 hr delay, expressed as a \% of carcass weight and adjusted for price difference between liver and carcass meat, as 0.1\% of equivalent carcass weight; i.e. \% loss in liver weight (24-48 hr) X liver weight as a fraction of carcass weight X price of liver/kg/price of carcass/kg. I could not estimate losses due to weight decreases in other organs.

(iv) Bruising, crippling and deaths Animals sold indirectly are subject to more handling procedures, at least one more loading and one more unloading, than those consigned directly to slaughter and hornless cattle may be mixed with horned animals. This creates more opportunity for bruising to occur. Although the extra handling does not necessarily increase bruising the potential for increased bruising is there and small environmental changes, e.g. rain or potentially slippery pen surfaces, can increase bruising in saleyards considerably (Wynethes et al. 1982, In preparation). I have been unable to find data to indicate the effect of increased handling, or delay to slaughter, on the prevalence of crippled cattle. An increase in deaths due to the delay in saleyard selling, relative to direct selling, may be inferred from data on deaths as related to time in transit. Using Q.M.I.O.M.A. (1981) data, deaths increased in transit by about 0.07\% per day. This value is likely to be an over estimate of deaths due to handling cattle through saleyards. I have guessed that losses due to extra deaths, crippling and bruising, in 24 hours, are about 0.1\% to 0.3\% of carcass weight.

DISEASE

Meat from animals that have passed through saleyards cannot be exported to Sweden. This is because their imported meat is subject to routine bacteriological testing in Sweden and unacceptably high contamination with food poisoning organisms was found. The insurance rate on meat destined for Sweden is 3.8\%, of meat value, more than that for meat destined for the U.S.A. Feed deprivation and stress can increase the susceptibility of animals to infection from low doses of organisms. Grau and Smith (1970) studied the etiology of salmonella infection of animals in saleyards. They showed that starvation or intermittent feeding increased the percentage of infected animals. In groups of cattle slaughtered 18 hr after leaving a feed-lot 4\% were infected, in their intestinal tract, in groups of cattle, ex-saleyard, held for 3-5 days 86\% were infected. They also showed, with sheep, that increasing preslaughter holding periods increased the percentage of carcasses contaminated with salmonellae; 7\% were contaminated when animals were held 1-2 days, 12\% when they were held 3-5 days and 26\% when held more than 6 days. To calculate the cost of increased contamination for meat to Sweden only, I divided the difference in insurance between meat for Sweden (4.5) and meat for the U.S.A. (0.7) by 2, attributing half the difference to hygiene requirements. The increased risk of contamination to saleyard animals is thus costed as 1.9\% of carcass weight.

STRESS

Sending animals to meatworks via saleyards as well as increasing the time from farm to slaughter and the extent to which they are handled also increases the time they have to interact and their exposure to, possibly inclement, weather. It might be expected that indirect marketing could stress animals more. I compared the incidence of animals, fat bullocks, with a pH value at 24 hr postmortem (pm) in the M-longissimus dorsi (LD) of > 5.7 in 7,600 cattle. Twenty-two percent of the 1160 animals arriving at the meatworks via saleyards had LD (24 hr pm) pH
values > 5.7, whereas only 1% of 6,400 animals consigned directly to the works had LD (24 hr pm) values > 5.7 (Shorthose, 1980).

Buchter (1980) recorded a greater incidence of dark cutting meat in young bulls and calves arriving at meatworks via a saleyard compared to similar animals consigned directly to the meatworks; the difference was exaggerated as time held at the meatworks increased. Wythes and Underwood (1980) reported that depriving cows of access to feed for 96 hours before slaughter rather than 72 hours, after they had travelled 1200 km by road, resulted in an increase in ultimate pH of the M.longissimus dorsi; 16% of cows deprived of feed for 96 hours had high ultimate pH values.

The reduction in value of dark meat is difficult to estimate (Tarrant, 1980) and variable. If one presumes a dark cutting carcass has 95% of the value of a normal carcass, and that 10% extra animals are affected if they arrive at meatworks via saleyards, then the net loss in carcass weight terms if c. 0.5% of carcass weight.

CONCLUSIONS

The extra extent of losses in product quality and quantity due to holding animals in a saleyard for one day are given below. They are guestimates and are expressed as though they are a % loss of carcass weight.

<table>
<thead>
<tr>
<th>Loss Type</th>
<th>% Loss of Carcass Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass weight loss</td>
<td>0.4%</td>
</tr>
<tr>
<td>Liver weight</td>
<td>0.1%</td>
</tr>
<tr>
<td>Bruising, crippling, deaths</td>
<td>0.13%</td>
</tr>
<tr>
<td>Meat quality</td>
<td>0.5%</td>
</tr>
<tr>
<td>Meat hygiene</td>
<td>1.9%*</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3.03%</strong></td>
</tr>
</tbody>
</table>

(* For exports to Sweden only)

Although the absolute values of these guestimates are questionable, one can suggest that meat quality and meat hygiene costs of marketing via saleyards could be at least as significant as those due to loss of product mass.

