COST OF HANDLING POTATOES IN THE LOCAL MARKETS

A THESIS

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CHAPTER I

INTRODUCTION

The purpose of this thesis is to give a brief description of the potato marketing system, showing the place of the local concerns in the system, describing them and their business practices; to give a complete accounting system for local concerns; to state difficulties encountered in applying this system to past records; and to analyse and summarise the data thus obtained.

POTATO MARKETING SYSTEM IN MINNESOTA

The perishable nature of potatoes makes them far more difficult to handle than less perishable products such as grain, warmer storage facilities must be maintained and a large part of the crop must be shipped in heated refrigerator cars. All of the crop with the exception of a small part used for starch when the supply is large and prices low, is sold to consumers without passing thru any manufacturing process.

Minnesota produces for sale about 25,000 carloads of potatoes annually, which with the exception of the early potatoes grown near the Twin Cities are all harvested in a comparatively short period in October and November. One of the chief marketing problems arising is to provide suitable storage facilities as the crop has to be marketed over a period of approximately eight months. Part of the crop is stored in pits and cellars on the farms, but it is very difficult to remove the potatoes and haul them to shipping points after cold weather sets in. In the fall some potatoes are hauled into the Twin Cities by trucks and a considerable amount is bought and loaded directly into box cars, but the local warehouses receive, grade and sack most of the crop, and are the chief means of

storage in this state: only a comparatively small amount of storage for potatoes is provided in the Twin Cities.

Minnesota potatoes find their destination in approximately 29 states and Canadian Provinces, but the importance of these various outlets varies depending on size and conditions of crop here and in other regions. "For instance if Michigan has a short crop, relatively more Minnesota potatoes will go to Illinois, Ohio, Pennsylvania, and other states east of Mississippi River. Likewise, when Colorado has a short crop, Minnesota potatoes compete more successfully in Kansas, Nebraska, and Oklahoma. At least 40 per cent of Minnesota potatoes are sold for seed. (1)

At present the marketing system in Minnesota is characterized by the lack of any strong central produce exchange or central market. Three years ago the Minnesota Potato Exchange started business. It was connected with most of the cooperative potato shipping associations in Minnesota and a few in North Dakota and South Dakota. During 1920-21 it handled 2,405 cars of potatoes and sold supplies to its members to the amount of approximately $300,000. It made an income great enough to cover costs and pay a part of its organization expenses. During 1921-22 it lost heavily as its volume of business had fallen off 23 per cent. And this year altho it is still doing some business it is not an important factor in the marketing system.

The Exchange did not market the potatoes directly to buyers but sold them thru the North American Fruit Exchange and the Federated Fruit and Vegetable Growers Incorporated. In this respect they were really an extra middlemen which did not add sufficient service to justify its existence.

Failure cannot be attributed to any single cause but aside from the one already mentioned other causes were, general business conditions with falling prices, poor management and lack of control over quality and supply

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(1) Minn. Bul. # 195. Local Cooperative Potato Marketing in Minnesota, page 43.

A movement is now on foot to reestablish a central exchange which will have more control of grading, handling and distributing of potatoes than the present Exchange, and which will be assured of a larger volume of business by long-time contracts with producers who will agree to market their potatoes thru the Exchange.

Undoubtedly the most important factors in the potato market are wholesale potato dealers who handle more of the crop than any other agency: they own, rent, and operate on joint account large numbers of local warehouses, and handle potatoes on a commission for other local concerns. These wholesale dealers have their central offices in the Twin Cities: from there they direct the management of their local branches instructing the local managers what price to pay, the quality of potatoes to buy, when and where to ship. All sales are made by the central offices; some are made direct to retailers, some to jobbers and some to wholesale grocery houses, but most of the sales are made thru brokers in other cities. Most of these wholesalers own no storage facilities in the Twin Cities. However, they frequently rent storage in the Twin Cities to care for potatoes purchased by their truck buyers or for temporary use when cars have to be unloaded or reconditioned.

The portion of the crop not handled by the wholesalers is sold by the local concerns direct to retailers, jobbers, stores and farmers clubs or thru brokers and commission firms in the Twin Cities and other central markets.

LOCAL SHIPPING CONCERNS

Local potato shipping concerns may be classified on the basis of ownership and operation as follows:

1. Independent dealers. The independent potato dealers own or operate one or more warehouses in the same town and do their own buying and selling. They often run the potato warehouse in connection with some other enterprise such as the handling of hay, feed, flour, fuel, machinery, or in connection with a

general store.

2. Local wholesalers. These dealers have a central office at some country market where they have one or two warehouses. In addition they own and operate a number of warehouses in nearby surrounding towns. They may carry on other enterprises but they usually confine their activities more strictly to the handling of potatoes than do the independent dealers.

