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# Cost keeping in the leather belting industry

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L. L. Harr

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**Revised copy of a paper read by Mr. Wm. F. Carroll of the L. L.  
Harr Corporation of New York at a meeting of the  
Leather Belting Exchange held at the  
Hotel Biltmore, New York,  
Wednesday, Decem-  
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## **COST KEEPING IN THE LEATHER BELTING INDUSTRY**

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Gentlemen:

No doubt, you are all more or less familiar with the reasons for the investigations which have been made by Mr. Harr and myself during the last few weeks in the plants of the leather belting manufacturers most conveniently situated; but in order that there may be no misunderstanding as regards what we are trying to accomplish, I think it may be well to explain at the outset the object of our visits to the comparatively small number of plants which it was possible for us to reach during the short period that we had to prepare for this meeting. We both regret our inability to visit and investigate the methods employed in more of the plants before appearing at this meeting, but the stress of business and other matters beyond our control made it impossible for us to do so.

### **A UNIFORM COST SYSTEM; NOT UNIFORM COSTS.**

Our object in visiting the plants and making the investigations was to obtain sufficient information relative to the manufacture and sale of leather belting to enable us to design a uniform cost system for use in all of the plants of the members of the Leather Belting Exchange. This does not mean that we are going to try to make the costs uniform in all of these plants, which would be a practical impossibility owing to the fact that each manufacturer of leather belting, and of anything else for that matter, has his own ideas as regards what constitutes a good article of product and also as regards the best method of finishing his leather as well as manufacturing it into belting. Furthermore, each manufacturer has his own ideas as regards the grades of raw leather required to produce belting which will meet the requirements of his customers and which can be manufactured at a cost which will yield him a fair profit. Again one manufacturer may do his own tanning thereby either increasing or decreasing the cost of the raw leather while another may purchase raw leather. Still others may purchase finished leather from which they produce belting, thereby eliminating the currying department, which may represent a gain or a loss in the cost of finished leather in the plants which do their own currying.

For these reasons and for many others which might be mentioned, any attempt to make uniform the cost of producing belting in all of the plants under the present conditions must

result in failure. Our object therefore, is not to attempt to make costs uniform in all plants, but instead, to start with the assumption that the manager of each of the plants is a practical leather belting manufacturer and knows what he is doing, and to design for use in all of the plants a simple, common-sense cost system which can be operated with the least possible amount of clerical labor and which will be absolutely devoid of red tape, but which will make it possible for each manager to know absolutely what it is costing him to produce the belting manufactured in his plant, and to know also that he is including in his costs all of the items of cost which should be included in them and which are being included by all of the other manufacturers of leather belting in the Leather Belting Exchange.

There can be no doubt of the practicability of accomplishing this result. The system required by each plant may vary from that required by the others in some details owing to the fact that one plant produces a certain line of specialities while another produces no specialities or a different line; but the principles on which all of the systems will be based will be the same.

### **THE OBJECT OF A UNIFORM COST SYSTEM.**

Probably one of the principle reasons which prompted your Exchange to investigate the possibility of establishing a uniform cost system of this kind was its knowledge of the harm which can be done to the market as well as to its members, quite unintentionally by a member, who, through lack of information relative to his actual costs and without knowing that he is doing so, is underselling his competitor at a loss to himself. There are in all lines of business concerns who are doing this without knowing it owing to the fact that they are not provided with adequate cost systems; and they do not as a rule discover the harm that they have been doing themselves and others until it is too late. They gain nothing by this practice and would not continue it if they knew the facts; but while they do continue it they injure the market and deprive others of good business.

One frequently hears of a contractor or an engineering concern undertaking a large piece of work and going into the hands of a receiver before the work has been completed. I have heard of one case in which the contractor who took over the work also went into the hands of a receiver before he completed the balance of the job. These are results of faulty systems which made it impossible beforehand to estimate the probable cost of the

work. These concerns did not intentionally take the work at a loss. They would not have undertaken it had they known the facts; but having secured the work by underbidding competitors, they undoubtedly spoiled what might have been reasonably profitable contracts for competitors who knew their costs, and they accomplished no good for themselves by doing so.

The results of this practice are not so quickly discovered in the leather belting business, and the leather belting manufacturer can continue it for a very much longer period without discovering that he is selling below his cost or at a margin of profit which is not sufficient to cover the cost of conducting business and to yield him a fair income. He can therefore continue to do harm to the market and to himself for a longer period without detecting the fact that he is doing so unless he is equipped with a cost system which will show him the facts from month to month.

### **FLAT BELTING COST SYSTEM.**

I will not discuss at this time the methods of ascertaining the costs of specialties which are manufactured in the different plants of the members of this Exchange; but will simply say that the methods of determining these costs and of separating them from the cost of flat belting will be taken care of by us at the time of designing and installing the system in each of the individual plants. Neither will I dwell at this time on the subject of tanning, as I understand that only a comparatively few of the manufacturers of leather belting who are members of the Exchange do their own tanning, and this is therefore a subject which would interest only a small number of its members and which can be discussed and handled separately at the time of installing the system in the plants which do their own tanning.

### **SCOPE OF THE SYSTEM.**

Many of the manufacturers of leather belting do however, maintain their own currying departments wherein they finish the raw leather purchased by them, and each of these manufacturers maintains also a belt shop in which the belts are made from the finished leather. In describing the cost system which has been planned by our company, I will therefore begin with the purchasing of leather butts and backs and follow them through the currying department and the belt shop into finished stock, after which I will describe the accounts to be kept

in connection with manufacturing and selling the product of the plant as well as in connection with the administrative expenses of the plant. This system will cover all of the plants which do their own currying or finishing as well as those which purchase the finished leather and manufacture belting from it.

### **CURRYING DEPARTMENT COST SYSTEM.**

#### **Purchase Order, Form 1.**

In a plant which does its own finishing the leather is purchased in butts and sometimes in backs, which, in some cases, are inspected at the warehouse and selected before being shipped and which in other cases, I understand, are shipped to the manufacturers and inspected on being received. We have provided a form of purchase order which is intended to be used, not only in connection with the purchases of butts, backs and other materials but also in connection with all purchases of supplies and services made by the plant. This form provides an original to be sent to the concern from whom the purchase is to be made; an office copy to be retained by the purchasing department, the purchasing agent or the employee who takes care of purchasing in a small plant, so that the articles ordered may be followed by him until received, so that they may be checked off as received and so that the invoices may be checked with them; after which they may be transferred to a transfer file as records of purchases from certain concerns. The triplicate of this form is intended to advise the receiving clerk relative to the articles which have been ordered so that he may know what to expect and what to do with them when they have been received. This form also acts as a receiving receipt to advise the office that the articles covered by it have been received and to be applied to the invoices covering the articles received.

