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Cost methods in the packing industry

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Swift & Co.,
Chicago, Ill.

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130 WEST 42nd STREET, NEW YORK CITY

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APRIL 15, 1922

National Association of Cost Accountants

COST METHODS IN THE PACKING INDUSTRY¹

PUBLICATION DEPARTMENT NOTE²

Little material has been published on the subject of packing costs. On page 15 there is a reference to one source of information; and the Appendix to this article is a summary of the system of the Institute of American Meat Packers. Mr. Bliss's article makes clear the difference between major products, by-products and joint products and the costing methods for each of these classes of products. His injection of the term opportunity costs—a term used by H. J. Davenport in his *Economics of Enterprise*, and in his *Value and Distribution*; and by John R. Turner in his *Introduction to Economics* and by other economists—is another interesting feature of this article. This term is little used by accountants, but is an appropriate one, particularly, in the packing industry. Most accountants call opportunity costs inter-departmental or inter-organization sales or transfers. Comments on this publication will be welcome.

THREE TYPES OF COST FINDING

From a cost finding viewpoint, the various types of manufacturing operations may be divided into the following three classes, each requiring a particular method of cost figuring: a—costs for ordinary manufacturing operations, b—costs for operations producing major products and by-products, and c—costs for operations producing joint products. It is the character of the operations that makes differences in methods of cost figuring necessary and determines the type of cost figuring to be applied to any specific kind of business. It is fundamental that the method of cost figuring should fit the particular operations to which it is applied. In the consideration of any accounting or cost finding method, therefore, the first information to be secured consists of the operations and transactions to be recorded.

In the packing industry there are numerous and varied operations. All three types of operations mentioned above are represented in the various branches of the business and therefore the various types of costing mentioned above are used.

Each one of these types will be discussed.

COSTS FOR ORDINARY MANUFACTURING OPERATIONS

The ordinary manufacturing operations which exist in the great majority of industrial enterprises consist of the putting to-

¹ This article is based upon a paper read before the Chicago chapter.

² The National Association of Cost Accountants has published another article dealing with main products, joint products and by-products. This was Vol. I, No. 7, of the official publications, entitled *Accounting for By-Products*.

gether or building up of materials, labor, and expenses, into a finished product. The steps involved are as follows: 1. A known amount of material of a determinable cost is used, 2. A definite amount of labor of ascertainable cost is expended, 3. An average amount of overhead expense is absorbed, and 4. The whole is the cost of the finished product.

This method of cost figuring is applicable for example, to plants which make automobiles, soap, furniture and to foundries.

COSTS FOR OPERATIONS PRODUCING MAJOR PRODUCTS AND BY-PRODUCTS

A varied and somewhat different type of operations involves the taking apart or breaking down of some materials of known value into several or many parts, one being the major product and the others, by-products. Since all of these products are derived from the same material, they are in the nature of joint products, that is, they are all produced by the same operations out of something of known cost. It is impossible in this case to determine the cost of *each product separately, although the cost of all may be figured.*

The cost of the major product from such operations is usually calculated in the following manner: 1, start with the known cost of the materials used, 2, add the costs and expenses incurred, which gives 3, the total outlay, and 4, deduct therefrom the *value* of the by-products produced, 5, the balance being the cost of the major or prime product.

By this method of figuring, the cost of the prime product is ascertained by deducting or crediting to the total outlay the full value of the by-products produced. The costs of such by-products are not ascertainable and the cost for the major product could not be ascertained except by deducting from the total outlay the full value of all of the by-products produced.

The problem of costs for major products and by-products arises in several industries, particularly in the petroleum, farming, and packing industries and in the production of gas, coke, etc., by gas plants.

This method of cost figuring was recognized by the United States Tariff Commission in figuring the cost of wool, where mutton was the by-product, and also in figuring the cost of mutton where wool was the by-product.

It is essential in figuring the cost of major products that the full value of by-products be credited. By full value of by-products is meant the marketable value of such by-products in their first commercial stage, less any costs and expenses incurred in processing them to such stage and in marketing them. This gives the full value of the by-products in their present form at the time of production and is the valuation to be used in cost figuring. If an arbitrary or different valuation were used, the *cost of the major* product would not be determined correctly. By this method of figuring the results of the entire operations, the profit or loss appears upon the disposition of the major product. Since by-products have been figured at their full value,

they should not show either a profit or loss when disposed of unless market conditions have changed or costs of processing and marketing have been over- or under-estimated. This is the only known method of figuring costs when major products and by-products are produced out of the same operations and is the method customarily used in such businesses.