A STUDY OF DRESSING PERCENTAGE AS A PARAMETER FOR TRADING IN SLAUGHTER CATTLE

W.J.A. HALL

INTRODUCTION

The auction of slaughter cattle on a liveweight (LW) basis ($/kg LW) is now established at many saleyards throughout Australia. Its use is based on the belief that LW prices reflect the consumer value of the carcass more accurately than a per animal price basis (SCA, 1981). This in turn rests on the assumption that dressing percentage (DP) can be estimated more accurately than carcass weight (CW). If estimates are inaccurate, relative LW prices will not reflect the relative amounts of carcass beef in each sale lot (group). As a consequence, price premiums and discounts will not reflect consumer value and production or operational inefficiencies are likely to occur.

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This study examines two aspects of the problem, firstly the degree to which prices reflect DP and secondly factors which influence DP in the saleyard auction.

BUYERS ESTIMATIONS OF DRESSING PERCENTAGE

A number of studies have demonstrated that buyers may mis-estimate DP (e.g. Loyns 1965; Park 1979). However these studies considered individual animals rather than lots of cattle. Naive et al. (1957) found with pigs that estimation of DP in lots was more accurate than those for individuals. In addition, previous studies examined DP estimation in a non-competitive environment when considerable time was available to assess the animal. Previous studies usually involved small numbers of buyers and cattle and may not, therefore, have accurately reflected conditions in the market as a whole.

An alternative method of assessing the accuracy of DP estimation is to analyse the actual prices paid for different lots of cattle. A theoretical illustration is provided in Fig. 1. If two lots (a and b) are identical except for their DP, and each DP is accurately assessed by buyers, then the carcass price ($/kg CW) will be the same for both lots at $P_x$ in Fig. 1. In other words, there would be no statistical relationship between DP and $$/kg CW ($B=0$) if there was a consistent tendency for buyers to average their estimates of DP by over-estimating lower DP's and under-estimating higher DP's.

![Fig. 1. Theoretical relationship between carcass weight price and dressing percentage.](image)

A study was made of the prices paid by a number of buyers employed by one meatworks for 125 lots of slaughter cattle. Prices were analysed by multiple
regression using the equation:

\[ P^A_t = \beta_1 DP_t + \beta_2 W_t + \beta_3 CW_t + \beta_4 LN_t + \beta_5 F_t + \beta_6 S_t + \beta_7 D_t + \beta_8 PH_t + \]

\[ \sum_{x=9}^{11} \beta_{xt} + \sum_{k=12}^{15} \beta_{kt} + e_t \]

Where \( P^A_t \) = Price in \( \$/kg \) CW for each lot, \( DP_t \) = Mean DP for each lot, \( W_t \) = Mean weekly price, \( CW_t \) = Mean kg CW, \( LN_t \) = No\&. in each lot, \( F_t \) = Mean mm carcass fat thickness, \( A_t \) = Mean nos. permanent incisors, \( S_t \) = sex, \( PH_t \) = Proportion horned, \( BR_t \) = Breed group, \( AC_t \) = Saleyard centre and \( e_t \) = Random disturbance.

The statistical estimate of \( \beta_1 \) was -0.90 (\( t = -2.12 \)) suggesting that DP had a negative effect on the price paid in \( \$/kg \) CW (\( P = 0.05 \), Fig. 1).

**FACTORS INFLUENCING DRESSING PERCENTAGE IN THE SALEYARD**

Many of the variables which influence DP have been established under experimental conditions but not in the saleyard environment.

The weight of gut contents has the greatest influence on DP. At the saleyard auction, a major determinant of gut content weight is the length of time cattle are without feed and/or water, which in turn varies according to the mustering, travelling and resting times, the availability of feed and/or water and procedures specific to each saleyard. Under experimental conditions a positive relationship between DP and CW, DP and fatness, and DP and age could be expected (Preston and Willis 1970). There is no evidence of any significant difference in DP between males and non pregnant females. Zebu breeds have higher DP than British breeds which in turn, dress out higher than dairy breeds.

This study examines the effect of a number of variables on the mean DP for each of 125 lots of slaughter cattle bought over a five week period from five different saleyards. At each auction the mean LN per animal, estimated breed type and sex of each lot was recorded. All lots were slaughtered at the same meatworks with the delay between liveweighing and slaughter being approximately 48 hours. Hot fat thickness at the 12/13th rib and CW were obtained on the slaughter floor. The equation to estimate the effects of various variables on DP was:

\[ DP_t = \beta_0 + \sum_{j=1}^{4} \beta_{jt} + \sum_{k=5}^{7} \beta_{kt} + e_t \]

The subscripts and result of the multiple regression analysis are outlined in Table I.