#### **Inspection Sheet, Form 2.**

We have provided also an inspection sheet to be used in cases where the butts, backs, etc., have not been inspected or selected before being shipped, so that the result of the inspection of the butts, etc., on being received may be called to the attention of the employee or officer of each company who assumes responsibility for the purchase of leather. This form will, of course, show this employee or officer whether the leather received is up to the specifications and in accordance with the leather invoice and will prevent, as far as it is possible to prevent such things by inspection, the receipt of inferior grades of leather where higher grades have been ordered and paid for.

### **Raw Material Stock Record, Form 3.**

The receipts of rough leather as shown by the receiving slips should then be entered in the rough material stock record for which we have provided a form. This record will then show the quantities of leather of different kinds which have been received in the works, and by crediting to its pages the quantity issued for use, in the manner which will be described later, this ledger will at all times show the quantity and value balance of each kind and grade on hand. This ledger should be made to show the price at which the various lots have been purchased and the total cost of each lot received as shown by the invoice. The freight in should be added to the cost of each lot and should be entered in the stock ledger on the proper page and included in the whole cost of each carload or lot received. The various lots and tonnages may be separated in this record by using separate pages for each. It is understood, of course, that each lot will be weighed at the time of being received and that the actual weight will be checked with that shown by the invoices.

It will be seen that the foregoing provides for determining the cost of the currying department on the pound basis. Before deciding to use the pound as the basis for determining the cost of this department we carefully considered the effect of doing so in connection with each of the operations performed therein. It is evident that the operation of removing the shoulders and tails and of cutting the centres from the butts will take about as long in the case of light butts as in the case of heavy ones and it is evident also that if the labor cost of cutting these butts be charged to them or to the finished leather produced from them at a rate per pound the lighter butts will have an advantage, part of the cost of cutting them being charged to the heavier butts on account of their additional weight. The operation of wetting down also takes about as long for a light butt as for a heavy one and the same rule applies. The operation of removing the flesh is another to which the above rule applies. We find that several different kinds of scouring machines are used for scouring operations in which the cost should vary according to the square feet of leather rather than its weight for which reason the light butts are favored in this operation also. The operation of packing in the "sammy" packs is one in which the heavy butts are favored by the pound basis for the reason that the heavier butts take longer to dry and must be handled more frequently or more often in consequence than the lighter butts. The operation of stuffing, for which several different pro-



cesses are used in different plants, is one in which it would appear that the lighter butts are favored by the pound basis as the time required to stuff the lighter is about as long as that required to stuff the heavier butts. On the other hand the heavier butts require longer to dry and in all probability required to be handled more often as a consequence in addition to taking up space in the currying department for a considerably longer time than the lighter ones. The drying, dampening down and other operations after stuffing are figured on the pound basis as regards to the labor charges, this applies also to setting out, oiling and jacking as well as stretching and glazing or polishing and the final drying and weighing operations.

It will be seen that most of the operations in the currying department favor the light butts, where the cost of its product is figured on the per pound basis and the heavier butts require more handling and drying in "sammy" packs take more stuffing materials which constitute a portion of the currying department expense and require longer to dry which necessitates using space in the currying department for a longer period thereby increasing the overhead expense chargeable to them. The cost of the productive labor in the currying department is in all probability less than the overhead expense of that department for any period in most if not all of the shops due to the fact that there are employed in the currying department comparatively few employees whose rates of wages are not high and a considerable amount of expensive machinery, floor space, power, insurance, depreciation and other items which tend to increase the overhead expense of the department. The cost of additional time during which heavy butts remain in the currying department as well as the extra handling will therefore, in all probability, counterbalance the labor cost gained by the light butts and make the pound basis a reliable basis for use in that department.

Each lot of leather on being received should be marked in some way to distinguish it from other lots, as it is the intention to carry the leather through the operations of the currying department by lots so that such information as may be necessary in connection with each lot passing through the currying department may be obtained.

#### **CURRYING DEPARTMENT, Requisition, Form 4.**

So far we have described the receiving and placing in stock of the rough leather required to produce belting, and the recording of its receipt in such a manner that we may know at all

times the value of the balance on hand, representing the investment in rough leather. In the event that an entire lot of rough leather be passed through the currying department at one time, it is evident that the rough leather cost as well as the weight of the leather put into process could be determined by simply referring to the stock record; but as we are of the opinion that it is not always convenient to pass a single lot through continuously, and that it frequently becomes necessary to start part of another lot while one lot is going through the currying department, we have provided the currying department requisition to be used by the foreman of the currying department to report the weight of rough leather put into process and the lot number of each lot of which he puts into process any portion in the currying department. The breaking of lots in the currying department, will, of course, necessitate weighing the quantities withdrawn from rough stock so that these requisitions may be properly prepared. One requisition will be sufficient for all of the withdrawals for each day, and the preparations of these requisitions should not therefore take a very great amount of the foreman's time, as they simply call for the quantity and description of the leather withdrawn for use and the numbers of the lots from which it was taken. These requisitions should be passed to the office by the foreman at the end of each day and will be used in the office to charge the "Goods in Process" ledger sheet covering the process of currying or finishing leather.

### **Goods in Process Ledger Sheet, Form 5.**

The goods in process ledger sheet is a sheet which has been designed to cover the whole cost of certain continuous operations which are performed in the various leather belting plants. One sheet of this form will be used to cover the operation of currying, another the straightening and stripping of finished leather and a third, the operations of the belt shop. It will be seen from the foregoing that this sheet covering the operation of currying or finishing will be charged with the pounds of leather which have actually been withdrawn from stock and its actual cost per pound plus the freight in as shown by the stock ledger; or in the event that several lots of leather have been received at different prices, at the average cost of the balance remaining on hand as shown by the stock ledger.