3. Wholesale dealers. These have all ready been mentioned in describing the market system. They are large companies, either corporate or private, with central offices in the Twin Cities, that own and operate branch houses in practically all the potato shipping points in the Minneapolis potato market area. As a rule they confine their business strictly to potatoes.

4. Farmers cooperative associations. In this class of dealers is included all local potato marketing agencies that are farmer owned and operated and that handle potatoes as the main business, or as a side line of cooperative elevators, creameries, livestock shipping associations or stores. When handling of potatoes is the main line they often handle paris green and such other supplies as are commonly handled by the private dealers.

5. Track buyers. They consist of private dealers or agents of private dealers, wholesalers or concerns in other states that go to shipping points during the harvest season and buy potatoes for cash, loading them directly into boxcars for shipping. No definite records can be obtained of cars handled this way, but it appears to be a considerable number. One wholesale dealer for example reported as having bought over 400 carloads in one season in this manner. The track buyers have an important advantage over their competitors in that all expenses connected with

warehouses such as taxes, insurance depreciation are eliminated as well as most of the equipment costs. In some cases sorters are used but often potatoes are bought "field run".

BUSINESS PRACTICES

Business practices may be divided into two general groups, namely, buying for cash and pooling and storage.

Private dealers, branch houses and about 1/3 of the cooperative associations pay the growers cash, receiving full ownership of the potatoes at time of purchase and taking all losses and gains due to cost of handling and price changes. Competition is usually very keen and in the majority of cases the farmers receive a fair price for their product. Some wholesalers have said that at a few shipping points too many warehouses have been built so that their business has fallen off more than half and now none of the dealers get a sufficient volume of business to keep overhead costs per unit of product handled at a minimum, that competition instead of increasing prices has increased the margin that all dealers must charge in order to realize expenses.

Buying for cash may be divided as to means of financing. All wholesalers and some of other dealers pay cash and finance the purchases themselves, but often private dealers and some cooperations will buy on a commission or joint account for wholesalers. In buying on a commission, the wholesaler furnishes the capital and often the sacks. He sends out notices as to the price which can be paid and he assumes the storage and the marketing risks; The local buyer receives a commission ranging from 10 to 15 cents per hundred weight, for which he must furnish all labor, buildings and equipment. From the wholesalers point of view this method is very satisfactory.

In buying on joint account the wholesaler furnishes all of the capital and from 1/2 to all of the sacks. He directs the buying by keeping the local concerns posted as to the daily prices and he takes complete charge of the selling.

The local concern furnishes labor, buildings and equipment and does all the buying. All losses and gains are shared equally. From a cooperative point of view this is not a good method as the wholesaler is interested in buying on a circle margin so that his share of the gains will be larger. All he gains in this way the producers lose.

Pooling is the method followed by most of the cooperative concerns, the grower retains ownership of potatoes until they are sold in the central market. In this way the grower finances the shipments and waits for his receipts until returns from central market are prorated. Many problems arise in connection with pooling such as period of pool, methods of prorating direct and overhead expenses and methods of caring for variations in quality.

Selling on a commission is another practice which has been followed in a few cases. It is similar to pooling in that grower retains ownership until potatoes are sold in the central market. He must also furnish all of the sacks.

A flat rate of so much per hundred weight is usually agreed upon at the beginning of the potato marketing season and is used as a basis for handling potatoes for the entire season.

Potatoes are stored in most local warehouses either as property of the concern or of the farmers. In storing for farmers some cooperative associations store free of charge for members and some dealers store free for the first thirty days if potatoes are sold to them; but usually a charge is made at some definite rate per bushel or hundred weight per month or season. No general rule is followed and the charges are seldom based upon real costs. Ordinarily they are merely estimates of the cost.

Potatoes in storage have to be properly ventilated and kept at a uniform low temperature. The problem of ventilation is solved by installing a ventilating system when houses are built.

It is often difficult to regulate the temperature. Potatoes give off enough heat to prevent freezing in most basements, but where first floor space is

used for storing it is necessary to use stoves for heating. These stoves must be tended to at least twice daily.

There is always a considerable loss in weight and quantity of salable potatoes from storing, depending on the quality of potatoes stored, storage facilities and length of time kept in storage: when clean healthy potatoes are properly stored, the loss is primarily due to evaporation, but when the general run of potatoes are stored there is often considerable loss from diseases of various kinds. Potatoes infected by blight, black leg, or other diseases may appear healthy in the fall, but rot completely in a few months. When dirty potatoes are stored the dirt dries up and falls off causing some loss in weight. There are also chances of loss from freezing and over heating and the owner runs the risk of loss in value due to price fluctuations. (1)

TERMS OF SALE

F. O. B. shipping point is the method followed by most local independent and cooperative dealers, altho they make occasional sales by other methods. In this case price applies to shipping point either on day of sale or on arrival at destination and the buyer pays all charges.