Lots acquired at three auction centres had significantly lower (\( P<0.05 \)) mean DP’s than Cannon Hill. Zebu breeds and British breeds did not differ in mean DP but dairy breeds were lower (\( P<0.05 \)). Mean CW and the numbers of permanent incisors has a significant effect. Fat thickness had a positive effect on DP and females had a lower mean DP than males (\( P<0.10 \)). The adjusted coefficient of determination suggests that 52.0 percent of DP variation was explained by the equation.
TABLE 1 Analysis of variations in the dressing percentage of cattle purchased at auction

<table>
<thead>
<tr>
<th>Subscripts</th>
<th>Explanatory Variables</th>
<th>Coefficients</th>
<th>Estimates and Critical t(a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_t$</td>
<td>Constant</td>
<td>$\beta_0$</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td>Auction centres</td>
<td>$\beta_1$</td>
<td>-0.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\beta_2$</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\beta_3$</td>
<td>-0.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\beta_4$</td>
<td>-0.01</td>
</tr>
<tr>
<td>$B_{R_t}$</td>
<td>Breeds</td>
<td>$\beta_5$</td>
<td>0.01</td>
</tr>
<tr>
<td>$C_{W_t}$</td>
<td>Mean Carcass fatness (mm)</td>
<td>$\beta_6$</td>
<td>-0.00</td>
</tr>
<tr>
<td>$F_{t}$</td>
<td>Mean Carcass fatness (mm)</td>
<td>$\beta_7$</td>
<td>-0.07</td>
</tr>
<tr>
<td>$A_{t}$</td>
<td>Mean number of incisors</td>
<td>$\beta_8$</td>
<td>0.0002</td>
</tr>
<tr>
<td>$S_{t}$</td>
<td>Sex (Female compared to male)</td>
<td>$\beta_9$</td>
<td>-0.0112</td>
</tr>
<tr>
<td></td>
<td>Sample size</td>
<td></td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>Degrees of freedom</td>
<td></td>
<td>113</td>
</tr>
<tr>
<td></td>
<td>Adjusted coefficient of determination</td>
<td></td>
<td>0.52</td>
</tr>
<tr>
<td></td>
<td>Overall standard error</td>
<td></td>
<td>0.0256</td>
</tr>
</tbody>
</table>

(a) Critical levels of significance at $P = 0.05$ level based on a two tailed test are (+) 1.98.

**DISCUSSION**

The results confirm the findings of Loyns (1965) that buyers average their estimates of DP across all acquisitions. This indicates that the LW selling method provides price premiums to those lots with below average DP's and discounts to those with above average DP's.

Pricing inefficiency might be reduced if buyers paid greater attention to saleyard by saleyard variations. In addition the evidence that different centres result in different DP's indicates that comparisons of LW price reports from different auction centres may be confounded by the differences in DP. For example, if it is assumed that a 216 kg CW steer actually receives $280/head at all centres, the above results suggest that the LW quotation would be 70.06/kg at Cannon Hill; 66.36/kg at Kingaroy; 67.56/kg at Murgon; 68.36/kg at Gympie and 67.66/kg at Dalby. These price differences are likely to create confusion amongst market participants who attempt to compare centres solely on the basis of LW price reports, and were to select selling centres on that basis. One method of lessening these price differences is to introduce saleyard procedures.
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which minimise DP variation at different saleyards. The proposals of the SCA sub-committee on LW selling procedures (1981) are intended to achieve that objective and should receive support from industry.

The estimated coefficient of determination underlines the difficulties faced by buyers at LW auction saleyards when attempting to estimate subjectively the DP of each lot. Even if buyers were fully aware of all the factors included in the equation, the results suggest that buyers estimates will only incorporate half of the sources of DP variation. Whilst further investigations into DP variation appear warranted, any procedural changes which reduce DP variation within a saleyard are likely to improve buyer's estimates. The recommendations of the SCA sub-committee on LW selling are also relevant in this context.

LIVESTOCK MARKETING – PROGRESS AND IMPEDIMENTS

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INTRODUCTION

The effort and money put into livestock marketing research and development has increased considerably over the last decade. However, compared with investment in production research, the level of expenditure is still low. This research and development in the livestock marketing area has led to some changes, but most livestock are still marketed through the traditional auction system.

The areas covered in this paper are:

. the need for marketing change
. the approach adopted in South Australia to achieve change
. the major impediments to change and suggested methods of overcoming them.

WHY CHANGE?

At present the live auction (either per head or live weight) is the predominant method of marketing livestock in Australia. It is only one of many available systems, so its dominance indicates real or perceived advantages. The competitive price determination is probably the major advantage perceived by farmers. The role of stock agents in determining the method of sale also needs to be recognised.