The first operation in the currying department consists of removing the shoulders and tails from the butts; and as this operation is performed practically immediately after the butts have been taken out of stock to be finished, a space has been

provided on each requisition to take care of the weight of the shoulders and the weight of the tails removed from the butts. These requisitions will therefore show not only the total weight which has been withdrawn from stock but the weight of the shoulders and the tails separately, which weight deducted from the total weight will show the exact weight of the leather which is to be finished. On reaching the office therefore it will be possible to determine by referring to these requisitions the weight of the shoulders and tails separately, and these weights multiplied by the scrap value of each will represent credits to the "Goods in Process" ledger sheet covering "Currying" to which the weight of each should be credited at its scrap value.

Up to this point it will be seen that the "Goods in Process Ledger Sheet" covering currying will show the net weight of the leather which is to be finished and its net cost, as represented by its original cost less the scrap value of its shoulders and tails. It will also be seen that this information will be secured with very little work on the part of the foreman and with very little office work.

At the time of crediting the "Goods in Process Ledger Sheet" covering currying with the value of the shoulders and tails, the same value of each will be charged to the scrap accounts covering "Shoulders" and "Tails". These accounts will be charged with the values which, it is expected, will be realized from the sale of the shoulders and tails, and should these articles be sold later at a greater or less price than was considered their value at this time, debit or credit balances will appear in the scrap accounts, thereby calling attention to the fact that the shoulders and tails have been sold for more or less than the estimate. This will place the management in constant touch with the conditions as regards the sale of scrap, and will make it possible to correct the estimates thereafter and to transfer the balances into costs thereby insuring accurate costs. The credits will be made to the scrap accounts at the time of selling the scrap and should therefore be accurate.

We find that in some cases the leather is finished in whole butts or sides and that in other cases, the butts are cut into centres and sides before passing through the currying department. If to be cut, the first operation after removing the shoulders and tails will be cutting, which should, of course, be done by a practical leather man who can determine the proper centre obtainable from each butt and cut accordingly in all cases except where the requirements of the trade demand that centres of other widths shall be cut from the butts on hand.

### **Report of Waste in Skiving Operation, Form 6.**

We find that in some plants the flesh is removed by means of a splitting machine, which leaves a split which has a fair scrap value, while in other cases the flesh is removed by scraping which leaves shavings having very little value and not sold in all cases. This will, of course, make a difference in the cost of finishing where the operation varies in different plants. In either case, where this scrap is sold, a report of waste in the skiving operation should be made to the office showing the dry weight of the splits or shavings resulting from this operation, an allowance being made for moisture in the case where they are sold wet. It will take but little time to prepare this report, which can be made at intervals whenever it is found convenient to remove the scrap to a place where it can be weighed when each lot has been through the fleshing operation, or at the time of gathering it together for sale at which time it must be weighed in any case. On being received in the office, the weights shown by these reports should be credited to the "Goods in Process", Currying Sheet at the scrap value of the waste and the same value should be charged to the proper waste account. In this way, the cost of currying will be reduced by the value of the scrap obtained from this operation. It would be well to determine the total amount of waste in pounds for each lot of leather passing through the currying department whether this scrap be sold or not, as this information will be of value in determining whether or not too great an amount of shavings or splits had to be removed from each lot of leather received.

### **Storeroom Requisition, Form 7.**

The stuffing operation is one in which stuffing materials which have been purchased must be used, and the cost of these materials will, of course, increase the cost of the leather into which they have been stuffed. A record in the form of a storeroom requisition should be used to report to the office the weights of the various materials withdrawn from the storeroom for use in this operation. These requisitions should be prepared at the time of withdrawing the materials from the storerooms and should be forwarded to the office at once. The stock ledger covering such materials should be referred to in the office to determine their exact cost and the requisitions should be priced accordingly. The total cost of these requisitions should be charged to "Goods in Process, Currying Department", as material. Should other materials of any kind be required in the

process of stuffing or in any of the other operations of the currying department or for the maintainence of the machinery or equipment of the currying department or for use therein in any way, these materials also should be withdrawn from the storeroom on storeroom requisitions and these requisitions should be handled in the office in the same manner as those described above. In this way all of the materials used in the various operations of the currying department as well as all of the supplies used in that department will be charged at cost into the cost of operating the department for the period during which they have been withdrawn for use. They will be charged to that department at their actual cost as shown by the stock ledger and their cost will be included in the cost of the product of that department during the same period, no item of expense for material being over-looked in determining the cost of the product of the currying department.

So far we have charged to the goods in process ledger sheet covering the currying department all of the material in each lot passing through it and we have credited the currying department for the same period with all of the material which has been scrapped at its scrap value. This sheet will therefore represent at this time the net value of the material which has gone into the finished leather produced during the same period. In addition to the material which has gone into the currying department to be made into finished leather, expense has been incurred in that department through the employment of labor and also through fixed charges and other overhead expenses; and in order to determine the whole cost of any lot passing through the currying department we must determine the cost of the labor and overhead expenses as well as the material.

The determining of the labor cost will be a very simple matter, especially in small plants where it will not be necessary to separate the employees by operations, and these costs will be determined by simply segregating the employees of the currying department on the payroll and adding their earnings at the end of each payroll period. These earnings may therefore be charged direct from the payroll to the goods in process sheet covering the currying department under the heading of "Labor" and this sheet will then represent the entire labor and material cost of all lots passing through the currying department during the period.

The method of ascertaining the amount chargeable to the currying department on account of indirect or overhead expense at the end of each cost period will be based upon the

actual floor space occupied by the currying department in each plant the value of the machinery and equipment used therein, the amount of power required to operate the machinery, the amount of insurable stock, fixtures, etc., carried therein, and all other items which enter into the cost of operating that department in each of the plants. These expenses will be carefully investigated by us in each plant and a schedule showing the proper distribution of the entire expense of each business will be prepared by us; so that all that will be necessary for the book-keeper of any plant to do will be to charge to each department the amount shown by our schedule at the end of each cost period or the percentage shown by our schedule of the actual expenses of the period.

The indirect or overhead expense of any manufacturing business consists of a fair percentage of interest on the investment, a fair percentage of depreciation on buildings if the buildings be the property of the company or a charge for rent when the buildings are not owned by the company; the cost of maintaining buildings owned or leased with the understanding that the tenant shall stand the cost of maintenance; a fair percentage of depreciation on machinery and equipment as well as the entire cost of its upkeep; all non productive labor in the factory and the factory office, the cost of power, heat and light, insurance, supplies and all items of miscellaneous expense incurred in connection with the operation of the factory.

