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## BETTER MEAT FOR A BIGGER MARKET

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NEW ZEALAND'S CONTRIBUTION to international trade in meat has no equal. The *per capita* production of beef and veal at 221 lb, and mutton and lamb at 400 lb per annum is well ahead of competing countries. The daily consumption of animal protein per person in New Zealand is the highest in the world at 72 g compared with only 6 g in India. The caloric intake of New Zealand people amounting to 3,430 is second only to the Irish at 3,570 calories per day (Phillips, 1963). These figures are well in advance of optimum levels. Morris (1945) considered that the consumption of protein of animal origin should be about 33 g per day and the energy intake of 3,430 calories per day is probably about 10% in excess of real need (Fisher and Swift, 1959). Thus, not only does New Zealand produce large quantities of protein mainly in the form of meat, but its population consumes considerable amounts of it.

About one-third of the national export earnings come directly from the sale of meat and its by-products, and trade, having a value of over £100,000,000, is done with some 35 countries, the three most important of which are Great Britain, United States and Japan. Behind this ever-growing industry is the hard work, skill, drive and determination of farmers, freezing works personnel, meat exporters, New Zealand Meat Producers' Board members and executives, Government leaders and officials, research workers, and extension officers employed by various organizations. This stupendous effort has been rightly acclaimed a great success. Much more, however, remains to be done before this country can be assured of an unchallenged position of world leadership in meat. It is the intention of this address to consider some aspects of the situation from the standpoint of what is happening in New Zealand's traditional and new markets and also to examine certain developments in animal production that may have important lessons for, and effects on, producers and exporters.

## RECENT CHANGES IN PREPARATION OF MEAT FOR EXPORT

In the last decade there have been far-reaching changes in the preparation of meat for export from New Zealand. Previously a high proportion of meat was exported as whole carcasses or as quarter beef. Bobby veal, low-grade beef and some ewe mutton were, however, boned out, trimmed of excessive fat, frozen in stockinette bags and exported in these containers. Today the position is very different. Over a million carcasses of top-quality lamb are cut, prepackaged in polythene bags or vacuum packed in cryovac, placed in stoutly-made cardboard containers and frozen for export. Nearly all export beef is shipped overseas in cartons, each of which contains boned-out and trimmed fabricated cuts of prime beef for use as steaks, roasts or stews, or boneless manufacturing beef trimmed to a 10 to 15% "visual fat" content for hamburgers or sausage-like meats. Mutton carcasses of certain weights are likewise deboned and trimmed for export. These developments have given the industry new life and vigour and all export meat works have contributed to upgrading the product so that it now enjoys an extremely high reputation in overseas markets.

Pre-cutting and packaging of meat have provided the exporter with the opportunity to meet the particular needs of his customers by shipping only the cut or cuts of meat they require rather than the whole carcass or quarter of beef as was formerly the case. This development has greatly increased the responsibility of the exporter as he now has to satisfy the rigid specifications laid down by the importer. These conditions specify, among other things, the cutting procedure, the size and shape of the cuts, the fat content, the length of the aging or conditioning period, and the wrapping and cartoning materials to be used. Rejections can and do occur if the consignment fails to comply with strict sanitation requirements or if the product is not up to specification.

There are, however, many technical matters that still require to be overcome if the frozen pre-packaged product is to have wide acceptance. One major problem is the formation of cavity ice or frost within the meat package. This leads to difficulty in product identification by the customer and the meat under these conditions is very different in appearance from fresh packaged or unpackaged meat. Loss of colour in the packaged, frozen meat, and the durability of the wrapper, are also real difficulties and are a challenge to the technologist.

Pre-cutting and packaging are expensive operations but exporters must not reduce quality of the product to pay for the added cost. The appearance of the wrapping material may be an important factor in making a sale, but, if the quality of the meat does not come up to expectations, reputation will not be built and, without reputation, repeat sales cannot be maintained.