COSTS FOR OPERATIONS PRODUCING JOINT PRODUCTS

Costing for the third type of operations mentioned earlier in this article involves the separation of something of known costs into several or many parts, *none* of which may be termed major products. These parts are known simply as joint products, which are the result of the same operations performed on a material of known cost. Being joint products it is impossible to figure the cost of *each separately*, though the cost of the *whole group might be readily calculated*. For such operations it is almost always impracticable to apply an average cost to all of the various products because some are usually high-grade and of relatively high value, while others are of medium or lower grades with relatively lower values, and therefore, an average cost would be entirely misleading.

The practice in cost finding for such operations producing joint products is somewhat as follows: 1, figure the value of all of the products derived from the given operations, 2, figure the cost of materials going into such operations, 3, figure the amount of expenses incurred, the total of the materials and expenses making the total outlay, and 4, compare the total cost expended to the total value of all products derived, arriving at the margin of profit or loss between the total costs and the total value of products made.

This method emphasizes three points: The total cost or outlay, the total value of the products made, and the margin of profit or loss on such operations.

In some cases the values of these various products may then be adjusted by spreading the profit or loss shown on the entire production, that is, the value of each of the products may be reduced by a portion of the profit or increased by a portion of the loss, so that the total value of the products as a group is adjusted to the total of the outlay. The effect of this procedure is simply to spread the total cost over the various products made on the basis of the relative market values of the various products. In other businesses this adjustment of spreading the profit or loss over the products is not made, especially if such products are merchantable commodities and may be marketed in their present stage or passed on to other departments of the business for further manufacturing where their identity is entirely lost. The reason for this procedure will be made clearer later.

The problem of joint costs is found in several industries. One is in the sorting and grading of tobacco. Several grades of different values are sorted out of a given amount of tobacco purchased at a certain price. The costs of the various grades sorted out are figured by spreading the total outlay over the various grades upon the basis of the relative market values of such quantities of each grade. Another example is the glue industry. Various grades of glue are

produced out of the same operations. The total cost of the processing is spread over these different grades made up on the basis of the relative market values of such quantities of each grade produced. Another example is the cottonseed oil industry. Oil meal, hulls, linters, etc., are produced by the crushing of cottonseed. Since each product is a merchantable commodity in the form produced, the practice is to compare the cost of seed crushed to the total value of the products produced, arriving at the gross margin realized on such operations. The net results are then determined by deducting the expenses from this gross margin. Still another example is the hog business of the packing industry. This will be discussed later.

The usual methods of cost figuring cannot be applied to operations like these which produce joint products. The differences between ordinary costs and costs of joint products may be illustrated by the building up of an automobile and the taking apart of a second-hand automobile. In the building up of an automobile, costs may be figured in the customary manner. Amounts for known quantities of materials, parts, labor, and overhead, are expended and the totals give the total cost of the finished automobile. On the other hand assume that a second-hand automobile is purchased for a certain sum, and is then dismantled. The problem of joint costs would be like attempting to determine the cost of the engine or any part of it such as the cost of a fender, or a tire, when the only facts known are, first, the total cost of the machine as bought, and, second, the expenses incurred in dismantling. Obviously, the costs of any of these parts cannot be determined. The cost of all of them as a group may be figured, but not the cost of any one item. The problem is one of joint products.

WHERE ORDINARY COST METHODS ARE SUITABLE TO PACKING INDUSTRY

The method of cost figuring for ordinary manufacturing operations is used in the packing industry wherever it is appropriate. It is applicable to such operations as the manufacture of sausage, soap, oleomargarine, boxes, cooperage and other supplies, commercial fertilizer and canned meats.

CATTLE BUSINESS AN EXAMPLE OF OPERATIONS PRODUCING MAJOR PRODUCTS AND BY-PRODUCTS

The cattle business in the packing industry is a good example of that class of manufacturing operations which produce major products and by-products. Dressed beef is the major product from this operation. By-products include hides, oleo oil, stearine, tallow, tongues, other edible small products, bones, horns, tankage, fertilizer, etc. The dressed carcass of beef is the largest single product made from cattle by these operations and represents about 50-60% of the live weight. This is the prime product produced in the slaughtering and packing operations in the cattle business.