Some of these expenses can be charged direct to the departments in which they are incurred, while others, such as depreciation, interest, power, heat and light, insurance, etc., which constitute more or less fixed charges, will be prorated by us to the various departments on a basis which will be fair to all.

The charging of overhead expenses, under these circumstances, to the currying department and to the other departments will be a very simple matter after this schedule has been prepared, as it will simply necessitate copying amounts or figuring a certain percentage of the known amounts at the end of each cost period, and charging those amounts in the proper column of the goods in process ledger sheets covering the currying department and the other departments.

When this entry has been made on the "Goods in Process Ledger Sheet" covering the currying department, that sheet will show the material, labor and overhead expense of operating that department for a certain cost period, and its total amount divided by the number of pounds of finished leather which have been delivered by it to the belt shop will be the cost per pound

of all of the leather which has been so delivered. There will, of course, be a certain amount of leather in process in the currying department at the end of each cost period, and an allowance must be made for this inventory at the end of each cost period. The inventory in the currying department at the end of any cost period may readily be determined by referring to the goods in process ledger sheet covering the currying department and deducting from the pounds of rough leather of the lot or lots which are passing through the currying department, the deliveries which have been made to the belt shop on account of those lots plus or minus the proper allowance. This weight of leather at its actual cost per pound should then be credited as material to the goods in process ledger sheet and carried forward as a balance to the next period. The same number of pounds figured at an average cost per pound considered sufficient to cover the labor and indirect expense which has been applied to the leather in process in the currying department should then be credited as labor and indirect expense to the "Goods in Process Ledger Sheet" covering the currying department and the net cost of operating the currying department after making these deductions will represent the net cost of the finished leather delivered by that department to the belt shop during the period.

After the system has been in operation for a sufficiently long period to determine accurately the average labor and indirect expense per pound of the finished leather in each plant, the above inventory may be dispensed with by crediting the quantities delivered to the belt shop to the goods in process ledger sheet at the average cost per pound, which will leave us a debit balance at the end of each period the value of the goods still in process in the currying department.

### **Report of Deliveries to the Belt Shop, Form 8.**

In order to insure accuracy in connection with recording the weights of the finished leather delivered to the belt shop care should be taken to see that the leather is thoroughly dry before being delivered; or if the demands of the trade necessitate removing it from the currying department before it has been thoroughly dried, a fair allowance should be made for the moisture contained in it. The quantities of centres and sides in each lot should be reported to the office by means of the daily report of deliveries to the belt shop. The weights of the centres and sides and also the number of each as well as the weights of slabs, if they be separated at this time, should be shown separ-

ately on this report. On being received in the office 'this report should be tabulated on the "Record of Yield of Lots" so that the total weight of finished leather in centres, sides and slabs may be ascertained for each lot when the lot has been completed in the currying department. It will readily be seen that if tabulated in this way it will be possible to determine the shrinkage or gain on each lot of leather passing through the currying department, which is necessary to determine as regards whether or not the leather received of each tannage and in each lot is up to the standard.

The weighing of each lot of leather delivered to the belt shop and the comparison of the weight with the weight put into the currying department will make it possible to determine the gain or loss on each lot in currying, which is important in determining as regards whether or not each lot is up to specifications. From this point on, however, the lots should lose their identity, because on reaching the belt shop the centres and sides are not always cut to size at once, as there may not at that time be orders on hand for belting which could be cut to advantage from the centres and sides received, which would make it a long drawn out operation to follow any lot through the belt shop.

On being delivered to the belt shop, however, the quantity delivered should be charged to "Finished Leather" account and credited to "Goods in Process, Currying Department", at the whole cost of each lot. There is likely to be some difference of opinion among the members of your Exchange as regards whether or not the belt shop should be charged with more than the number of pounds of rough leather finished where a lot shows a gain in currying.

We are inclined to favor charging the belt shop with the actual weight of the rough leather finished in all cases where a lot shows a gain, the actual weights being reduced proportionately, as the gain must be stuffing or moisture and does not represent leather, the cost of which is greater than the same weight of stuffing material. This is a matter which we believe, can be settled to best advantage by the members of your Exchange; and should it be decided to charge the leather to the belt shop at the increased weight where a gain has been made in currying, a rule should also be made that the cost per pound should be reduced accordingly by dividing the total pounds received in the belt shop into the cost of each lot passing through the currying department.

In all cases where a lot shows a loss, the belt shop should be charged with the actual weight of each grade delivered to it,



less an allowance for moisture in the event that the leather has been removed from the currying department before it is thoroughly dry, and the cost may readily be determined in the manner already described which will take care of the shortage by increasing the cost per pound automatically.

### **Record of Yield of Lots, Form 9.**

We assume that the centres will be cut to the best advantage possible in connection with the demands of the trade, which must be met by each manufacturer. The fact that narrow centres are sometimes cut from butts which would yield wider ones results however, in leaving on the sides a portion of the leather which could be regarded as centre stock and which should be priced accordingly.

Several methods of arriving at the quantity of centre stock or first quality leather contained in each lot of butts passing through the currying department, have been suggested but all of these methods are based upon average widths of centres to be taken from the butts. There is, however, no reliable way of determining before hand the average width of centres which any lot will yield, and as it also becomes necessary at times for manufacturers to cut the leather or rather the centres to suit the requirements of the trade regardless of whether or not they will cut from the butts to the best advantage, and as there is a wide variation in width of centres which can be cut from the butts, we are of the opinion that the more reliable method of pricing the finished leather yielded by the various lots would be to consider as centre stock at the time of making deliveries to the belt shop only the exact weight of the centres delivered to the belt shop, and do regard all of the other finished leather delivered at this time as second quality until the amount of first quality contained in it can be determined accurately. For this reason we have so arranged matters that the reports of finished leather will show the exact weight of the centres and of the sides delivered to the belt shop. If the slabs have been removed at this time and can be weighed separately there is no reason why they should not be weighed separately and why their weight should not be shown as slabs or third quality at this time.

On being received in the office the report of deliveries to the belt shop will show the exact weight of centres and sides and possibly of slabs delivered to the belt shop and the office should, of course, be advised of the completion of each lot in the currying department. On being advised of the completion of a lot it will therefore be possible for the office to determine as

regards whether or not the lot of leather received is up to the standard, and by keeping a record of the pounds received from the currying department for the entire cost period regardless of lots by recapping the lot records, the office will be in a position to know at the end of each cost period the total number of pounds of leather which have been finished during the period. As already explained all of the material, labor and indirect or overhead expenses of the currying department will be gathered together on the sheet of the "Goods in Process Ledger" covering goods in process-currying department, and that sheet will therefore show at the end of each cost period, the entire cost of operating the currying department for the period.