American supermarkets rarely lose a customer because of the quality of their groceries but they can and do lose customers because of the quality of meat they sell. The retail industry in that country has spent thousands of dollars trying to teach the housewife how to judge meat but she refuses to learn; she would rather put her trust in some retailer or packer brand (Curtis, 1958).

#### LABELLED MEAT AND THE MEAT PACKER

This has been a factor responsible for Cudahy Packing Company in America featuring their beef as meat from selected animals under 18 months of age and around 750 lb liveweight at slaughter. This special beef is labelled Cudahy Bar-S Tenderlean Beef (Anon., 1964a). Similarly, the consumer demand for reliable, labelled beef encouraged another very large American meat packing organization — Armour & Co. — to establish in 1958 a beef cattle improvement research programme involving performance testing and progeny testing, the use of photogrammetry to predict the size, shape and weight of each meat cut in the live animal, and the employment of ultrasonic equipment to determine *in vivo* the depths of fat and lean. The selected sires are rated as silver star animals until an adequate progeny test result is available and those that excel are designated gold star sires. These are used widely under an artificial insemination programme. Armour's refer to this research project as their "sperm-to-steak programme"! The whole exercise has as its aim the increased production of uniformly high-quality branded beef for the fastidious consumer.

Swift & Co. have also been much concerned with having their product identified at the meat counter. One major way in which they have attempted to achieve this is through injecting a proteolytic enzyme, papain, into the vascular system of the animal immediately before its slaughter. The tenderizing enzymatic action does not commence until the temperature is elevated during cooking. The process has been patented and in the United States the meat from treated animals is sold under the brand name "ProTen"

(Goeser, 1961). Although this is a significant development designed to provide the consumer with uniformly tender meat, there are still a number of important problems to be solved before there is complete and acceptable control over this most sought after quality in meat (Landmann, 1963).

#### COMPLEXITY OF CHOICE AND THE SALE OF MEAT

Because meat is expensive and is displayed in a multitude of cuts and can be prepared for the table in a great variety of ways, it must present a complex problem of choice at the retail counter. Indeed, the American housewife confronted with the complexity of the choice-making process is apt to pass the decision to her husband who often knows more about price differences between stores, and bargains, not only of price but bargains of value, within stores at the meat counter. A supermarket retailer is well aware of this problem and in order to expand his sales he must be scrupulously honest with quality, he must let the customer see as much of the correctly-identified product as possible, and he must resist changing the appearance of the product too fast and too often. Above all, he must learn all he can about the shopping habits of the customers and their decision-making processes. With this knowledge he is better able to plan and develop a promotional activity having as its aim more and better satisfied customers.

The producer groups of primary produce must likewise become intimately concerned with what their ultimate consumers want in each and every market. This involves market research with emphasis not only on why the product is bought but also with emphasis upon why the product is not bought; a study of psychological factors such as discriminating cues and cue-expectancies; investigation of habit purchasing or the unthinking operation; the role of context (*e.g.*, eggs for breakfast) in relation to the consumption of the product; and the sociometric patterns in purchase decisions, such as the extent to which the purchaser is under the influence of other members of the household. All these studies, especially with meat, must take into account religious, race and socio-economic factors. In addition, there are a number of psychological problems within the distribution channel involving the retailer, the wholesaler, the processor and his product development, advertising and promotion personnel, and right back to the ultimate producer — the farmer (Bayton, 1961).

Some products of high nutritional value, even when moderately priced, fail to be bought in the market place in quantity. A case in point is lamb. To increase its demand, a long-range promotional programme designed to break down social customs and other identified influences that account for its low consumption must be undertaken. Advertising and promotion in this instance become a long-range educational process designed to create a favourable image for lamb. Early response to promotional activity will be forthcoming in areas where consumption of lamb is already higher than the national average (Henderson *et al.*, 1962).

