PRODUCT DEVELOPMENT IN BEEF

by Elliott S. Clifton

No real world shaking changes have occurred in product development in beef yet some products have been developed and others are in the developmental stage which may have some great implications for the beef industry.

Product development takes place by developing a product for which consumers already have a demand, or by developing products for which a demand can be created. It makes little difference whether there is a physical change in the product or whether the image of the product in the consumer's mind is changed. A product that the consumer thinks is different is just as important and effective as a product which is physically or chemically different. For example, I strongly suspect that the continued increase in the per capita consumption of sausage items is largely due to the ability of the processors to create a demand for the product rather than an inherent taste for sausage items by the consumer.

I want to make this explicit because changes in the attitude of consumers that are currently taking place or may be made to take place will play a very important part in future product developments in beef.

Recently there has been increased effort in research and development in beef products. This has been brought about by the fact that beef is experiencing increased consumer demand relative to other meats. In the past, processors felt that they could best expand their businesses and profits by pushing their brand items. Since beef is sold fresh and cut at the store, there is little possibility for packers to maintain a brand identification through to the consumer. The activities of the government and others have been directed toward keeping beef a commodity. Such things as grade standards, dual grading, price quotations and outlook information tend to give everyone in the market equal information. The effect is to prevent beef from having any great potential as an item in which a brand franchise can be developed.

I am not voicing an opinion about the desirability of improving both the pricing and the operational efficiency of beef marketing. I am merely stating why I think that product development efforts in the past have been centered in areas other than beef.

Nevertheless, as we look at the future and realize that beef is to constitute a larger proportion of the meat business, we are going to expend a lot of additional research time and money to pull beef out of the commodity class. If the large packers are to exist in the beef business, they must do this.

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I think anyone familiar with the meat packing industry would agree that the larger firms stay in business only because of advanced technology. This progress must be substantial to offset higher wage rates and fringe benefits, and more governmental regulations, which affect larger processors more adversely than smaller ones. Thus, continued technological progress is required if the larger firm is to have a profitable future.

Now let us turn to what is being done.

**Product Developments**

Cutting or breaking the carcass. Our general belief that beef was a commodity and would remain so may have led us to a false sense of security about the product. The specifications we have been using for trading are extremely inaccurate.

With the changes in beef merchandising now taking place there is a sharp increase in the number of cattle broken into wholesale and retail cuts at the packer level. This has prompted study of which carcasses to cut and how to cut them. It has long been recognized that carcasses of equal weights and grades have different values depending upon the conformation of the carcass and the relative value of the cuts. There has not been a general realization, however, of how great those differences are when each carcass is cut so as to give the largest return for that carcass.

Those who have done research in this area know that the differences in the retail value of cuts from carcasses of equal weight and grade may vary as much as 10¢ per pound for the total carcass, or $100 on a 1,000 pound carcass.

With linear programming and the electronic computer, it is now possible to take the price of the cuts and determine the relative values of carcasses. Thus, those can be selected that will give the greatest difference between the value of the cuts and the purchase price of the carcass. Moreover, any carcass which has been purchased can be cut so that the total value of the cuts from that carcass is maximized. All that is required is knowledge of the conformation of the carcass, the relative value of the cuts and the possible ways that the carcass may be cut.

While this operation is being used in a very limited manner at the present, there probably will be some very rapid developments in this area in the future.

I do not think that we will measure the conformation of each carcass and decide on the optimum way to cut that carcass, but I do expect a much different and more severe form of grading to take place. If this practice is developed, there will be a great incentive to cut large quantities of beef at a single location, as the cutting procedure might need to change with each grade, weight and conformation classification. Labor contracts with retail stores may have a retarding effect on this development since it would reduce the need for the butchers at the retail stores. These butchers most likely would object to this change in operations.
We should not end our discussion of this potential development without mentioning that if it occurs it will cause severe changes in our current system of marketing cattle. The present grades, price quotation and market information systems would be quite inadequate. New trading procedures would need to be developed.

**Specification beef.** Changes in merchandising are leading to a closer coordination between beef producers and beef merchandisers. One recent development in this area is the production of "specification beef"—that is, beef for a specific final use and market. While this may not be a specific change in merchandising, it is closely related. The age, weight, grade, conformation and related factors are controlled to fill the needs of a specific merchandising program. Currently the merchandiser is contracting with individual producers to provide specification beef. In some cases the merchandiser actually becomes involved in the production process.

There is little doubt in my own mind that this practice will develop very rapidly in the future. It will be interesting to see whether contracts or vertical integration predominate in the production of specification beef.

**Prepackaged frozen meat.** Many unsuccessful attempts have been made to sell meat in a frozen state. There may be many reasons why this practice has not been successful. Our market research indicates that consumers feel freezing destroys the quality of the meat. Also, there has been a fear by some that meat is frozen to prevent spoilage or to preserve a product already partially spoiled.

In recent years films have been developed that permit products to be vacuum packaged and frozen. This development has led to a large business in prepackaged frozen cuts of beef among the institutional trade. When meat is frozen in the absence of oxygen, it discolors very badly. This discoloration disappears when the meat is thawed and the vacuum is removed. Due to the discoloration not much effort has been made to sell products to the consumer in this manner.

Apparently consumer demand can be created for the product. The housewife is rapidly becoming adjusted to buying food items in a frozen state, and the stigmas of the past are disappearing. Our research indicates that a consumer education campaign and promotional efforts now would overcome many of the past objections. We probably will see some real attempts to sell frozen meats to consumers. In addition to consumer resistance there is the problem of selling prepackaged meat to retailers who have labor contracts with butchers who want to cut the meat.