It will therefore be possible for the office to divide into the total cost of operating the currying department the number of pounds of leather which have been delivered by it to the belt shop during the same period and thereby determine the average cost per pound of all of the leather passing through that department.

### **The Adjustment of Values of Centres, Sides and Slabs.**

As already explained the reports of leather delivered to the belt shop will show separately the weights of centres, sides and where they are separated at this time, the slabs. The whole cost of each completed lot or of the deliveries on account of each lot which has not been completed can readily be determined by multiplying the number of pounds delivered by the average cost per pound as shown by the "Goods in Process Ledger Sheet" covering the currying department. Having ascertained the entire cost of each lot, or of the quantity delivered on account of each lot which has been completed, the next step should be to adjust the prices of the centres by adding to them the proper percentages of cost, and to reduce the prices of the sides and slabs proportionately.

Several methods of adjusting these prices have been suggested, some being based on the selling prices of the leather, or rather the belting produced from each quality of leather and others being based on the prices on which centres, sides and slabs can be purchased on the outside. We do not believe that it would be entirely fair to the sides to use the market quotations for the centres and slabs and to charge the difference between the total cost of those in each lot and the total cost of the lot to the sides, as it is apparent that should the prices quoted in the market be higher than those at which the leather is being produced in any plant, the sides will be charged with less than

they should be and the centres and slabs will be carried at a higher price than they should bear, while if the market quotations be lower than the cost at which the finished leather is being produced in a plant the centres and slabs will be carried at market values and the sides will have to bear the difference in cost.

It will be seen therefore that this method will not result in giving to the manufacturer the actual cost of the various portions of each butt which has been finished and is to be used in the belt shop. Neither do we approve of using the selling prices of the belting produced from the various qualities of leather as a basis for determining the cost of the various qualities produced, for the reason that these selling prices are constantly fluctuating and may be different in each or many of the plants manufacturing belting.

In our opinion the most reliable method of determining the cost of the sides and centres, as well as the slabs produced in the various plants, would be to use the average market quotations for centres, sides and slabs as a basis only. In arriving at the average market quotation for centres, the average price quoted for No. 1's, 2's and 3's should be considered the price quoted for centres. The same applies to the market quotations on sides. The slabs we do not believe are graded in this way. If they be; the average price of the No. 1's, 2's and 3's should be considered the price of slabs.

Having ascertained the average price per pound of a lot of leather which has been passed by the currying department to the belt shop, the value of the centres and sides or the centres, sides and slabs, if the slabs have been separated from the sides at this time, may readily be determined by determining first the percentage which the average market quotations for sides and centres bear to the average market quotation for slabs, whereupon these percentages should be added to the pounds of sides and centres which have been delivered to the belt shop in the lot for which it is desired to determine the prices for the sides and centres.

Having added the percentage to the pounds of sides and centres which have been produced, the revised pounds of centres and sides and the actual pounds of slabs should be added, and the total arrived at in this way should be divided into the total cost of the lot as shown by the "Goods in Process Ledger." The result will be the cost per pound of the slabs. To ascertain the cost per pound of the sides, the percentage which has already been added to the pounds of sides should now be added to the

prices of the slabs. The cost per pound of the centres may then be determined by adding to the cost per pound of the slabs the percentage which has already been added to the pounds of centres.

Having determined the cost per pound of centres, sides and slabs in this way, the actual pounds of centres, sides and slabs which have been delivered to the belt shop, on being multiplied by these prices will give the value of the centres, sides and slabs separately, and the sum of these three values will equal the entire cost of the lot, as shown by the goods in process record covering the currying department.

It will be seen therefore, that by determining the cost of the various parts of the butt in this way, the market quotations have simply been used as a basis for distributing the whole cost of each lot passing through the currying department and the costs resulting from this method are the actual costs of producing the centres, sides and slabs in the particular plant in which they were produced. This method of ascertaining the cost of the centres, sides and slabs will also make it possible to compare the cost in each of the plants with the cost at which these articles could be purchased on the outside.

### **First Quality Stock Stripped from Sides.**

According to the system described in the foregoing only the weight of the centres actually delivered to the belt shop will be priced at the value of first quality or centre stock at this time. In some cases, however, narrow centres are cut from butts which would yield wider centres and the sides will in these cases contain a sufficient quantity of first quality leather to produce first quality belting. Each butt will vary in this respect. The establishment of an average distance from the backbone to be considered centres would help to arrive at cost values, but this method is not thoroughly reliable and it would be practically impossible to separate the weight of centres from the weight of sides and to properly charge the belt shop with the leather delivered to it unless all centres were cut the average width which would be impossible. It is our intention therefore, to refrain from using averages for the purposes of determining the total quantity of first quality leather in each lot delivered to the belt shop and to determine the actual quantity of first quality delivered thereto by recording later the quantity of first quality which has been stripped from sides, which, as already explained, have been charged to the belt shop at this time as second quality leather.

## **The use of the Pound Basis in the Currying Department.**

The first operation in the belt shop will be cutting off the stretcher ends and straightening one side of each centre and the back of each side and slab, if the slabs be separated from the sides at this time, after which the sides will be graded according to weight per square foot and cut into strips to the best advantage.

While it will take just as long and cost just as much to perform these operations on light leather as it will on heavy, it would require a considerable amount of clerical labor to determine the cost of them in any other way than on the pound basis; and as this cost is comparatively small, we are of the opinion that that basis will be sufficiently accurate at this point for all practical purposes. The labor cost of these operations should be charged to a separate sheet of the "Goods in Process Ledger" to be known as the "Goods in Process" ledger sheet covering "Stripping and Straightening."