#### THE SUPERMARKET AND ITS SELF-SERVICE MEAT DEPARTMENT

The rise of the supermarket, with its self-service meat department, has and will continue to influence markedly the types of meat that ought to be produced. The supermarket in North America is a retail store selling over 6,000 different items under the one roof, and, in order to cater for the public it will provide, in close proximity to the store, space for the parking of upwards of 8,000 cars. Each item for sale has to earn its shelf space or it is replaced. There are 500 different new items added each year and all compete for the shopper's dollar. The meat department — the most important part of the store — is almost always located at the rear and is used as a draw, but not as a loss leader, to get customers into the store and past the array of other food items and household requisites. The customer will leave the store with meat that amounts to at least 12% of her purchases. Thus meat is the central item in the store and if the store is to expand its business the quality of the meat it offers becomes of supreme importance.

In Great Britain by mid-1961 there were some 600 supermarkets, accounting for about 6% of the grocery turnover. Since then stores have been opening at the rate of one a day and the tendency is towards larger and larger supermarkets. In spite of the very wide range of goods on sale, stores in Britain of up to 12,000 sq. ft can achieve sales of fresh meat and poultry equal to 20% of total turnover, although generally the proportion of fresh meat to total sales is around 12%. These supermarkets by the end of 1963 were expected to do 10% of the total food trade and by mid-1970 they will probably be doing half the trade. Their proportion

of the retail trade in fresh meat is likely to be very close to these figures (Anon., 1963c).

The emphasis on meat in the supermarket in Great Britain follows American policy, namely, "bring the customer to your store with your grocery bargain, and keep them with the quality of your fresh meats and produce" (McClelland, 1962). Moreover, "the desirability of having a meat department doing retail sales of over £500 per week — because less than this is less economical and less satisfactory — is one of the most powerful factors pushing supermarkets up to 4,000–5,000 sq. ft sales area and beyond" (McClelland, *loc. cit.*).

The large supermarket chains almost always buy direct from the meat packing plants and in Britain a continuation of this practice may have serious repercussions on wholesale markets such as Smithfield. The policy of virtually all supermarkets and self-service stores is to pre-package the meat, either at the store or at central packing premises which serve a number of retail outlets. The preference to cut and package at the shop or at a central depot in close proximity is because freshly-cut meat has a bright and attractive appearance, whereas meat, particularly beef, which has been packaged for some time loses its appeal through darkening of the cut surfaces. The manager of the meat department rightly places great emphasis on eye-appeal and at the present stage of packaging technique he does not believe that buying pre-packed retail cuts direct from distant slaughter-houses will provide a product having first-class appearance at the self-service counter.

The appearance of the frozen, pre-packaged product at the meat counter is very much less attractive than packaged fresh meat. This disability faced by New Zealand meat cannot be easily overcome. The knowledgeable shopper who realizes that colour of meat is a transient character and has little, if anything, to do with its eating qualities, will buy frozen pre-cut and packaged meat if it is priced below comparable fresh meats. Chefs in the catering trade would in most cases raise no objection to the frozen product especially if they are acquainted with its eating qualities. Attempts are being made in North America to sell attractively-printed cardboard cartons containing a 15 lb side of frozen New Zealand lamb cut into leg, loin, rack, and square-cut shoulder. It is hoped that this pack will be bought in quantity at the supermarket and placed in the home freezer. It will be opened only when a joint is required for a meal. The customer does not see the contents of the pack in the

store and consequently the meat quality must be absolutely first class if this method of merchandizing is to succeed and result in greater numbers of satisfied purchasers.

A supermarket self-service refrigerated cabinet full of attractively cut and packaged meat is irresistible to the shopper. For instance, one American study showed that the average shopper spent 41% less time but bought 9% more meat in a self-service than in a service meat department. It is also found that it is easier to sell the lower-priced cuts when people can pick them up without asking, and a greater variety of meat is therefore sold (McClelland, *loc. cit.*). On the other hand, the uncoerced customer effectively polices the quality; she silently rejects what does not suit her. This is in sharp contrast to what one English commentator said: "I say that she [the housewife] is justly suspicious of the butcher. She is scared of him. She dare not question him. He is the authority supreme. So she goes to the supermarket where she can learn and gain confidence. There she can stay as long as she likes, buy what she wants at the price she wants, and discard the joints she does not like the look of or the joints she knows are overpriced" (Carter, 1962).