The live auction does, however, have disadvantages. It is a costly system. Producers can regularly pay up to 7 per cent of gross returns in direct marketing costs. There are also indirect costs. There may be an increase in bruising and stock are double handled between farm gate and abattoir.

Paddock selling and weight and grade selling are two cheaper and less stressful marketing systems that currently exist (BAE 1981). The continuing popularity of live auction sales indicates that farmers are not satisfied with aspects of these alternative systems. Their dissatisfaction may be associated with the returns, or the information generated, or a lack of trust. Our approach in South Australia has been to bring the various sectors of the industry together, in an attempt to combine the apparent pricing efficiency of the live auction with the cost efficiency of direct sales.

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A carcass classification system was introduced at South Australia’s major abattoir, South Australian Meat Corporation, in the early seventies. This led to the formation of a number of producer cooperatives who were able to sell livestock by private treaty using carcass classification. Though these groups were initially successful and some still exist today, some of the members quickly realised further changes were needed for widespread adoption of improved marketing systems. The provision of a better method of price determination and introduction of a classification system at other abattoirs was required. A number of interested groups and individuals combined in 1977 to form the Livestock Marketing Study Group (LMSG). The LMSG initially was comprised of producers, Department of Agriculture representatives and a limited meat processor representation.

The LMSG conducted a workshop late in 1977, to bring together industry expertise from all States to review the implication of a number of marketing systems based on carcass classification (Anon 1977).

Although the workshop did not recommend the immediate introduction of any one of the five systems evaluated, it did agree that the LMSG continue its research into marketing systems and that its membership be expanded to include agents and processors.

The principal achievement of the Livestock Marketing Study Group since the workshop has been the successful introduction of pig sales by classification in South Australia. Other States are in the process of introducing a similar marketing system.

An important side benefit of the continued activity of the Group is that it provides a forum for all sections of the industry to discuss a range of issues. One important result of such discussions has been the establishment of a course in live animal appraisal, meat marketing and carcass classification at a community college. This course while open to all members of the industry has been supported by agents. Agents see the need to improve their skills to retain their important position in livestock marketing.

South Australia has developed a climate suitable for a more uniform industry approach to marketing reform. Changes have been achieved in pig marketing. Significant changes to beef and sheep marketing will hopefully flow from the present research and development being undertaken.

IMPEDEMENTS TO CHANGE

The impediments to change in livestock marketing are many and they vary from state to state. Tradition, conservatism and previous investments impede change in the meat industry as they do in other industries.

The three main impediments to market change are:-

. the lack of communication and co-operation between the various sectors of the meat industry.
. the difficulty of obtaining funds for research and development activities in livestock and meat marketing.
. the lack of a standard carcass definition and standard methods of carcass specification.
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(i) Communication and Co-operation

South Australia has been fortunate. All sectors of the meat industry have been willing to communicate and co-operate. The LMSG has so far failed to modify the sheep and cattle marketing systems. Nevertheless, it has been claimed successful by participants simply for its communication function. Nationally there is still a tendency to sectionalise the meat industry. Some people have even suggested that it is not one industry but two – a producing industry and a processing industry. Though producers should not tell processors how to run their businesses, and vice versa, the interdependence and mutual benefits necessitate communication and co-operation.

The traditional middle men have been the stock agents. In an atmosphere of mistrust between producers and processors, their role has been largely of arbitration. The live auction has been the most effective arbitration system. Many producers rely heavily on stock agents for advice, finance and marketing expertise. Developers of new selling systems who ignore the role of stock agents undoubtedly reduce the chances of adoption.

The lack of communication and co-operation is not only between producer and processor. within Departments of Agriculture and similar bodies the traditional separation of economists and technical people has hindered progress. The two disciplines have attempted to answer marketing problems individually with a consequent lack of success.

(ii) Funding

In South Australia we have been fortunate that the State Swine Compensation Fund and the Rural Credits Development Fund supported the initial work of the LMSG. Recently, there has also been a refreshing change to funding by the National Carcass Classification Supervisory Committee. In absolute terms funding remains a problem for all marketing research.

Communication and cooperation have been stressed previously. Funds are needed to facilitate this activity. Intra-state activities such as those of study groups need to be supported. Funding of national forums is equally important, given the national nature of the meat industry. As such, annual ‘refresher’ courses dealing with meat marketing issues are worthy of consideration. It is important that people working in meat marketing research and development areas are able to meet fairly frequently to avoid duplication of effort and to maximise progress.

(iii) Standard Carcass Definition and Specifications

Over the last decade there have been millions of dollars spent on the research and adoption of a national carcass classification system. A carcass classification system requires standard carcass definitions and a standard means of specifying the carcass characteristics. Though there has been some success in pig classification, there are still no national standard carcass definitions or carcass classification as envisaged by the National Carcass Classification Supervisory Committee.