Beef is customarily marketed at wholesale in the form of dressed carcasses, either as quarters or sides or whole carcasses. When the beef carcass is received by the retailer, it is cut up into various parts, such as roasts, steaks, etc. The retailer faces a prob-

lem in joint costs. He knows what the whole carcass costs him and what the various cuts that he makes from it are worth. He knows that the market value of these various cuts varies widely and he is therefore unable to apply or spread the total cost over them on any average basis. These retail cuts are simply joint products for which individual costs cannot be computed.

Since the beef is customarily marketed in the form of dressed carcasses by packing houses, it is the one major product resulting from the cattle operations. The following is an example of the method of cost figuring for a representative lot of cattle.

EXAMPLE OF COST-FIGURING FOR LOT OF CATTLE¹

1. Live cost, 46 head, weight 52,390 lbs. avg. 1,138, native steers, at \$7 per cwt.	\$3,667.30
2. Expenses, killing, dressing, chilling (estimated for month).....	118.03
3. Allowance, condemnations, trimming, etc. (average).....	17.77
Total outlay on lot.....	<u>\$3,803.10</u>
4. Less credit for hides cured (values less expenses curing and marketing)	\$ 387.06
5. Less credit for fats (value of products less expenses).....	116.30
6. Less credit for other by-products (value of products less expenses preparing)	125.73
Total by-products credits.....	<u>\$ 629.09</u>
7. Balance—Plant cost of carcasses—in cooler.....	<u>\$3,174.01</u>
8. Dressed carcasses weighed 29,615 lbs.—Yield 56.53% of beef	
9. Average dressed cost per cwt.....	\$ 10.72
10. Add selling costs and expenses.....	1.87
11. Total cost of lot, per cwt.....	<u>\$ 12.59</u>

This example emphasizes clearly the effect of the yield of beef on prices, creating the spread between the live price and the cost of the beef produced. The total live weight was 52,390 and the weight of the dressed beef only 29,615. This is a yield of 56.53% of beef out of the live weight. The live cost was \$7.00 per cwt., which means \$7.00 for each hundred pounds of live weight. Considering that the yield of beef is only 56.53%, there would be the effect of almost doubling this price as applied to the dressed beef produced. This is the most important single factor in accounting for the spread between the cost of live cattle and the cost of dressed beef and is probably one of the most confusing factors in the public mind. Note also that the value of the by-products is considerably in excess of all of the expenses so that the dressed beef might be sold at a good margin over cost and still be sold for less money than was paid for the live animal.

The credit for hides is arrived at in the following manner: From the current market price for this particular grade of cured hides there is deducted a sufficient amount to allow for the shrinkage and expenses in curing and marketing. This gives the present value of the green hides per cwt. This price is applied to the actual

¹ See page 11 of Part II of the system referred to in the Appendix for some material bearing upon the calculations for the dressed cost of a lot of cattle carcasses.

weight of hides produced by each lot. The credit for raw fats is likewise figured backwards. Starting with the market value of the yield of oil and stearine from fats, the expenses of rendering and marketing are deducted and an allowance is made for the yield of such oils and stearine. This gives the basis for valuing the fats produced from each lot in their present raw state. The credit for other by-products, which includes everything else produced out of the animal, is all calculated in the same manner. That is, from the values of the finished products at current markets are deducted the expenses of preparing and marketing, which gives the present value of such by-products in their raw state.

The values of by-products should be determined upon the basis of current market prices, for that is the only known basis. It is impossible to predict what the market for these by-products may be 30, 60, or 90 days hence, when they are disposed of, and to use other than the present market in figuring their values would be mere guess work. When the current market price is used, any loss or gain realized upon the ultimate disposition of the by-products will consist of two factors: 1, loss or gain due to changes in market values of by-products between date of slaughter and date of sale, and 2, loss or gain due to adjustments in expenses and yields. Since the by-products are figured at their full value, based upon the present market, it follows that the results of these transactions will show as a profit or loss in the disposition of the beef.

The results shown when beef is disposed of which represent the profit or loss between the cost as figured and the sales price, are subject to periodical adjustment as follows: 1, loss or gain on realization of by-products, and 2, difference between estimated and actual expenses. By applying these adjustments you get the final result, whether it be a profit or loss, on the cattle business as a whole.