The concluding remarks of an address given by McClelland (*loc. cit.*) in England are worthy of repeating: "Supermarkets," he said, "mainly in chains, will very rapidly take over most of the retailing of fresh meat in this country. Consumption will go up, partly because displays are more attractive and the method of buying is more satisfactory for the customer, partly because retail costs are cut and supermarkets are used to competing and retail margins will therefore come down. The accent will be on home-produced meat of good quality. Supermarkets will get larger and the chains will do their own buying from the producer. They will want good value, uniform quality — with reliable grading — and they will be alert to move in and take advantage of surpluses by passing on low prices to the consumer. More will be demanded of the producer; the efficient producer will benefit."

McClelland (*loc. cit.*) believes that *per capita* meat consumption will increase by as much as 25% when super-marketing becomes more universal in Britain.

#### QUALITIES REQUIRED BY THE CONSUMER OF MEAT

What are the qualities the consumer wants in meat? Surveys have almost always shown that consumers want a high proportion of lean with a minimum of wasteful fat,

sufficient marbling fat in the case of beef, a high degree of tenderness, and a meat which is acceptable in terms of flavour, aroma and succulence. Other considerations, such as shade and uniformity of muscle and fat colour, size of cut, size of the eye of the chop, the appearance of the bone and the quantity present, may also be important to the consumer consciously or subconsciously, and may exert considerable influence on her choices at the meat counter.

In order to try to provide the kind of meat that will satisfy most of his customers, the retailer will purchase top grades of carcasses from young animals. He will almost always have to trim excess fat from these grades but the meat will be attractive in colour and succulent, it should be more tender than meat from older animals, and the bone will be small in amount. Flavour in this case, however, may be mild and unappealing to the gourmet. It is important, however, to realize that consumers know little or nothing about grades of meat and, in any case, there is little relation between grade and eating quality (Doty and Pierce, 1961; Rhodes *et al.*, 1955).

Meat grading is subjective and is applied to the whole carcass in most countries and consequently the colour, texture, marbling (intra-muscular fat) and depth of subcutaneous fat and amount of intermuscular fat cannot be properly assessed unless the carcass is cut. For example, the top grade of New Zealand lamb carcasses has more fat but less red meat and bone than Y grade carcasses (Barton, 1960). Conformation and amount of fat finish are the two main criteria taken into account in determining grades of New Zealand carcasses (Barton, 1947, 1958, 1960; Smith-Pilling, 1959). If it can be shown that shape of carcass is more important to the consumer than the amount of red meat it contains, then the present grade standards are justified. The standards cannot, however, be justified on the amount of fat present in the carcasses of the top grade.

#### THE JUDGING OF MEAT CUTS

Carcass contests in New Zealand have been concerned only with the appearance of the uncut carcass in the case of lamb or with only the ribbed carcass\* in the case of beef. The short-legged, meaty-looking carcass (or pen of three carcasses in export lamb carcass competitions) with an

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\* Side of beef cut almost through between the tenth and eleventh ribs.

even and adequate covering of subcutaneous fat and a well-developed and marbled loin eye in beef, would win the competition and would be lauded as the type of carcass farmers should produce. With increasing quantities of lamb being cut and pre-packaged for export, primal lamb cuts competitions have been initiated and conducted by the writer at several centres in both Islands since 1961 (Barton, 1963). In these competitions, the cuts are weighed and the weight of each is multiplied by a price factor. From the total of these calculations an unlimited number of penalty points can be deducted, if need be, for excess or insufficient fat, poor muscle or fat colour, faulty conformation especially of the leg, texture of the flesh, and the like. Seldom does the winning entry in the cuts judging correspond with the winner in the whole carcass or live animal sections of the competition.