Track sales are sometimes made and they differ from f. o. b. sales in that prices always apply to shipping point on day of sale.

To arrive sales are most common with wholesalers. The price applies to destination at time of sale and the seller pays all charges.

Delivered sales are sometimes made in which price applies to destination on day of arrival and seller pays all charges.

Future sales, a common method of sale in the grain market, are sometimes made in marketing seed potatoes. The contraction of sale is made in the fall of the year for delivery of potatoes in the spring. The price, quantity to be delivered, quality or variety to be delivered and the time of delivery are stipulated at the time the sale is made.

(1) Reference. A more complete description of business practices is given in Minn. Bul. No. 195. "Local Cooperative Potato Marketing in Minnesota".

BUILDINGS AND EQUIPMENT

A few potato warehouses are constructed of hollow tile, concrete block or brick, but most of them are frame buildings set on a central foundation. In a few cases the foundation is extended up several feet to form part of the wall. Practically all of the warehouses are 40 feet wide and a majority are 60 feet in length, but lengths ranging from 40 to 100 feet are not at all uncommon. Warehouses are built with or without basements and are only one story high. Very few of the buildings constructed several years ago have basements but practically all erected in the last few years are provided with full basements.

Potato warehouses differ especially in their construction from that of other buildings by having extra well constructed walls and seldom any windows. Too much light is injurious to the potatoes and windows add to the difficulty of keeping an even temperature. The walls are quite thick, containing a wide dead air space and being insulated with a heavy layer of flaxemum and one or more layers of building paper in order to make the building warm and frost proof.

Racks and linings are used to keep the potatoes about four inches away from the walls and floor, especially in the basements. When linings are not used on the first floor the bins are usually arranged so as to leave an aisle about two feet wide between the bins and the wall. This is necessary in order to secure complete circulation of the air and to prevent freezing. Special air intakes and outlets are provided in order to secure complete ventilation which is very essential to proper storage.

In some cases stoves placed in the basements supply all the artificial heat needed, in other cases stoves have to be placed both in the basement and on the first floor. In a few warehouses with deep basements no artificial heat is needed in the basement and stoves are used only on the first floor.

A corner of the warehouse is usually partitioned off for an office. The sections called offices vary from that of being only a shelf nailed to that

of being a well equipped room. This room may be a part of the main building or an addition built especially for an office. In a few instances especially where the potato business is a side line of an elevator or a store, an office is maintained in some other building.

When products other than potatoes are handled a portion of the warehouse is usually partitioned off for that purpose, or a shed of cheaper construction is built in one end of the warehouse. When dump scales are used for receiving they are usually covered by a shed built against the side of the warehouse and arranged so that a wagon load of potatoes can be driven thru. A few of these sheds are long enough to be completely enclosed to give protection to the team and produce while the potatoes are being received during cold weather.