Cattle are customarily bought in the central live stock markets in lots ranging from one or a few head to several carloads. Usually the lot as bought is the basis for cost figuring. In some cases purchases of small numbers may be combined into one lot for slaughtering and cost figuring purposes, especially if they are of the same kind and grade. Almost all of the beef products are sold fresh and have to be marketed within a very limited time after slaughter. The markets for beef and for beef products are changing from day to day. It is necessary, therefore, that the costs of these lots killed daily should be figured within a very few hours after the operations take place. This necessitates an estimate of expenses, and yields of various products on the basis of averages. Hence the results in the beef business within a period, for a day or a week, may be subject to some minor adjustments, but when the business for a period is considered and the adjustments for expenses and by-product values are applied, these become the final figures for the cattle business.

Dressed beef is customarily inventoried at cost, for costs are figured and are available. By-products, however, are customarily inventoried on the basis of market values, for no other values are or can be determined.

THE HOG BUSINESS AS AN EXAMPLE OF OPERATIONS PRODUCING JOINT PRODUCTS

The hog business in the packing industry is a good example of operations producing joint products. Pork products are customarily marketed in the form of cuts, loins, hams, bellies, shoulders, etc. Very little pork is marketed in the form of a dressed carcass, as in the case of dressed beef. Another feature of importance is that part of these pork products may be marketed fresh, as is usually the case with loins, butts, etc., and other parts will be cured and smoked and finally marketed in the form of bacon, smoked hams, etc.

The hog business differs from the cattle business essentially in that there is no one major or prime product. It is purely a case of joint products, or many products made by the same operations out of certain raw materials of a known cost.

The following is an example of how a test on a lot of hogs would be figured. It should be noted that it follows substantially the procedure discussed already under the heading, Costs for Operations Producing Joint Products. The yield column shows the pounds of each kind of product produced out of each 100 pounds of live weight on the average for the lot. Applying the current price to this amount of product, as extended, gives the value of each product out of 100 pounds of live weight. For example: This lot produced on the average, 13½ pounds of fresh hams for each 100 pounds of live weight. These hams were worth 13c. per pound. Hence the hams produced were worth \$1.76 per 100 pounds of live weight. The procedure is the same for each product in the hog business. The complete test follows:

TEST ON LOT OF HOGS

LOT OF HOGS OF AVERAGE LIVE WEIGHT OF 250 POUNDS

Products	Average Weights	% Yield Out of Live Wt.	Current Market Price	Extension
Fresh hams	16/18	13½%	13c.	\$1.76
Fresh shoulders	12/15	10%	10½c.	1.05
Fresh bellies	14/16	12%	11¼c.	1.35
Fat backs	8/10	7%	7c.	.49
Pork Loins	8/10	10%	14½c.	1.45
Spare ribs .....	.....	1%	11c.	.11
Prime steam lard.....	.....	14½%	8c.	1.15
Trimmings .....	.....	2%	7½c.	.15
Miscellaneous .....	.....	3%	4c.	.12
Yield and gross value.....	.....	73%	.....	\$7.64
Expenses (Per cwt. alive).....	.....	.....	.....	.62
Hogs per cwt.....	.....	.....	.....	\$7.02
Hogs cost .....	.....	.....	.....	6.70
Profit per cwt. alive.....	.....	.....	.....	\$0.32

The above method provides the information needed by the management in following the markets, and judging whether or not it is profitable to buy at prevailing prices. The method emphasizes

the following points: 1, what all of the products are worth at the present market, reduced to a live weight basis, 2, the expenses of operation, and 3, the cost or present market value of live hogs.

Obviously, the difference between the value of the products and the total costs would represent the profit or loss between the markets at these figures. This is the method that a man doing a hog business would use in figuring whether or not his purchases were profitable, and in judging whether it would be advisable to extend operations.

These figures also indicate the basis for figuring costs in the fresh pork or killing and cutting department in most packing houses. Such a department would record as charges to the department, the cost of the hogs purchased and all expenses incurred; and as credits to the departments, the value of all products sold or transferred from it. These facts together with the inventories at the beginning and end of the period, make up the fresh pork or killing and dressing departmental accounts, the profit or loss for a period on current hog business operations being indicated.