Marketing systems which are based on carcasses also require an accepted carcass definition and a means of carcass specification. Clearly, if a suitable national ‘system existed it would greatly simplify trials of new marketing systems and greatly improve information flow from existing systems. A method of facilitating communication flow is vital. An objective specification of
carcasses will lead to greater confidence between the different sectors of the meat industry (producer, processor, wholesale and retailer and overseas buyer). It will also permit new marketing systems to be introduced and evaluated more effectively. The lack of a suitable national classification system is the greatest single impediment to marketing change.

The word 'suitable' is used deliberately. Australia already has a national classification system. The existing system is embodied in the export meat regulations. This fact has been obscured by the pedantics about the words classification and grading. Dictionaries use grade and class synonymously. The words are interchangeable in general conversation. The meat industry, however, has used the words almost as antonyms.

Classification or grading is simply the allocating of a carcass into predetermined grades or classes based on measurable or defined criteria. Such criteria should be selected on the basis of those criteria that influence the value of the carcass. What is commonly called export grading as laid down in the Export (Meat) Regulations and supervised by the Australian Bureau of Animal Health could just as easily have been called a classification system. This system uses measurable or defined criteria (conformation, age, fat cover and weight) to allocate carcasses to predetermined categories (1st, 2nd or 3rd). Such criteria were initially selected as being important in determining the value of carcasses.

For too long there have been attempts to differentiate grading and classification. The approach has been to introduce the so-called national classification system largely in isolation to the existing grading system. It is little wonder that many processors have reacted to these attempts at a dual system. So the question should not be whether we need classification but rather can the existing classification system, called export grading, be improved.

The export grading system for sheep and cattle does need to be improved for two reasons. First, the measurement of criteria is subjective rather than objective and second, the ordering of grades into 1st, 2nd & 3rd assumes a rigid demand schedule for our meat which no longer exists on the world market.

Numerous people who have been overseas or communicated with buyers of Australian meat have noted the lack of buyer confidence in our export grades. This is hardly surprising given the subjective nature of assessment. This subjective assessment is illustrated by the following example. Two graders independently graded 101 lambs into 1st, 2nd and 3rd grades. The results were:

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grader 1</td>
<td>48</td>
<td>37</td>
<td>16</td>
</tr>
<tr>
<td>Grader 2</td>
<td>15</td>
<td>35</td>
<td>51</td>
</tr>
</tbody>
</table>

The difficulty with the present situation is that it is not possible to prove that one grader is wrong. The subjective grade descriptions do not permit such a decision.

The problems associated with the ordering of categories into 1st, 2nd and 3rd are inherent in that ordering. The development of Middle East markets has led to the situation that buyers have requested a carcass type best satisfied by either our 2nd or 3rd grade carcasses. This is because they prefer leaner animals. It is understandable that such buyers are upset when their purchases arrive with 3rd grade labels attached. No such ordering of the categories should occur.
Government must accept the need to change our outdated grading system. Industry must be involved in any such updating of the regulations. The grading regulations should at a minimum specify weight classes (preferably comparable with Livestock Marketing Reporting Services classes), age (either dentition or cartilage) and fat cover in millimetres. Other criteria such as fat and meat colour, conformation etc. could be added now or later if required.

CONCLUSIONS

We believe that the LMSG in South Australia has been successful, primarily because it has facilitated discussions between all sections of the meat industry. The LMSG has been able to capitalise on other historical developments in South Australia such as the early provision of a classification service and the development of producer marketing groups. However, the same impediments to market reform that existed ten years ago still exist at a national level.

The impediments are the lack of communication and cooperation between the various sectors of the meat industry, the difficulty of obtaining funds for research and development activities, and the lack of a standard objective carcass definition and specification.

The main job is to modify the existing classification system, i.e. export grading, which is outdated. This will allow the development of national selling systems based on carcass traits. This assumes that the effective interchange of ideas is allowed to occur, and that the necessary funds for research and establishment are provided.

CONSUMER PREFERENCES FOR AUSTRALIAN BEEF?

S. BEILKEN* and W.R. SHORRTHOSE*

INTRODUCTION

"Inadequate knowledge can justify both action and inaction, which are merely different ways of meeting our fate" (Orlans 1979).

The path from consumer, via cook, retailer, wholesaler, and meatworks to beef producer is tortuous. In such a situation, even with goodwill allround, the many in-built lags can result in distorted information being relayed.

Advocates of classification maintain that it facilitates communication between producer and retailer. Accurate assessment of consumer preferences will allow the flow of undistorted information from consumer to all other sectors of the meat industry. It would also allow the industry to correctly assess the overall benefits of processing, or production, innovations which offer advantages to particular sectors, e.g. the more efficient growth of bulls or the processing of heavy carcasses (see Ellis 1979). Without the approval of the end-user such new departures cannot benefit the industry as a whole. It is, therefore, of prime importance that consumer preferences be understood.