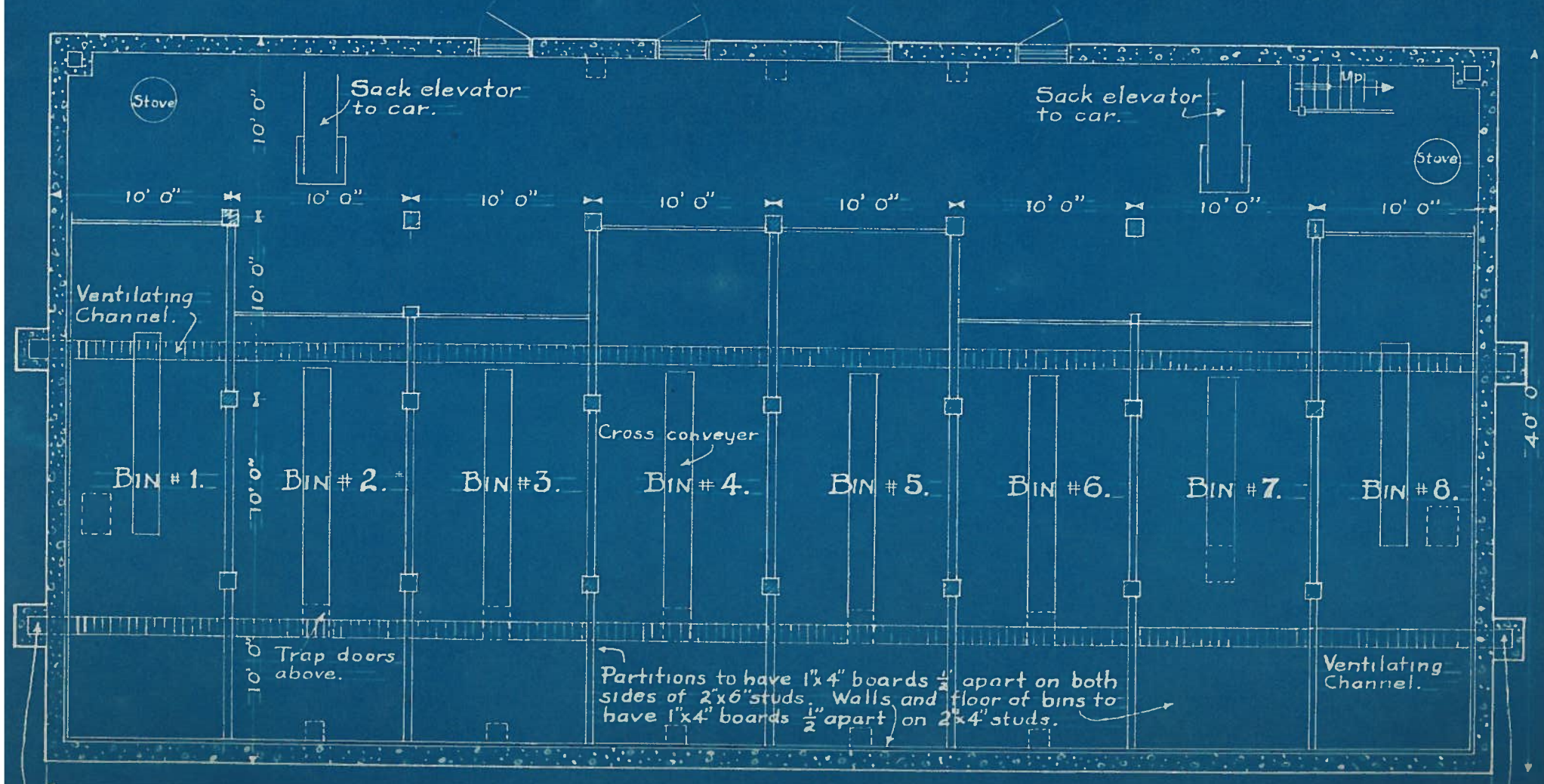
The following blue prints show the cross section view of a basement and first floor plan of a 40 x 60 foot warehouse. This arrangement is a little more modern than that found in most of the warehouses built several years ago. This warehouse is also planned with modern equipment, something that is not found in many warehouses.

There is a very wide range in the amount of equipment used in warehouses Some have only one small sorter nearby a gasoline engine while a fully equipped warehouse according to the latest ideal has dump scales, elevators, sorters, complete set of conveyers and hoppers. In most houses with any degree of modern equipment all power is generated by electric motors.

When simple machinery is used the farmer shovels his potatoes into a chute (hole in the wall). The potatoes are elevated over the sorter and dropped into sacks. These sacks are set on scales and held open by a simple device called a sack holder. One man runs the sorter, picks out the cull potatoes and does the weighing. The sacks are filled and set aside, without sewing, and when all of the load is received the same man sews the sacks and trucks them to other parts of the warehouse. During the busy season an extra man is employed to sew and truck away the sacks. When potatoes are stored in bulk the wagon is weighed before and after

POTATO WAREHOUSE.

Total Capacity = 22,000 Bushels.



BASEMENT PLAN.