The foregoing statement emphasizes as well that there is no one major product in the hog business. Note that no one item produced is as much as 15% of the total live weight of the hog. Also note the wide range in the value of the products realized, from the highest (pork loins at 14½c. per pound), to trimmings (at 7½c. per pound).

Inventories of such hog products are necessarily valued on a market basis. There are no actual costs for the various products. As these products move throughout the various processes and manufacturing operations, the identity of specific items is lost, so that the only available basis for valuing inventories is the current market value for such products.

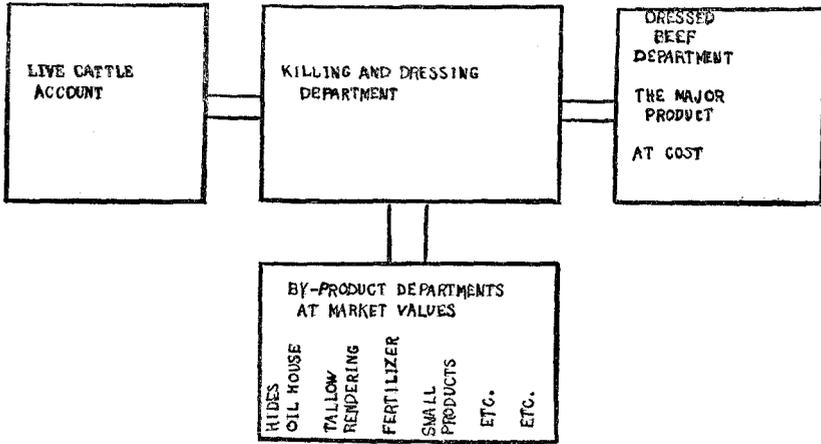
DEPARTMENTIZATION FOLLOWS INDUSTRIAL OPERATIONS

Departmentization of the business and of the accounts is one of the features of the present-day packing organizations. Departmentization is necessary because of the large variety of operations and activities which a modern plant of any considerable size conducts. Any plant may have a variety of operations peculiar to itself, and it will naturally have to be departmentized according to a plan particularly adapted to its physical layout and operations. Some plants handle only a cattle, calf, and sheep business. Others may handle only a hog business. Some will handle all classes of live stock. Some plants do not process by-products to any extent, but dispose of them in the raw stage or in the lesser stages of manufacture while others process their by-products to various degrees. Some plants do not engage in allied industries while other organizations may have an allied business, such as glue, soap, fertilizer, etc.

In the cattle business the departmentization should fit the operations and support the cost figuring and accounting procedure. The following chart indicates briefly a general plan for departmentization of the cattle business.¹ This will of course be varied somewhat

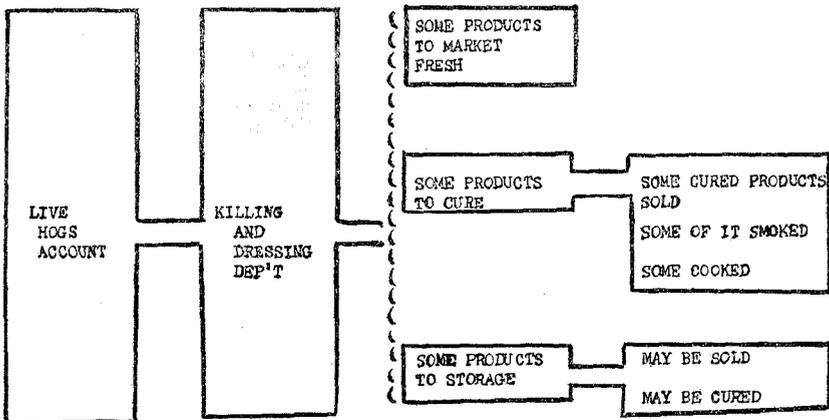
¹ On page five of Part II of the system of the Institute of Meat Packers there is a chart showing the departmentalization of the cattle business.

to meet local conditions, but the general plan will usually be found to be about the same in various concerns.



The departmentization of the hog business will naturally differ somewhat from the cattle business because the operations and processes differ materially. One of the outstanding features of the hog business is that the operations are a succession of processes. The dressed carcasses are customarily cut up into the form of cuts, hams, shoulders, loins, bellies, etc. Some of these may be sold fresh, some may be put into cure, some may be carried in storage from a period of surplus production to a period of scarcity. As the product comes from cure, some of it may be sold in that stage, and some of it processed further, into the form of smoked hams, bacon, etc. For each one of these products the various processes such as killing, dressing and cutting, storage, curing, and smoking, are in fact distinct competitive industrial businesses, and the departmentization has to recognize these peculiar features.