Meats compete with other foods for their share of the consumers dollar. Consumer reactions to many other food products have been carefully determined and exploited. To maintain, or improve, the market position of meats consumer

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reactions and preferences to them need to be determined.

SURVEYS OF CONSUMER OPINIONS

A number of surveys have been carried out in Australia. The Australian Meat Board (AMB) has commissioned surveys of factors involved in promoting meat sales (AMB 1962 and 1978). Wardrop (1962) surveyed expenditure on meat in the area around Camden (NSW). The BAE have carried out surveys on meat consumption of households in Sydney (1967) and Melbourne (1970). More recently, Roberts and Neville (1974) surveyed meat consumption in Brisbane.

Replies to such questionnaires may not equate with those given when purchasers/consumers react to actual samples of beef. Nevertheless a few interesting results emerged from these studies. For example, in the AMB (1962) survey respondents placed tenderness last, after nutrition, flavour, and value, when ranking "most liked" attributes of beef but in the survey of Roberts and Neville (1974) tenderness was one of the most sought after attributes.

PUBLISHED ASSESSMENTS OF CONSUMER REACTIONS TO BEEF

Inverse logic probably dictates that in a country which has a very high per capita consumption of beef there are few published studies of the reactions of Australian consumers to actual samples of beef steak. We are aware of none in which their reactions to actual beef cuts, other-than steaks, have been evaluated.

(1) Appearance

Halls and Board (see Stafford 1977) recorded the reactions of consumers in Warrnambool (Vic) to beef steaks. About half preferred steaks with 2-4.5 mm of fat cover. Stafford (1977) assessed the response of visitors to a field day at Dookie Agricultural College to the appearance of actual T-bone steaks of different sizes, meat colour, and subcutaneous fat cover. It is likely that the participants in this survey were not representative of consumers in Australia as 60% usually bought whole sides or killed their own beef. Bearing in mind this reservation, 10% preferred smaller sized steaks (from 135 kg carcass), 80% medium sized (from 205 kg carcass), and 10% larger sized steaks (from 275 kg carcass). Ninety-six percent preferred steaks with less than 11 mm of fat. Of this latter group 57% preferred 0-11 mm, 27% liked 6-7 mm and 11% preferred 2-3 mm of fat. Steaks with lighter, medium or darker coloured meat were equally preferred, with about a third of participants opting for each category.

In an unpublished part of the study reported by Ford (1981), the opinion of 125 householders was sought as to the fatness of striploin and cube-roll steaks from Brahman X Hereford, Simmental X Hereford, Friesian X Hereford and pure Hereford steers, (mean carcass weight $\approx$ 246 kg). Ten percent of households considered the steaks from Herefords to be too fat and 10% considered the steaks from Simmental X Hereford steers to be too lean.

(ii) Organoleptic reactions

Naumann et al. (1966) surveyed the attitudes of a representative sample of Brisbane consumers to free beef steaks. In their first survey, steaks came from different cross-breeds of cattle, were either aged or unaged, and given to participants frozen. In their second survey, steaks from commercial carcasses that had been grouped into the, then, Queensland DPI grades were used, and in the third the effects of tenderizing or aging commercial steaks, fresh or frozen, on consumer opinions were assessed.
They concluded that "an excessively large proportion of normal commercial
steak beef available in Brisbane was not liked by the consuming public" and that
the attribute most affecting consumer reactions to steaks was tenderness. Their
results showed that consumers could not detect differences between breeds or
Queensland DPI grades, but could detect, and preferred, steaks that had been aged
or tenderised.

Ford (1981) surveyed attitudes of a representative proportion of Brisbane
consumers (125 families from 10 suburbs) to frozen striploin and cube-roll steaks
from sides of beef, that had either been hung normally or had been tender-
stretched, from Hereford and cross-bred Hereford steers. Comparative steaks were
supplied, free, about 2 weeks apart and the study was over a 19 months period.
Something of the approaches of Brisbane cooks was revealed in this study. 79% of
cooks thawed the steaks before cooking. Frying (57%) and grilling (39%) were the
most popular cooking techniques but some of the remaining 4% stewed steaks. Meat
steaks were "well done" (62%) or "medium" (32%); presumably 2% ate "rare" steaks.
Three quarters of the respondents replying (90%) to the survey were "satisfied"
with their steaks from Tenderstretched sides whereas 45% were less than "satisfied"
with their steaks from Achilles tendon-hung sides, steaks which were similar to
commercially available ones.

In summary, there is little published information on reactions of Australian
consumers to beef, or their preferences. The available evidence indicates that a
large proportion of Brisbane consumers were not (Naumann et al. 1966) and,
probably, are not (Ford 1981) satisfied with the tenderness of steaks from
conventionally processed sides but preferred steaks treated (by aging,
tenderising or Tenderstretching) to improve tenderness.