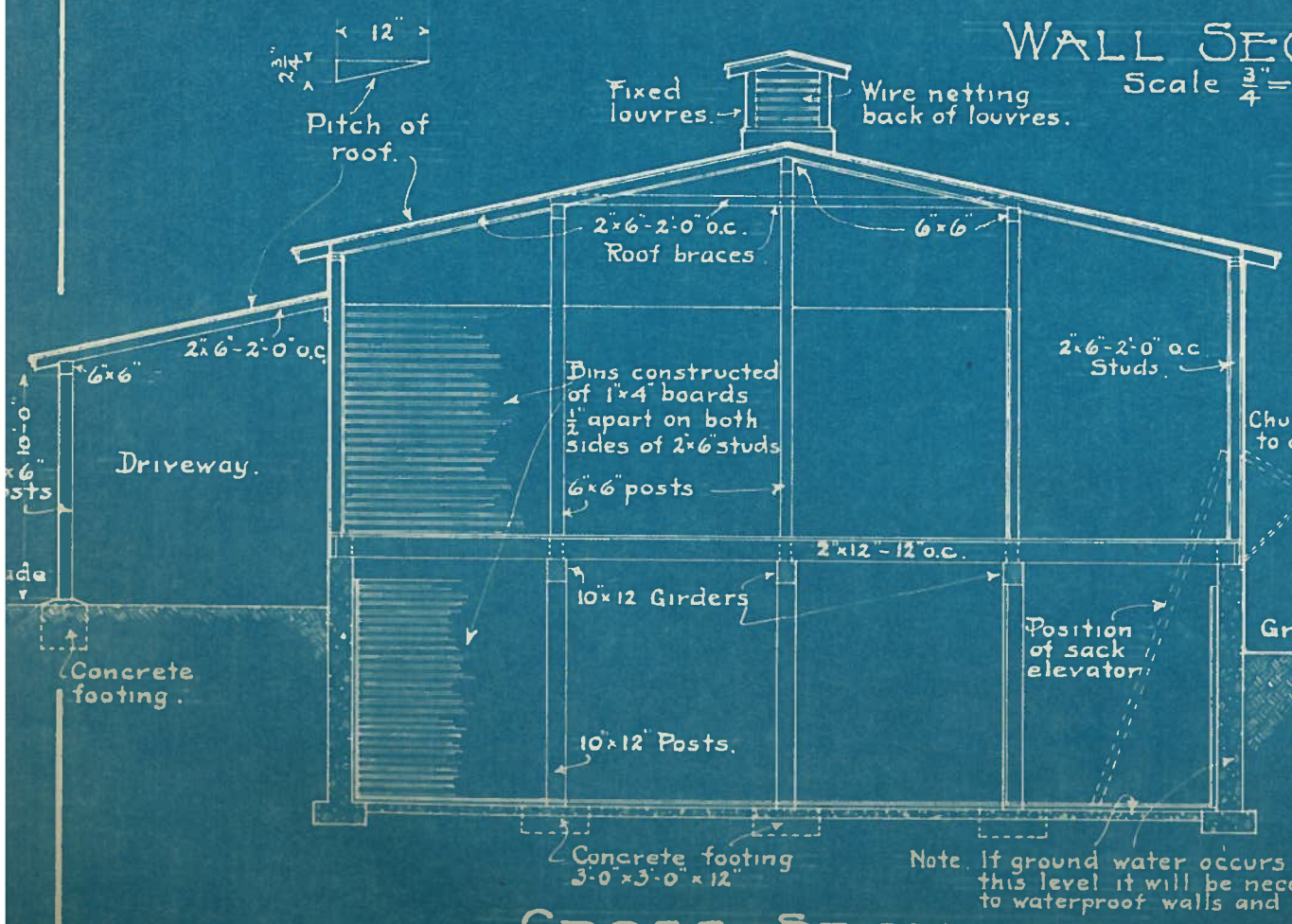
Scale ⅛"=1'-0".

Note- For first floor plan, see Plan # 160, Sheet "S".
For Cross Section, see Plan # 163, Sheet "S".

POTATO WAREHOUSE.

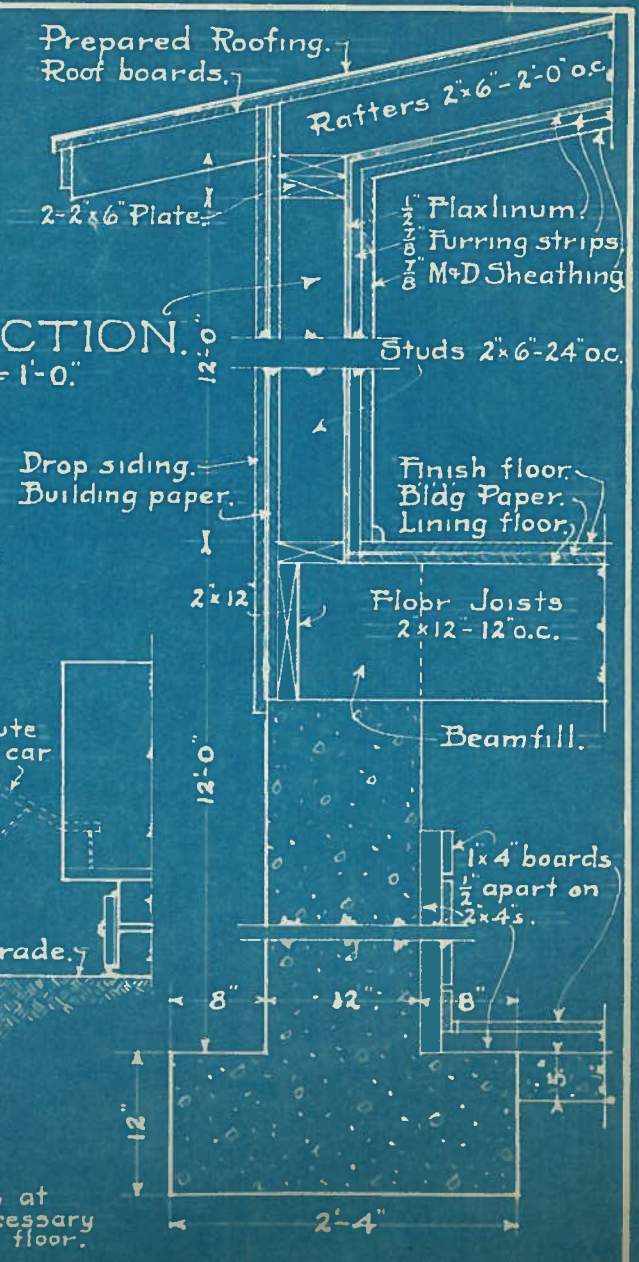
CROSS SECTION.