### **Report of Deliveries to Stripped Stock, Form 10.**

The cutter, at the time of cutting the strips, should of course take advantage of all cases in which first quality strips may be cut from sides, and when his work has been completed each day or during each day, he should deliver to the rack the strips cut. At that time the strips must be assorted according to quality and width to be paced in the proper compartments of the rack and by simply separating the first quality strips from the others and weighing them, the actual weight of the first quality recovered from the sides charged to the belt shop as second quality may be determined and recorded. This weight should be reported to the office daily by means of the Report of Deliveries to Stripped Stock, on which the first quality cut from sides should be shown separately. A continuous record of the lots received from the currying department should be kept in the office on the "Record of Yield of Lots" to show the average cost of the centres, sides and slabs delivered to date; and on this record the weight of the first quality strips taken from sides should be added to the total weight of first quality delivered and deducted from the total weight of second quality delivered, as shown by that record. Once a month or at any other convenient period, such as the time of ascertaining the cost on a lot just delivered to the belt shop, will be sufficient to take care of this, the reports being tabulated in the meantime.

The average cost of the centres, sides and slabs as shown

by the continuous record of yield of lots should then be adjusted to take care of the additional centre stock which has been recovered from the sides. This can readily be done by simply changing the number of pounds of centres and sides in accordance with these reports and refiguring the averages in the manner already described.

It will be seen that by means of this method an absolutely reliable record as regards the first quality leather secured from the various lots of leather passing through the currying department can be secured, also a reliable record as regards the stock which is in the racks awaiting the processes of manufacturing into belting. This scheme will also, we believe, eliminate troubles which have been experienced in the past in some shops through charging all sides as second quality and later using the first quality leather recovered from them for first quality belting without adjusting the prices .

### **Report of Waste in the Belt Shop, Form 12.**

The waste cut from centres in straightening may readily be kept separate from that cut from sides and slabs and both should be weighed, these weights should be reported to the office as the waste is assorted by means of the Report of Waste in the Belt Shop. The weight of the straightenings should be credited from this report to "Finished Leather" at actual cost and charged to "Goods in Process, Straightening and Stripping."

The total quality of leather used to produce strips as shown by the weights of the strips on the Report of Strips delivered to stock should then be charged from that report to "Goods in Process, Straightening and Stripping," and credited to finished leather account, which will show at all times the value of the unstripped leather on hand in that belt shop. The weight and scrap value of the straightenings should then be credited to "Goods in Process, Straightening and Stripping" from the Report of Waste in Belt Shop and charged to the proper scrap account. The straightenings should be credited at scrap value or at the value which it is expected that they will bring on being sold as scrap.

The overhead expense of these operations, which will be determined by us, should then be charged to "Goods in Process, Straightening and Stripping" in the manner which will be described later, and that account will then represent the whole cost of the strips delivered to the rack. The first, second and third quality leather charges should be made to this sheet

separately, and as the labor and overhead cost of each strip will be the same per pound and the material cost of each will be shown, the cost of the various grades and sizes may be determined. This cost should be charged to "Stripped Leather" account and credited to "Goods in Process, Straightening and Stripping" from the Report of Deliveries to Stripped Stock, the latter of which should be closed out by this entry. "Stripped Leather" account will then show the value of the stripped leather in the rack at all times.

There is no way of knowing at the present time in most of the leather belting plants the amount of the investment in finished leather or stripped stock, which may be very much more than it should be. One reason for this is that the cutters are not informed in a reliable manner relative to the requirements in strips, and work to keep the racks supplied with the various qualities and widths regardless of the actual requirements.

The weight of the strips required to produce any quantity of belting can readily be determined, and by keeping a stock ledger showing the quantity of each quality and width in the rack at all times and entering therein the requirements as the orders are received, it will be possible to advise the cutter daily regarding the requirements, thereby placing him in position to keep the investment in stripped stock at its minimum.

We understand, of course, that this will not entirely eliminate the stripping of stock in excess of actual requirements, but it will do a great deal towards reducing the investment in such stock. There can be no doubt that it is better to carry extra stock as finished leather rather than as stripped stock, as this permits of stripping to meet the requirements of orders, and avoids the necessity of tying up stock for a considerable period where the requirements change suddenly.

### **Belt Shop Operations on Stripped Leather.**

Up to this point it is practicable to determine labor, material and overhead costs on the pound basis, but from this point on the pound basis cannot be applied so readily.

It is quite evident that the labor cost of matching a six-inch belt would not be three times that of matching a two-inch belt of the same quality. Neither would it take three times as long to match a six-inch belt; but in figuring on the pound basis the six-inch belt would be charged with three times the labor cost and three times the overhead cost of this operation. In the event that the narrow belt was of lighter material the excess charge

on the wide belt would be even greater. The same applies to scarfing, squaring points, feathering, press work, trimming and polishing. Furthermore, the cost of whitening and cementing doubles or whitening, cementing and buffing the grain off the middle plies for multiple ply belting, which has nothing whatever to do with single belting would, on the pound basis, be included in the cost of singles as well as doubles and multiple ply belting and it would be a very difficult matter to establish differentials which would place these charges where they belong. The extra cost of waterproof cementing would also be included on all belting unless reliable differentials could be established, which would also be a very difficult matter.

### **Report of Stripped Leather Issued for Use, Form 13.**

The Material cost of the belting produced in the belt shop should, of course, be figured on the pound basis; and this cost may readily be determined by ascertaining the percentage of waste in the belt shop and the sales value of the scrap. In order to determine the percentage of waste in the belt shop, it will be necessary to weigh the quantity of each quality and width of strips given to the matchers and to weigh the quantity of each quality returned by them when the laying out of the rolls or special belts has been completed by them, the difference being the quantity of each quality to be used in the belt or roll which is to be produced. These quantities should be credited to "Stripped Leather" account and charged to "Goods in Process, Belt Shop," as material, the values being taken from the stock ledger. We do not mean to say that these entries must be made for each lot. These reports may be passed to the office daily by means of the Report of Stripped Leather issued for use.

By crediting these quantities in the stock ledger already described, the quantities and values of all qualities and sizes on hand will at all times be apparent therein and may be compared with the requirements.

### **Report of Belting delivered to Finished Stock, Form 14.**

### **Record of Percentage of Waste in Belt Shop, Form 14-A.**

All belts manufactured are weighed after completion and these weights should be recorded on a report of belting delivered to stock less an allowance for rivets where they are used. It is therefore evident that by tabulating the weights issued from the rack and the net weight of the belting produced, the percentage



of waste in the belt shop may readily be determined in pounds in a manner which is entirely reliable and which necessitates a very small amount of clerical labor either in the shop or in the office.

Knowing the quality and size of strips required to produce any given belt, its average cost per pound and the finished weight of the roll or special belt to be produced from it, the cost of the material required to produce it will be its actual finished weight plus the average percentage of waste in the belt shop of the quality and size of strips required to produce it, at the average cost per pound of the strips, less the average sales value of the waste in the belt shop.