This primal cuts competition has the consumer clearly in mind, as the cuts as judged are exactly those pieces of meat she herself would appraise at the self-service meat counter.

The first primal beef cuts competition to be staged in New Zealand was judged by the writer two weeks ago and this too was based on the weight of the cuts, the yield or cutability of the side, the proportion of kidney and fat trimmings, the prices of the various cuts and the area of the rib eye muscle. Penalty points for meat-quality factors were deducted when necessary. No claim is made that the basis for judging in this way lamb and beef primal cuts approaches perfection. It would certainly be premature to say, on the basis of these competitions, that conformation *per se* is unimportant in lamb and beef. Nevertheless, in broiler chickens body conformation has been found to be of secondary importance because of the practice of marketing broiler meat in the cut-up and packaged form (Nordskog, 1962). On the experience of the present primal lamb cuts judging it has, however, become clear that the Romney-Southdown cross lamb does not invariably win as is the case in the district export lamb contests where only the intact carcasses are judged.

#### STUDIES ON FAT IN LAMB AND MUTTON

It has already been stated that the modern consumer requires meat with a high proportion of lean and a minimum of wasteful fat. A persistent complaint is that meat

is often too fatty. Much effort at Massey University has been directed at this problem as far as mutton and lamb are concerned. Studies have shown the magnitude of the problem (Barton, 1957; Barton and Kirton, 1958b; Kirton *et al.*, 1959b; Smith-Pilling and Barton, 1954); that there is a strong positive relationship between carcass weight and fat content (Barton and Kirton, 1958a); that there are breed (Kirton *et al.*, 1959a; von Borstel and Barton, 1952) but not type of ewe differences (Hight *et al.*, 1962); that number of lambs weaned affects the fat status of the ewe (Ulyatt and Barton, 1964); that short-term undernutrition and/or thyroxine treatment do not effectively lower the fat content of aged ewes (Hight and Barton, 1964; Kirton and Barton, 1958a); that there are large fat differences between grades of lamb, ewe and wether mutton carcasses (Barton, 1960); that there are sire (Barton *et al.*, 1949) and sex differences (Barton, 1960; Barton *et al.*, 1964; Clarke *et al.*, 1953) in fat content of lamb carcasses; that there are marked differences in the amount and quality of fat in the fatty tissues (Barton *et al.*, 1963; Shorland *et al.*, 1962); and that there are very appreciable differences in the carcass composition of sheep grazed on different pasture types (Barton and Ulyatt, 1963). Techniques for determining fat and other body and carcass components and the efficiency of the procedures employed have also been examined and demonstrated to yield reliable information (Barton and Kirton, 1956, 1958b, 1958c; Kirton and Barton, 1958a, 1958b, 1962; Kirton *et al.*, 1962; Ulyatt and Barton, 1963). Further progress in the elucidation of this major problem will be of the utmost importance to the industry.

#### DUAL GRADING OF BEEF CARCASSES

It may be of distinct help to the New Zealand beef producer and the exporter of beef if a dual grading system similar to the one started in 1962 by the United States Department of Agriculture was instituted here. In essence, dual grading takes into account the quality of the meat and the yield of trimmed retail cuts from the carcass. There are eight quality grades (Prime, Choice, Good, Standard, Commercial, Utility, Cutter, and Canner) and within each quality grade there are six yield grades (1 to 6, with 1 designating the highest yield). The quality grade of a beef carcass is determined from a composite evaluation of the colour, texture, firmness and marbling of the rib eye (*longissimus dorsi*) muscle and the ossification of the bones

and cartilages. Conformation also used to be considered along with quality but this has now been dropped. The yield grade is determined by considering the amount of external fat, the amount of kidney, pelvic, and heart fat, the area of the rib eye muscle, and the carcass weight. For a carcass to be given a yield grade 1, it will have to have more than 53.1% of its carcass weight in boneless, closely-trimmed retail cuts from the round, loin, rib, and chuck. The comparable proportion for yield grade 6 is less than 43.9% (Anon., 1962). It has been shown, that in USDA Choice beef carcasses, only about 25% will fall into grades 1 and 2 and another 25% into grades 4, 5 and 6 (Pettus, 1962). Dual grading has been slightly modified since its trial year of operation, mainly to satisfy the protests of the meat packers, hotel purveyors and the like, but certain cattle breeding interests also voiced their opposition, presumably because dual grading showed up deficiencies in the meat content of their animals.