Cooking procedures interact with meat properties to alter the potential
quality of the raw meat. As steaks are dry cooked to an increasing degree of
"doneness" their toughness and dryness tends to increase, myofibrils harden and
lose liquid. This process occurs without any commensurate decrease in the
toughness of connective tissue. Thus, the tendency of consumers in Brisbane to
prefer "well done" or "medium" steaks ensures that the meat they eat is tougher
and drier than it would have been had it been cooked to a lesser degree.

DISCUSSION

It is clear that there is little published information about the reactions
of Australian consumers to beef. A little is known about the reactions of
Brisbane consumers to steaks but nothing of Australian reactions to other cuts of
meat. Similarly, not much is published about how Australians cook various beef
cuts, but we do know that some stew sirloin steaks! Does this mean that little
is known about consumer reactions to steaks?

Undoubtedly, meat purveyors have conducted some surveys on the attitudes of
consumers to meats, and some test market particular products. This information
is usually confidential and of no benefit to other decision makers in the meat
industry.

Why is there a dearth of published information and why does the meat
industry not seek more? One reason, we suspect, is that some sectors of the trade
believe they know what other sectors, including consumers, prefer. Perhaps these
beliefs are not always correct. For example, Halls (1975) showed that local
farmers considered that local (Warnambool) butchers preferred carcasses weighing
between 200 and 270 kg with a fat cover of about 13 mm whereas the butchers
required carcasses weighing between 135 and 180 kg with 3-10 mm of fat in the
loin area.
Again there is a general belief in the trade that meat from young animals is almost always tender and does not need tenderising. This is demonstrably untrue (Bouton et al. 1978) for some expensive steak cuts, e.g. rump and loin steaks, because these muscles can shorten pre-rigor during chilling and toughen, especially when lighter carcasses from younger animals are cooled quickly in modern chillers.

CONCLUSIONS

Given a) that published information on consumer preferences for beef is sparse, (b) that some of the beliefs held by the trade cannot be substantiated, (c) pleasing the customer is likely to become increasingly important if beef is to maintain or increase its market share, relative to other meats and foods, and (d) that increased earnings to producers and processors are likely to come through an accurate knowledge of the needs of the market (Verdon Smith 1964), we believe that there is need for the Australian consumers preferences for, and reactions to, meat to be accurately determined. To ensure that the information is freely available to all sectors of the industry this will need to be carried out by or under the aegis of a government or semi-government body.

MARKETING - THE CINDERELLA OF RESEARCH IN THE LIVESTOCK AND MEAT INDUSTRY

W.E. MEYNINK

Producers and processors of red meat have had to contend with constantly increasing costs and declining real prices for many years. In a free market system the solution traditionally has been to improve the efficiency of the industry by trying to reduce costs for the same output.

Efficiency has been achieved either by increasing the size of the individual property or plant or by adopting new techniques. The latter approach is often based on extensive research carried out by private individuals or government organizations. Providing that this research and developmental work is conducted, producers and others are willing to change. A classic example is that the proportion of Zebu type cattle in Queensland has risen from four percent to fifty-four percent in less than twenty years.

While government and industry bodies continue to fund production research at a relatively high level, research in the marketing field has been negligible. In 1980/81 the Australian Meat Research Committee allocated almost eighty-eight percent of its funds to production research and less than five percent to projects likely to improve marketing efficiency. Even the funds spent annually for national carcass classification trials are small when compared to the annual running costs of many production orientated research stations.

Perhaps funds do not indicate the complete picture. In the 1980 proceedings of this Society only six out of two hundred and eleven papers could be related to marketing projects. At the 1980 Australian Agricultural Economics Conference fourteen out of fifty-three papers were categorised as marketing research. Even more disconcerting were the recommendations of the Commonwealth Council for Rural Research and Extension (1981). In discussing the adequacy of, and priorities for, agricultural research in northern Australia, further work on the productivity of a variety of industries was recommended without any mention of marketing.

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efficiency or potential. Whilst this may simply suggest marketing problems are minimal compared to production problems, the overwhelming evidence suggests that this is not the case.

The vast majority of producer requests for government attention concern marketing rather than production problems. Since 1970 there has been a stream of reports highlighting the inadequacies of the marketing system. These included the reports of Cozens (1973); Brewer (1972, the Prices Justification Tribunal (1978) and the Bureau of Agricultural Economics (1981). These reports recommended an urgent need for research, extension and innovation. Many of the recommendations have been repeated again and again yet most have not been pursued by governments or other relevant institutions.