All of the waste of belt shop should be assorted under the various classifications of waste so that it may be sold to the best advantage. The waste of each operation need not be separated for cost purposes; but it would be well to do so to make sure that proper care is being exercised by each operator to prevent waste as far as possible. The quantity of each classification of waste should be credited to "Goods in Process, Belt Shop" and charged to the proper waste account at the price which it should bring. On being sold, the amounts realized through the sales of the different classifications of waste should be credited to the waste accounts, which will then show whether or not the amounts, which have been estimated have been realized, and will make it possible to transfer the difference into costs, thereby making the costs absolutely accurate as regards the allowances for waste.

The waste in whitening doubles and in whitening and buffing the grain off of multiple belting should be considered separately and its percentage should be added to them only. This percentage should be added to them in addition to the other waste of the belt shop which affects them in the same manner as it does single belting.

The labor cost of producing belting may be obtained more accurately on a footage basis than on a pound basis in the belt shop, for the reason that time required to perform most, if not all, of the operations of the belt shop is about the same for one width and quality as another. Doubles should be charged with twice the footage of singles and with the whole cost of additional materials and operations required by them. The time used in cementing water-proof belting may readily be separated from the rest and should be charged to that only. The footage produced can readily be determined for any period, and if the footage basis of charging labor and overhead be used throughout

the belt shop, the division of the footage produced into the labor and overhead of water-proof cementing will determine the average cost per foot of this operation.

Should it be desired to obtain further details in some of the larger shops, the labor cost of each operation and the quantity of each size passing through may readily be determined and the cost per unit may be obtained by dividing the latter into the former. This information may be determined by sizes also without much trouble, if required. It must be remembered, however, that each additional detail which may be required will necessitate further reports and additional clerical work and will thereby increase the cost of cost keeping. We believe it would be well therefore to avoid calling for information which can be dispensed with, and to outline a system which goes into sufficient detail to make it entirely practicable but which eliminates all unnecessary details.

### **Cost Calculation Sheet, Form 15.**

One of the principal reasons for establishing a cost system in any plant is to enable the management to readily estimate or calculate in a reliable and accurate manner the cost of any article of product produced in its plant. A system which will not do so is of very little use to the manufacturer.

In designing a system therefore for use in the leather belting business, which is a line of manufacture which consists of several continuous processes, we have so arranged matters that the average cost of each of the processes may be determined accurately on either the pound or the footage basis depending upon the operation being performed, and so that the percentages of waste of materials may also be determined accurately by ascertaining the average waste of the various divisions of the works. This being the case, it is evident that, as all of the raw leather goes through exactly the same processes in being finished, straightened and stripped, and as all of the finished leather goes through practically the same processes in the belt shop, the fact that the finished footage, quality, width and weight of all of the product of the belt shop are known, will enable the manufacturer to add to the finished weights the proper percentage of waste to cover the waste of his plant and to charge to each quality and width of belting produced the amount of labor and overhead expense which should be included in the cost of the belting.

In order to simplify the work of calculating the cost value of the various lots of belting produced or which it is desired to

produce, we have provided the cost calculation sheet which provides for showing the quantity of stripped leather required to produce each quality and width of belting by showing first the finished weight of the belting less any allowance which may be necessary for riveting and adding to it the average percentage of waste in the belt shop. It is understood, of course, that the total amount of stripped leather to be used, which will be the finished weight of the belting plus the waste, will be priced, at the cost of the stripped stock as shown by the stock ledger, which is the actual cost of the stripped leather as determined by the goods in process ledger sheet covering straightening and stripping.

Having ascertained the total quantity of stripped leather required to produce any belt and having ascertained the cost of that quantity, the next step should be to deduct the average percentage of waste of the belt shop at the average scrap value of the waste.

Materials other than leather, such as cement, rivets, etc., are used in the belt shop in connection with the production of finished leather belting. It is understood, of course, that in determining the finished weight of a belt, the weight of the rivets will be deducted where they have been used. The weight of the cement may be ignored. The average cost per pound or per foot of finished belting to be added for materials such as cement, may readily be determined from the goods in process ledger sheet covering the belt shop and these should next be added.

As explained in describing the "Goods in Process Sheet" covering the belt shop, it is the intention to ascertain the labor cost as well as the overhead cost of the various operations performed in the belt shop on a footage basis rather than on a pound basis. The total footage produced by the belt shop in any given period or in all of the periods to date, divided into the total labor cost of the belt shop for the same period or periods will give the average cost per foot of the belting produced, the same is true of overhead, and knowing the footage of the belting which is being calculated, it will therefore be a simple matter to determine the labor and overhead cost of that footage by referring to the goods in process sheet covering the belt shop. These costs should then be filled in on the cost calculation sheet.

There will always be a certain amount of goods in process in the belt shop, but it will be a comparatively simple matter at any time to determine the footage passing through the belt shop. It will therefore be possible to consider this footage and to make proper allowance for it in determining the average labor and

overhead costs of the belting passing through the belt shop during any given time.

The cost of any manufactured article or product consists of three elements, namely; material, labor and overhead. Having ascertained the cost of each of these elements and having added the three, the result, will be the cost of the quantity calculated of the finished product of the belt shop. This form will, therefore, enable each manufacturer to determine his costs on each order of belting passing through his belt shop in the same manner as costs are being determined by all of the other manufacturers in the Exchange and in a way which will be absolutely reliable and accurate.

Having ascertained the cost of each different classification of belting produced in the plant by means of the cost calculation sheet already described, these sheets should be placed on a binder in the office where they may be readily referred to when it is desired to price the deliveries of finished product to stock as they are reported each day by the belt shop. The reports of deliveries to stock or to finished product should be priced from the calculation sheets which should be corrected from time to time in the event that the averages shown by the "Goods in Process Ledger Sheet" covering the belt shop change from time to time.

On being priced, the reports of deliveries to finished stock should be extended and the quantities and values of the various rolls and belts delivered to finished stock should be charged from the reports into the "Finished Product Stock Ledger." The values as shown by these reports as well as the footage shown by them should be added at the end of each cost period to determine the total number of feet of each kind of belting and the total cost value of each kind of belting which has been delivered to finished stock during the period. This total footage and total value should then be credited to "Goods in Process, Belt Shop" and charged to "Finished Products."