For the hog business, the departmentization will be something along the lines indicated in the following chart.



ESSENTIAL THAT DEPARTMENTS SHOULD BE HANDLED ON A COMMERCIAL BASIS

The present-day packing organization is essentially a group or aggregation of separate industrial activities or competitive businesses. Each department or activity meets the competition of other firms engaged in that particular line of business. There are firms which have only a slaughtering business, selling all products fresh. They meet the competition of all slaughterers, including local and farm slaughterers. Some organizations process by-products into further manufactured stages, and in these activities meet the competition of concerns handling packing house products, such as rendering concerns, hide dealers, etc. Some concerns cure and smoke pork products and in this operation meet the competition of firms who do only this class of business. Some plants make sausage and must meet the competition of all sausage makers, whether they do a slaughtering and curing business or not. The larger organizations, therefore, which engage in many of these operations and processes, meet the competition of other firms at each of these various stages of manufacturing or processing. It is necessary, therefore, that each of these separate competitive businesses within the organization be handled, operated, and accounted for, on an independent commercial basis.

Each department is charged for its goods bought at their full value, whether bought from another part of the organization or from the outside; is charged with all factory and general expenses incurred, and the expense of selling its product at the full market value, whether to the outside or to some other part of the organization for further manufacture.

The delivery and receipt of these inter-organization sales or transfers at their full value is known as transfers at "opportunity costs." "Opportunity costs" are well recognized by economists but very little by accountants. Opportunity costs mean simply that any product is worth to a department of an organization what the preceding department had the opportunity to get for it if it were to sell it in the outside market. In other words "opportunity costs" is the cost to a department of products received from some preceding operation and represents the value the preceding department could get for such products if they were placed on the market in that form.

At the close of each process or manufacturing operation, the management in the packing industry has the opportunity or option of either selling the product on the market in that stage or transferring it to some other department for further processing and manufacturing, the product to be ultimately sold in some other form. This is one of the peculiar features of the industry. The product in its various stages of manufacture is almost always a finished merchantable commodity and may be disposed of in that form. For example, oleo oil is a merchantable commodity and may be sold as such or may be transferred to an oleo factory for use in making oleomargarine. Fresh hams and bellies may be sold on the market as such or transferred to a curing department to be cured. Cured

hams and bellies may be sold as such or may be transferred to the smoke house and manufactured into smoked hams and bacon.

The markets for various products are the factors which determine the disposition of products in any of the stages. If the market for the product at any stage is more than could be realized if it were manufactured into some other product, then it is more profitable to sell it in the first stage. If the markets for further manufactured products indicate that such processing would yield a profit over what would be realized by immediate sale, then it is more profitable to carry the processing operations further. The fluctuations of the markets for all of these various products is the factor that stimulates or contracts the processing operations and adjusts the supply of each kind of the various products to the demand. Each one of these various departments handled on a commercial basis receives a final accounting and a profit or loss is realized in each one. This is as it should be, for as each succeeding operation is performed on the product, labor and expenses are incurred. Buildings, machinery, equipment, inventories, etc., are used. The additional manufacturing operations incur additional costs and should be expected to yield a price sufficient not only to cover the expenses, but to yield a return on the investment used. The results of the hog business in total are the results of each one of these various departments or processes taken together. For operating purposes, and the conduct of the business, it is necessary to know how each department stands on a commercial, competitive basis.

Inventories of the various products in the process of manufacture will naturally include an element of unrealized loss or gain. To eliminate this would be impossible, for the reason that these various products are unidentifiable in any of these manufacturing processes. A vat of hams, for instance, may include hams from several lots of hogs bought at different times and at varying prices. A pile of dry salt cuts in the cellar would naturally include cuts made from many lots of hogs bought at different times and at different prices. It is impossible to follow the products and identify them as they pass through the various operations. Hence it is impossible to allocate any departmental losses or gains. It should be noted, however, that the margin in the packing house operations whether it be a profit or loss averages a very small percentage of the total value of the products handled. Since inventories are taken up on the same basis at the beginning and end of a period, the element of anticipated profit or unrealized loss in inventories is indeed quite negligible.