Scale $\frac{1}{4}$" = 1'-0"



WALL SECTION.

Scale $\frac{3}{4}$" = 1'-0"



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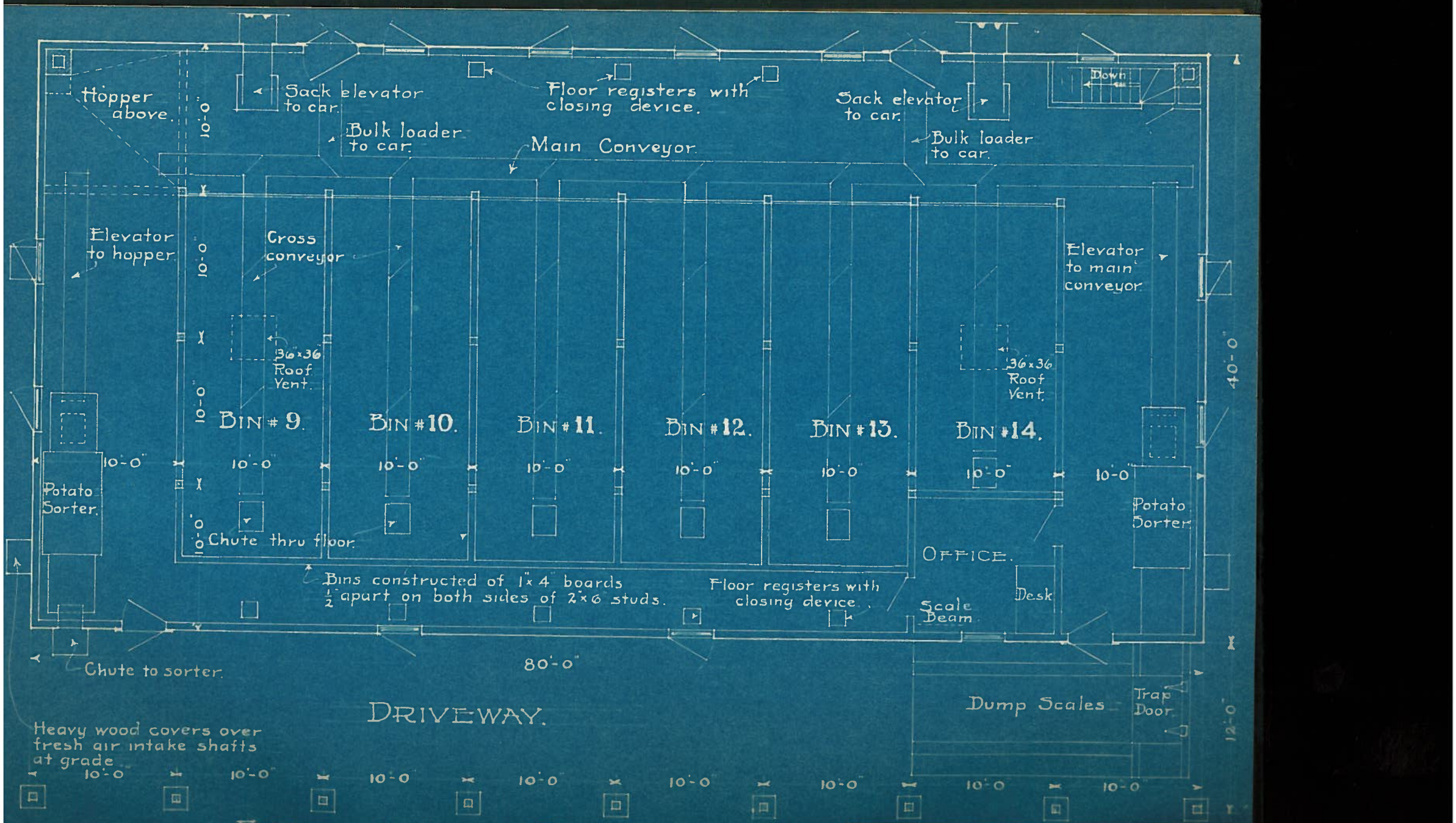

FIRST FLOOR PLAN.

Note - For basement plan see Plan # 159

Hopper above.

Sack elevator to car.

Bulk loader to car.

Floor registers with closing device.

Main Conveyor

Sack elevator to car.