### **Comparative Statement of Profit & Loss, Form 16.**

The finished product stock ledger will then show the quantities and values of all finished product which has been delivered to the finished storeroom, and by crediting the various pages of this ledger with the quantities sold or removed from finished stock for any reason, which can be done in the case of sale by analyzing the sales invoices and in the case of removals for any other reason, by means of requisitions, the understanding being that belting cannot be removed from the finished storeroom

except on receipt of a sales order or a requisition. The sum of the values of these requisitions as well as the cost values of the sales should then be credited to "Finished Product" and the values, that is to say the cost values of the belting drawn on requisition should be charged to the account shown by each requisition while the cost value of all of the belting which has been drawn for sale should be charged to "Cost of Sales." In this way it will be possible at the end of each cost period to prepare a profit and loss statement which will show the sales, the cost of sales and the gross profit, all of which can be sub-divided to suit the desires of the management of each individual business, also the selling and administrative expenses, miscellaneous items of income and expense and the net profit for the period, which information cannot be determined accurately in any other way than by means of a reliable cost system.

### **Comparative Statement of Factory Expense, Form 17.**

The comparative statement of factory expense, which we have provided is intended to be used for the purpose of determining the total overhead or indirect expense chargeable against each of the departments of each plant. It will be seen that these expenses have been sub-divided under the heading of "Miscellaneous Factory Expenses" or "General Expenses," which will include the salary of the superintendent, the wages of the watchman, the salaries of the factory office and all miscellaneous labor and supplies required in connection with the operation of the factory as a whole.

Under the heading of "Currying Department Expense" we have included the expense incurred in connection with the operation of the currying department only. Under the heading of "Straightening and Stripping" we have included the expenses of those two operations, which we have divided in this way to make possible determining the accurate cost of the stripped leather placed in the rack. Under the heading of "Belt Shop" we have included the expense of the belt shop only.

The labor charges under each of these headings will, of course, be taken from the payroll, and in the event that no further sub-division is necessary, they may readily be determined from the payroll by simply segregating thereon the employees of the various departments. The charges for supplies will be made to the "Supplies" account either from requisitions in the case that the supplies are withdrawn from the storeroom or from the invoices in the event that the supplies are purchased

for one purpose only and delivered at once to the department. Repairs will be charged to these accounts from the reports of the employees who are engaged in making repairs in the different departments. The fixed charges will be determined by us for each of the departments, and we will leave with the bookkeeper of each plant a schedule showing the method of distributing these charges and full instructions relative to the charges to be made to each department or operation at the end of each cost period. The "Sundries" account has been provided to take care of items not covered by any of the other classifications of expense. The proportion of general factory expense will be the portion of the expenses enumerated under that heading which should be charged to each of the departments, namely; the currying department, the straightening and stripping department, and the belt shop, which will be determined by us and in connection with which we will leave instructions with the bookkeeper of each plant.

In all cases where a plant maintains its own power plant a separate set of accounts will be provided to take care of the expenses of the power plant. The same is true of plants which maintain their own repair and machine shops also of those which have their own garages or stables.

When all of the charges have been properly distributed to the manufacturing departments the three sets of accounts covering the three manufacturing departments will show the entire amount of indirect or overhead expense chargeable to those departments. The total expense of the currying department should be charged to the "Goods in Process Ledger Sheet" covering the currying department, that shown by the set of accounts covering straightening and stripping should be charged to the "Goods in Process Ledger Sheet" covering those operations and the total amount chargeable to the belt shop should be transferred to the "Goods in Process Ledger Sheet" covering the belt shop at the end of each cost period. The method of transferring the labor charges to these "Goods in Process Ledger Sheets" has already been described and also the method of determining the amounts of the material charges to them. When all of these three charges have been made to these sheets they will show the entire cost of maintaining or operating the three manufacturing departments for the cost period covered and it will then be possible to determine from the goods in process ledger sheets the cost per pound or per foot, as the case may be, of the output of each during the same period.

### **Comparative Statement of Selling and Administrative Expense, Form 18.**

The comparative statement of selling and administrative expense is intended to show at the end of each cost period the total selling and administrative expense of the period, classified in such a manner that each of the items of expense may be compared from period to period. This statement as well as the comparative statement of factory expense provides for comparing the expenses of the current month or period with the accumulated expenses for a certain period to date so that increases or decreases in the expenses of the various periods may be called to the attention to the management and investigated if necessary. The comparative profit and loss statement provides for showing the sales, cost of sales, gross profits, less selling and administrative expense and miscellaneous items of income and profit and loss so that the net profit of each period may be determined at the end of each period. This statement also provides for comparing the results obtained in the current period with those obtained during the fiscal period to date and also for showing the increases or decreases during the different periods.

### **Balance Sheet, Form 19.**

The balance sheet which we have provided will show at the end of each cost period the assets and liabilities of each company, the net earnings for the fiscal period to date and the profit and loss for the current period which latter of course, agree with the showing of the profit and loss statement of the same period.

### **General Remarks.**

In conclusion, I wish to say that the forms and statements which we have presented here today are not tendered to be fitted for use in all of the plants engaged in the manufacture of leather belting. It is more than likely that some of the larger plants will require more detailed information than is taken care of by means of these forms. It may be necessary in some of the plants to determine the cost of each operation in the belt shop separately, and if this be desired there is no reason whatever why we cannot so arrange matters, but in this case it will be necessary to modify the forms and statements to some extent. The general scheme will, however, be the same, and the results which will be obtained from the more elaborate system will also be obtained from the simpler ones as regards the final cost of the

articles of product. In a large plant however, where the operations are continuous and an employee is engaged constantly on one operation, it may be possible to gain something in the way of efficiency by comparing the costs by operations instead of in a general way. The forms and statements submitted at this meeting are simply intended to show the plan of cost keeping in a general way and will be modified by us to suit the conditions found in all of the plants at the time of designing and installing the individual systems for them.

The use of time records, job cards, special office appliances, calculating machines, adding machines, etc., will also receive proper consideration at the time of installing the individual systems and where such appliances will be beneficial, they will be recommended by us and our reasons will be given for recommending their use.

The forms and statements finally decided upon for use in each of the individual plants will be fully described by us, and a written report will be left with each concern giving full instructions relative to their use and there is absolutely no reason why our instructions cannot be followed by any intelligent book-keeper who receives them, after he has received a reasonable amount of coaching from our representative.