**Tenderization.** Most of the early research in tenderizers was based on using an enzyme to digest the connective tissues of the meat. At first the enzyme was primarily used on portion-controlled frozen products. This practice did not work out on a commercial scale because the meat was not handled according to instructions. The product was usually prepared by the packer in a manner which required the housewife to thaw the product for 30 minutes prior to cooking. If she thawed it for too long a period, it was over tenderized; if she cooked it while frozen, it was tough.
Most research programs next tried to fractionate the enzymes into heat sensitive portions which would not digest the connective tissue at low temperatures nor become ineffective at high temperatures. The object was to make each piece equally tender, but this technique has not been perfected.

Swift has perfected and patented a tenderization process to inject the enzyme directly into the animal's blood stream. Supposedly there are some drawbacks to this process. Certain offal items are destroyed. Also, with continued cooking a piece of meat may become over tenderized. We have not tested this product, so I am not in a position to verify these statements. Whatever the disadvantages, if any, of this method of tenderization, it has permitted Swift to differentiate its product and to carry its brand through to the consumer.

An attempt to upgrade beef has been made by injecting fat to make the product more tender and tasty. As is generally known, this process has been tried in many ways in recent years. Supposedly, the technique has been developed to the commercially feasible stage at Texas Tech.

I have not investigated this method, since the addition of fat to the food of an already obese society has some negative connotations. There has even been some question of whether adding water is compatible with "consumer expectancy." More seriously, our market research indicates that housewives will not knowingly buy the product if they know that fat has been added. This seems to be true even though the total quantity of fat in the tenderized product may be less than that which would be found in a piece of meat of a higher grade and equal tenderness. It is doubtful that this innovation can become useful to large packers who ship interstate. They would have to use a label such as "fat added" or some similar type label.

I am sure that tenderization of beef on an economical basis is just around the corner. There is too much research time, effort and money being expended in this area for the solution to the problem to evade the researchers over a very long period of time. The solution to this problem will probably cause violent changes in production methods and areas. We probably will shift from cattle being fed to the top good or choice grade as at present to producing cattle to the standard or commercial grade. The cattle industry will shift from a high energy diet to a roughage diet. We will probably see a shift from a grain consuming industry to a grass consuming industry. Cattle production will probably be concentrated in the roughage producing territories.

Asceptic canning. One possible way to develop new products is through additional processing. Beef is one item that is usually not canned. The reason for this is that beef processed in cans to a sterile product usually has a metallic taste, which is undesirable. Some progress has been made in this direction with a process known as asceptic canning. The meat is sterilized and then canned in a sterile atmosphere so that the final product is sterile. With this process the undesirable taste resulting from cooking the meat in the can to sterilize it is avoided.
To date the process is still too expensive to be used on a commercial scale, but it may become commercially feasible in the future.

**Freeze drying.** A process which has received a lot of publicity in recent years is freeze drying. Under this process moisture is removed from the meat while it is frozen. Since bacteria require moisture to reproduce, the product remains sterile until moisture is added. The process is still relatively expensive and is being used primarily for items which offer relatively large profit margins per unit of weight. However, there is some indication that the process may become commercially feasible on a large scale for such things as beef.

**Irradiation.** Irradiation is one method of extending the shelf life that has been widely studied. Irradiation of the product destroys bacteria and spores and leaves the product sterile. However, recently most meat items developed off-flavors and odors. Recently reports by the armed forces indicate that most of this problem may have been solved. The process is still expensive and it is unlikely that it will become a major marketing innovation in the near future.

**Summary**

In concluding I would like to reiterate these major points.

1. Increased emphasis is being placed on research and development in beef. This is because there has been a continued increase in the demand for beef relative to other meats. Processors seeing this development realize that a larger portion of their business will be in beef in the future and are preparing to attempt to capitalize on it.

2. As beef has become increasingly important it has become obvious that present trading specifications do not describe a homogenous product of relatively equal value. The cutability of different carcasses may vary as much as 10¢ per pound on the carcass even though they are of equal weight and government grade.

3. Technological developments in mathematical techniques and electronic computers make it possible to cut and merchandise beef based upon its value characteristics.

4. Because of this and other developments, there is need for carcasses with the same characteristics. This need is leading to the development of "specification beef."

5. Consumers are slowly losing their aversion to frozen and canned items. With this development we can expect some expansion in the quantity of beef merchandised in this fashion.
6. Swift has made some progress in the tenderization of beef with its "Pro-ten." Beef also has been tenderized by injecting fat into the meat. A lot of time and effort are being spent on tenderization. It is highly probable that someone will solve this problem satisfactorily.

7. Other developments which may become commercially feasible are irradiation, freeze drying and aseptic canning.

**Implications**

What does this all mean to the future of the industry? Your guess is probably as good as mine. Here is what I think.

1. More and more cattle will be fed to exacting specifications.

2. Cattle carcasses will be closely sorted and cut according to their cutability and prices of the cuts.

3. This will lead away from government grading, or government grading will become much more precise.

4. The quantity of frozen beef being merchandised will increase sharply.

5. This beef will be portion controlled and tenderized.

6. There will be a shift to lower grade cattle using more roughage and less grain.

7. Cattle production and feeding will tend to shift to roughage producing areas and away from grain producing areas, or grain producing areas will shift to the use of more roughage and better use of roughage that is being produced. We probably will get some combination of both trends.