Bulk loader to car.

Down

Elevator to hopper

Cross conveyor

Elevator to main conveyor

36×36 Roof Vent.

36×36 Roof Vent.

BIN # 9. BIN # 10. BIN # 11. BIN # 12. BIN # 13. BIN # 14.

10'-0" 10'-0" 10'-0" 10'-0" 10'-0" 10'-0" 10'-0" 10'-0"

40'-0"

10'-0" 10'-0" 10'-0"

Potato Sorter.

Potato Sorter.

Chute thru floor.

OFFICE.

Desk

Bins constructed of 1"×4" boards ½" apart on both sides of 2"×6" studs.

Floor registers with closing device.

Scale Beam

Chute to sorter.

80'-0"

DRIVEWAY.

Dump Scales

Trap Door

12'-0"

Heavy wood covers over fresh air intake shafts at grade

10'-0" 10'-0" 10'-0" 10'-0" 10'-0" 10'-0" 10'-0" 10'-0" 10'-0"

FIRST FLOOR PLAN.

Note - For basement plan, see Plan # 159, Sheet "S".
For Cross Section, see Plan # 163, Sheet "S".

POTATO WAREHOUSE.

Scale 1/8"=1'-0"

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PLAN Nº 160. | SHEET Nº "S".

unloading and the potatoes are dropped into baskets instead of sacks and carried into the bins. This usually requires the services of two men.

Modern equipment provides for a dump scale. The wagon is weighed and then tipped up so that the potatoes run into a small hopper. The potatoes are then elevated over the sorter on to a belt conveyor and carried to the bins or into a hopper. This hopper is a funnel shaped bin set about five feet from the floor and arranged so that a chute can be opened and potatoes dropped into sacks. Underneath the sorter is another elevator which carries all small potatoes, culls and dirt into a small hopper directly above the dump scales. The contents of this hopper are emptied back into the farmers wagon and the weighing completed. The potatoes are carried into the basement by gravity chutes and are removed by means of sack elevators. These elevators are usually arranged so as to facilitate loading cars. (See blue print 163). Where simple equipment is used the potatoes are loaded into cars by use of small hand trucks.

A few warehouses will be found equipped according to extremes described above but the majority range between these extremes, being closest to that of having simple equipment. The wholesalers are of the opinion that it does not pay to have complete equipment. A large investment is tied up in machinery which depreciates very rapidly: dump scales have a tendency to bruise more of the potatoes; long conveyors get out of order and very little labor is replaced unless a very large volume of business is handled. To be a paying proposition a great deal of labor has to be saved in the fall because the equipment stands idle most of the year. The wholesalers equip their branch houses with the smallest amount of equipment that will give satisfactory service.

There are two general kinds of sorters, commonly called graders, in use at the present time. They are not really graders because more than size counts in determining the grade of potatoes. All they do is to mechanically divide potatoes into different sized classes by running them over holes depending on grade wanted.

The shaker sorter is the most common. It consists of a wire mesh declin-

ed at a small angle and vibrated as to cause potatoes to move along and all undersized ones fall thru. These sorters bruise the potatoes some especially those that are not ripe.

The endless belt sorter. In this class of sorters the potatoes fall on a moving belt and are carried along. Two types of endless belt machines are in use. In one type the belt is made up of parallel cross bars which may be described as serving the purpose of ends for the rectangular opening thru which the undersized potatoes fall. This belt slides over parallel rods which serve as sides of the openings. The space between the bars in the belt and the rods below the belt determine the size of the holes used in grading. The other type of belt is constructed to form a mesh of the proper sized openings. This type of belt sorter seems to give the most satisfactory results and most of the new machines installed are of this kind. The endless belt sorters do not bruise as many potatoes as the shaker sorters but they often let many small potatoes go over especially when they fall thickly on the belt.

Some other equipment is also necessary in all warehouses. It ordinarily consists of a few forks called scoops, one or two small scales, a few baskets and some sack holders. The investment in such equipment is very small.

SOURCES OF DATA

The data used in this thesis were collected by the Division of Agricultural Economics in connection with a cost of potato marketing investigation which is being made by the Division in cooperation with the United States Bureau of Agricultural Economics. It was first planned to use only records of cooperative associations but as records for only a few local potato shipping associations were available the records of other local potato marketing agencies have been included.

Records were used in making this study from 11 Farmers Cooperative Associations, 2 from Independent dealers, 5 of branches of local wholesalers, and 8 of branches of wholesalers.