A complete system of carcass description has not been developed for trading. Known carcass measurements cannot accurately predict retail meat yield. Quality communication between the consumer, retailer, processor and producer is almost untouched by research. Very little research has been conducted into the effects of promotion on consumption nor into the requirements of meat consumers generally. The economics of the retailing, wholesaling and processing techniques is unexplored. The effects of transport and stress on the eating quality and carcass weight of live animals are only now beginning to be assessed. A new method of marketing, based on the live weight of the animal, has spread throughout Australia with very little understanding of its effects on bruising, pricing or handling costs. These are not minor areas of study. Research and development in these fields will have a marked influence on the incomes of all participants in the industry. The sale of livestock with excess fat levels is a good illustration. Without an adequate marketing and pricing system which discounts against overfat (cattle, pigs or sheep) animals, producers have no incentive to produce the optimum product. Not only are thousands of units of feed wasted on producing this fat, but processors are faced with the costs of eliminating it in the works. Bruising is a similar example of a deficient marketing system.

There are a number of possible explanations for the emphasis on production and the corresponding lack of attention to marketing. It might be argued that production research tends to benefit producers directly while marketing studies are likely to benefit the middle man. In response, I suggest that the competitive nature of the industry is such that any benefits are certain to flow back to all sections.

I believe that the continuing emphasis on production is largely for institutional reasons. Most research organizations appear to be organized along production lines. Production branches contain only biologists, and marketing branches contain only economists and "never the twain shall meet". Yet most of the research needs to involve both areas of study. Similarly the training of most animal scientists does not include any marketing work.

It is also clear that marketing research lacks the scientific vigour that is possible under controlled experimental conditions. In other words there are less scientific papers or accolades likely and the "publish or perish" syndrome overrides real industry needs.

As a small step in what I believe to be the right direction, I hope that all policy makers in the animal and meat research industries will take a long unbiased look at their current and planned projects. I hope that they will ask themselves: how large are the benefits likely to be for the industry as a whole? and how long before the benefits reach industry? I suggest that an analytical answer to these
questions will lead to a flurry of activity in marketing research in the 1980’s and a corresponding decline in the amount of production research.

It is hoped too that the organization of various government bodies will be re-examined. Marketing research and development work will not be stimulated unless economists, biologists and people with industry experience are brought under one roof to co-operate. Similarly, I believe that universities, colleges of advanced education and agricultural colleges need to examine their training programmes to see if the requirements of marketing research are being satisfied.

Finally, I call on funding bodies to recognise that their role should not be a passive one in this field. They have a responsibility to encourage new fields of endeavour and to accept that government institutions are not the only bodies capable of carrying out research. Agents, producers, processors and meat traders have an important role to play in the research and development of marketing and funding should be flexible enough to accommodate them.

CONCLUSIONS

W.J.A. HALL and W.R. SHORTHOSE

The symposium has highlighted a number of constraints to research and development work beyond the farm gate. Our experience suggests that the major limitation is institutional. Generally, research is classified as biological or economic and funds allocated to the relevant professional groups accordingly. Marketing studies appear to suffer because of this divisive approach. Firstly, because the majority of research institutions are organized along professional divisions, it is unusual to find biologists and economists working together on similar problems. Despite sporadic attempts at communication between biologists and economists, research orientation can become biased, usually to the detriment of the marketing objective. An illustration of this is the contrast between the technical orientation of carcass classification research, and the limited attention that its trading relevance has received.

The professional separation of research institutions can leave marketing without a formal parent body. For many research units, marketing remains a grey, unchartered area, of secondary importance to its production activities. There have been some attempts to overcome these difficulties. Two such examples are the formation of The Livestock Marketing Study Group in South Australia and the Queensland Meat Industry Organization and Marketing Authority. However, these units are young and not always accepted as part of the scientific community. Indeed the nature of their being forces them to be more industry orientated than some of the established organizations. We believe that professional organisations, such as A.S.A.P., have a responsibility in this area. We suggest that they should press government to set up multidiscipline institutes of Marketing Science. Resources for these should be allocated soon and, if necessary, at the expense of those for production research.

Finally, we suggest that an ineffective marketing system, in which consumer desires fail to reach the producer, has stifled the adoption of new production technology and at times misdirected production research. In an efficient marketing system, consumer desires are signalled to producers via the price mechanism. There are many illustrations that this has not happened. The benefits of the years of research that identified the causes of bruising of beef have been corroded because prices paid to producers do not differentiate between bruised and unbruised stock. Because the price system for cattle fails to reflect retail yield differences, production systems generally fail to consider retail yield.
Breeding and nutritional research is orientated towards greater output per unit of input regardless of consumer requirements, because the price system fails to reflect consumer desires. Market research has not yet told us what those consumer desires are.

We conclude that unless improvements in the marketing system occur, extension and research workers in the production and processing fields are likely to continue to be frustrated in their attempts to achieve change. Resources should be redirected towards a more efficient marketing system - efficient in both a pricing and physical sense.

REFERENCES