INFLUENCE OF MARKETS ON PACKING-HOUSE OPERATIONS AND ACCOUNTING

Packing-house operations are conducted between two very sensitive and constantly fluctuating markets, the live stock market on the one hand where the live animals are purchased, and the product market on the other hand where beef, pork, and other products are sold. The prices in each of these markets change daily or almost hourly, in response to conditions within the market itself. Of course

the general movements of these markets have to be relative, for live stock is worth what its products will bring in the product market less a margin for the services of manufacturing and distributing. Any individual market, however, is subject primarily to the conditions of supply and demand within itself, for the reason that the marketable products are perishable and have to move into consumptive channels at the price that will induce the trade to absorb the supply at any time. Beef, for instance, is not sold in any market for a fixed or figured list price, but for what that product will bring in the market in which it is offered for sale. Retail dealers come to the wholesale houses and inspect the beef offered for sale and make bids. They customarily shop around and take advantage of the best bargains offered. Each individual sale to a retailer is a trade in itself resulting from bids and askings. Since this product is perishable, it must be sold within a few hours after it is received at a packing-house wholesale branch. Therefore, it necessarily moves at the best prices that can be obtained under the local conditions of supply and demand.

Live cattle, on the other hand, are customarily marketed by farmers in the established open live stock markets. They are consigned to and offered for sale to packing house buyers by commission merchants who act as agents for the producers. The prices for live animals are affected by the prices at which products are selling and the demand for them and the quantity of cattle offered on the market. Fewer cattle coming to market mean less beef to be placed on the product market. Less beef at any time in a product market to supply the demand there, tend to raise the selling prices. More cattle coming to the live stock markets means more beef on the product market. A large supply of beef on the product market with steady demand can only be moved at lower prices. And it must be moved.

It is the fluctuations in prices for products and animals therefore, that stimulate or contract the amounts coming to such markets. The trend of prices in the product markets reflects back to the live stock market. Price changes in the live stock market stimulate or hold back shipments by farmers. Naturally they attempt to place their stock in the most advantageous market. When prices are good it stimulates shipments coming in. When a surplus appears and prices are depressed, it naturally holds back shipments. Fluctuations in prices determined in open competitive markets is the only agency which adjusts the production of goods to the demand for them. The desire of the consuming public, and the prices they are willing to pay for goods and services, leads to the expenditure of human effort necessary to produce such goods. The forces controlling prices in markets between which the packing industry is conducted, do not differ fundamentally from the forces controlling markets for any competitive industry. The significant feature as mentioned is the sensitiveness of these markets for live stock and packing house products, which is due to the perishable character of the products that necessitates prompt movement into channels of consumption.

In this connection reference should be made to an article ap-

pearing in the *Journal of Political Economy*, Volume XXIX, No. 8, of October, 1921, entitled "Unit Costs as a Guiding Factor in Buying Operations" by Mr. George E. Putnam. This article emphasizes in a very clear and able manner the fact that unit costs do not *determine* selling prices. It is the demand for goods that leads to the supply, and the present and prospective consumers' prices that lead to producers' prices.

The fact that the markets for live stock and packing house products are unusually sensitive means that those controlling such packing house operations must be promptly and well supplied with market information and cost statistics. They must have at hand at all times the most recent information as to the markets and costs of live animals; they must know what the products are selling for, wherever such products are marketed; and must have prompt and reliable information as to costs. These conditions impose on the accounting forces of packing house organizations more exacting requirements than commonly met with in other industries. In addition there are the peculiar cost and accounting problems arising out of the character of the operations, which have to be considered.

The packing industry probably places greater responsibility on its accounting and statistical forces than most industries, and the information and statistics prepared must be dependable and supplied promptly. Old cost figures and statistics may afford consolation, but are of little value in the conduct of current business.