Dual grading is a step toward more precision and refinement in beef grading and, as such, it is a step in the right direction. A grading system must distinguish clearly and accurately between wasteful low-yielding carcasses and the preferred ones. If it fails to do so, it is ineffective and damaging to the future demand for the product.

#### IMPORTANT DEVELOPMENTS IN GREAT BRITAIN

In Great Britain, £150,000 has recently been made available to the Fatstock Marketing Corporation, and Durham University under the guidance of Professor M. McG. Cooper, to enable them to conduct a five-year study into domestic meat production and marketing, including meat-eating habits and tastes. This investigation could well provide a sound basis for a meat grading system having real meaning in terms of consumer demand. In this connection, the findings of the survey ought to be of first-rate importance to New Zealand, as they may possibly indicate that present carcass grading standards are out of sympathy with consumer demands.

Animal production in Britain is changing more rapidly than in New Zealand and the old ways are being carefully examined and sometimes superseded. For example, there are some (Clayton, 1963) who consider that Britain can no longer be regarded as the "stud farm of the world". It has been pointed out that the Shorthorn is being replaced by

the Friesian and to some extent the other beef breeds. The Charolais is likely to be a formidable challenge to the British beef breeders, especially when used in the dairy herd which now supplies 80% of the domestically-produced beef in Britain (Anon., 1963b). The Danish Landrace pig is challenging the British breeds. Finnish sheep are being imported to raise the fertility of British stock and the East Friesland Milk sheep has been used by Colburn to improve milk yield and fertility in his Colbred sheep. The poultry breeders of Britain are basing their breeding stocks on American-bred lines and are obtaining franchise rights from leading U.S. breeders. These developments are certainly not widely known in New Zealand so that breeders in this country continue their pilgrimage to the British livestock breeders and purchase from them individual animals costing up to £10,000 or more; none of them have been performance or progeny tested and often, in the case of beef bulls, are bought from herds of such small size that constructive breeding practices could not in any case be carried out (Cooper *et al.*, 1962). However, to the great credit of certain British breeders, performance testing under the auspices of the Aberdeen-Angus, Lincoln Red and Sussex Cattle Societies has been in existence for the last few years. Several local recording schemes have also been in operation for a number of years. The National Cattle Breeders' Association has been active in stimulating beef recording and has promised £5,000 for the first year's operation of the Beef Recording Association (United Kingdom) Ltd. The British Government will give to this Association a grant of £50,000 over three years to assist the development of a national beef recording scheme but its grant is conditional upon a similar sum being raised by the beef industry (Anon., 1963a).

There are several factors operating in Britain which are mainly responsible for increasing numbers of breeders turning to enlightened breeding aims. It would be difficult to name the prime factor in this move but the importation by the Ministry of Agriculture of 30 Charolais bulls from France and their use in England and Wales by artificial insemination since March, 1962, is having an important effect. The Charolais-dairy cross cattle are being compared at various ages in several locations with British beef bull-dairy cross animals. Data on birth weights, calving difficulties, growth rates and carcass quality are being collected and analysed as a matter of routine. The outcome of this intensive national examination of its beef production from

the dairy herd will be awaited with interest not only in Britain but in New Zealand and other beef exporting countries.