APPENDIX ¹

The Institute of American Meat Packers has issued a uniform system of accounting. It consists of three booklets entitled Part I—The Theory of Packing-House Accounting; Part II—Tentative Draft of Proposed Accounting Instructions on the Cattle Business, and Part III—Tentative Draft of Proposed Accounting Instructions on the Hog Business. Part I contains 14 pages; Part II—45; and Part III—120. All of the pages are of uniform size—8 x 10 $\frac{3}{4}$. According to a statement in Part II the classification and distribution of expenses is to be treated in a separate pamphlet or book. "In preparing this work, attention has been given primarily to the needs and requirements of packing-house executives and accountants. An attempt has been made, however, to present the subject in such a manner as to make it intelligible and useful to others interested in packing-house accounts." Part I is a brief description of the development and peculiarities of the packing business. Specifically it deals with the following topics: The development of the industry, packing-house organization, live stock purchasing and accounts, slaughtering operations and costs, manufacturing operations and costs, storage of products and selling and distributing of products.

The complex character of the packing business affects its accounting. There are four fairly distinct enterprises in the industry, each one performing a different function. These functions are slaughtering and meat-packing, specialized manufacture of by-products, storage of products and distribution or jobbing.

One outstanding point of difference between the packing industry and most other industries is that it has practically no control over its purchases of raw material. Most manufacturers buy definite quantities which are to be delivered at stated times and for stated prices. They meet competition in purchasing but it usually is not the open market, face-to-face competitive bidding that the packer encounters. "Each lot of stock purchased is a trade in itself." Stock when purchased is driven to a scale where it is weighed. A scale ticket is issued showing the number of head sold, the names of the seller and buyer, and the weight in pounds, etc. (See page nine of Part II for data which appears on scale ticket.) This form serves as a basis

¹ This appendix was prepared by the Research Department of the National Association of Cost Accountants.

"upon which the invoice is made out by the commission form, recording the sale to the packing concern." Scale tickets in some cases are used as invoices. Entries are made in live-stock purchases accounts from scale tickets or invoices. Slaughter-house reports "serve as a verification and check on the purchases and are the basis upon which costs are computed."

Part II deals with the scope of the cattle business, cost figuring, classification and distribution of expenses and determining by-product values to be used in cost figuring.

In the cattle business the "killing and dressing account operates in the manner of a controlling account over the cost figuring of all of the various lots of cattle killed. Each lot is computed separately by adding to the live cost, the expense of killing, dressing and chilling, and subtracting therefrom the value of the by-products. The balance remaining is the plant cost of the dressed carcasses, as transferred to the dressed beef department. The cost of running the cooler is considered as part of the killing and dressing department, that department extending to and including all operations and expenses up to the time the beef carcasses on the rail are ready to be disposed of, either by shipping or by transferring to other departments. The account for the killing and dressing department should not show any balance, either profit or loss, at the end of the accounting period, except differences between expense figures used in cost figuring and the actual expenses as they appear in the final accounting records at the close of the accounting period. This balance should be transferred to the dressed beef department as it is an adjustment on the cost of the beef charged to it."

The cost figuring section takes up such matters as adjustments for bruised and other undergrade beef, consignments to selling agencies, sold cost on consignments to selling agencies, invoicing, margin figuring, account scales and adjustments, differences between margins and adjustments, direct sales to customers, contract sales requiring specified trimming, clothing beef and transfers to cutting department.

Expenses are discussed only in so far as they help to explain cattle cost figuring. As mentioned above the "Institute" is planning to issue a detailed treatment of "expenses." The expenses chargeable to the killing and dressing department, and the dressed beef department, respectively, are listed and the different bases used for the charging are indicated.

The by-product values to be used in cattle cost figuring are prepared in schedule form. This schedule may be charged even more often than once per week. This is a striking peculiarity of the packing business. The schedule serves as a basis for calculating the dressed cost of the various lots of cattle. The preparation of the cost schedule, the determination of by-product values and the amount of expenses to be used constitute the most important tasks in accounting for the cattle business. The methods of determining the values of by-products for hides, raw fats, and all other by-products are explained.

Part III contains the following sections: the scope and general accounting features of the hog business, tests, costs and yields (five sample forms are shown in this connection), expenses chargeable against the hog section operations and departments, determining prices for transfers between departments and for valuing inventories and main and sub-divisions of hog section departmental accounts. In this connection 24 skeleton ledger accounts with entries but without figures contained therein are shown.

The cost figuring section of Part III presents an outline of the manner in which the principal costs in the hog business such as dressed cost, labor, supply expenses, indirect expenses, selling and administrative expenses, and drainage and saltage allowances, can be arrived at. The expenses chargeable to the hog department are listed and the bases for the charges are indicated.

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