#### THE FRIESIAN AS A BEEF AND VEAL PRODUCER

The increasing importance of the Friesian as a milk and beef-producing breed is having widespread implications in several northern hemisphere countries. The work of Preston (1963) in showing that cattle can be rapidly and economically fattened at 12 to 14 months of age on barley has likewise given the Friesian a great fillip. Barley-fed cattle already produce about a fifth of the British home produced beef and this level of production has been achieved in only three years, commencing at a time when barley was in oversupply. Large companies are being formed to produce barley beef and one such company — British Beef Company, a subsidiary of Union International owned by the Vestey interest — is constructing ten automated feed lots in Britain, each capable of fattening 10,000 head at a time (Anon., 1964b). Farmers are also grouping together to produce this kind of beef and are appointing technically qualified persons to guide the group in its purchases, and fattening and selling practices. All this endeavour will result in a mass-produced and uniform product grown under standard conditions at the lowest-possible cost. Meat retail outlets will dictate the carcass weight and the minimum acceptable standard of quality so that they can more easily promote and merchandise the meat. The consumer will complain about the lack of flavour in this beef but she will praise it for its absence of excess fat, its tenderness, its colour and price.

The Friesian is also ideal for the production of white veal, a high-priced product meeting with great success in Holland and England. It is a luxury meat and is fast becoming a favourite dish in the expensive restaurants on the Continent and in the East. Ungarnished it is a tasteless dish, but it certainly lends itself to the skill and art of the best chefs who seldom fail to whet the appetite of the over-fed and wealthy traveller. New Zealand could well develop a substantial trade in white veal even though a high proportion of male dairy calves are Jerseys which, although not entirely suitable, can be fed to produce a reasonable carcass at about 14 to 16 weeks of age. Carcass dissections on Friesian calves raised indoors on whole milk or reconstituted buttermilk powder have shown at Massey University that the meat yield is high and the product quite acceptable to the retail meat trade (Barton and Kirton, 1961).

## THE COLBRED SHEEP

The meat-type hog in America is the outcome of the impact of the self-service meat department upon the producer (Pearson, 1942) and this method of retailing is likewise responsible for the emphasis on the red meat steer (De Graff, 1960). With sheep in Britain a new company has been formed known as Thornber-Colburn Sheep Ltd., to exploit the high fertility, high growth rate and heavy milk production of the newly-established Colbred sheep evolved by crossing the Border Leicester, Clun Forest, Dorset Horn and the East Friesland Milk sheep. Thornber Bros, well known poultry breeders, have joined forces with H. A. Colburn and Son Ltd. who were the breeders of the Colbred sheep. Thornber Bros have been progeny testing up to 100 rams a season, mainly of the Suffolk breed, for growth rate and carcass characteristics. Selected rams will now be mated to Colbred or Colbred cross ewes for the production of high-quality standardized lamb to be sold exclusively through one large chain of supermarkets in England.

## CONCLUSIONS

The lessons for New Zealand are obvious if we are to take a larger share of the world's markets with meat of an improved quality. We need to intensify and expand greatly meat research at all levels. We must also encourage farmers to understand fully what is required of them. We must always think in terms of the consumer rather than believe that our product is the best and that she should clamour for it. All of us must become connoisseurs of meat and insist on a perfect presentation of it at the meal table. Only in this way will we project an image in the minds of every visitor to this country that New Zealanders really pride themselves in the production, processing, cooking and serving of meat. The satisfied visitor when he returns to his homeland then becomes an advocate for New Zealand meat. We have a very long way to go before meat, as served in this country, can be truly said to be the best in the world. This then is the task that lies before us. If we fail to get on with it we are in danger of losing our present position as the leading meat exporting nation in the world.

As a group vitally interested in animal production, we hope to serve an industry that is keenly aware of new findings and anxiously seeks them out. These new facts will become available in proportion to university, Government and industry's support of research. We solicit the moral

support of the meat production and processing industries for sufficient freedom to enable us to conduct bold research, together with the essential monetary backing to develop young minds and obtain the necessary research results to help these industries progress. We will watch carefully for their response as we search for additional facts and attempt to overcome their problems.

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