The data were obtained by personal solicitation of dealers to whose records and accounts the representation of the Division had access. Interviews with the managers of the different firms provided much information that was valuable in distributing costs. Some difficulty was experienced in getting the desired data owing to the character of the accounts and records kept by the local marketing agencies. Very few concerns keep a complete set of accounts and most of them follow no definite system of accounting, and where good systems are installed the records are often in very poor condition. It therefore required from one to five days to get a complete record from an individual concern depending on the volume of business done and the nature of the accounts kept. Where only such simple records as notations on check stubs were the only source of information, as was frequently the case, it was a slow and tedious process to secure the necessary data. In many other cases where some form of books were kept it was often necessary to refer back to the check books in order to get at the exact nature of the expenditures. Most of the concerns keep some form of a book of original entry called either day book, cash book or journal. Many concerns just total columns of receipts and expenses in an attempt to arrive at profit and loss for the season. Other concerns make attempts at keeping a ledger but invariably they group all payments for salaries and wages into labor costs while most of the other expenditures are grouped into a miscellaneous expense account which has no real significance and which had to be carefully analyzed in completing the records.

So called "balance sheets" and "profit and loss statements" were found in a few instances but most of them took no account of depreciation on buildings and equipment, inventories on hand and prepaid or accrued items of expense. In most cases there were no records showing cost of equipment or the number of years it had been used.

Records of potatoes bought and sold were also very incomplete but in all cases it was possible to secure either an accurate figure on pounds bought or pounds sold. But in no case could reliable records be obtained as to shrinkage,

the exact amount of potatoes stored, or the length of time they were stored. In some instances the managers followed the practice of deducting from forty to seventy pounds from each load when the potatoes were put into a pool or into storage. No record was usually kept of this deckage so the exact number of pounds bought could not always be ascertained. In some cases the sales were recorded only in dollars and cents and the exact number of pounds sold could not be determined.

In making up the records it was first necessary to make up balance sheets and then set up ledger accounts and post all items of expense. The balances of these accounts were then allocated to the accounts which had been selected to be used in making the cost study.

Information regarding the size of the warehouse and of the distribution of space was determined by personal inspection. Information as to the distribution of the labor hours was secured from the warehouse managers and in all cases was only their estimates as no records are kept of the time spent at various operations. In a few instances however, the estimates were so obviously incorrect when compared with the other data of other concerns that they were necessarily of little value.

It was planned to arrive at costs for all processes, but since no records showed the amount stored, length of time stored, the amount of reasacking and conditioning done all these processes were grouped under the item of warehousing.

The wholesalers keep complete accounts but as they are more interested in the cost of their business as a whole than in the cost of operating an individual warehouse they group many expenses into central office costs that might logically be charged to a local warehouse. It required approximately two weeks to secure data from each wholesale dealer and considerable more time to properly assign to each branch its direct expenses and its share of the overhead cost. They keep accurate records of the number of pounds bought and sold so that their costs of handling per hundred weight are more accurate than those obtained from local dealers. Data can also be calculated as to total shrinkage for the season but not on a bushel or hundred weight basis for a given period of time, because records

do not show the length of time that potatoes are stored nor the causes for shrinkage such as dirt, diseases, culls and loss in weight. In order to allocate the costs to the different processes it is necessary to visit each warehouse to determine space requirements and to secure managers estimates as to the distribution of labor costs.

CHAPTER II

SYSTEM OF ACCOUNTING

All successful business concerns keep financial accounts. They may vary somewhat in type and in number with the different kindsof business, but they all confirm to the general accounting practice of keeping accurate record of all receipts and expenditures in order to determine gains or losses as well as to ascertain the financial standing of the concern. Further information is often necessary as a basis for the analysis of the business and a comparison of one concern with other concerns. This can only be secured by a more complete set of accounts called cost accounts.

Cost accounts can not be kept independent of general accounts. Cost accounting is a bfanch of financial accounting which separates out the financial accounts and combines them into a few new accounts so as to show complete operating costs.

In order to determine the costs of handling potatoes by local concerns it is necessary to find all the costs to the concern, collect them into groups and then distribute them to potatoes and other enterprises on some adequate basis. For further analysis it is necessary to distribute the cost of handling potatoes to the various processes thru which they pass.

Cost accounting systems vary between the extremes of being so simple that they do not give the desired information or being so complex in an attempt to arrive at accurate costs that they become a burden instead of an asset.

In large scale business enterprises it is often desirable to hire special accountants to keep very minute records, but even in such cases there are always some joint costs that have to be allocated by estimates. In the local potato warehouses where the manager performs a large share of the direct labor and also keeps the books the method must be so simple as not to increase the expenses and yet give the desired information. The following system is devised to fit into the records already kept by warehouses or to show what records ought to be kept. For very small concerns it may be too complex, subdividing expenses into too many classes, for larger concerns it may be too simple to give the desired information. No general cost accounting system can be devised to fit all concerns doing the same kind of business. The system that is adopted must be modified to fit the particular concern in question, and some accounts may be modified or eliminated and others may be added, but in principle the accounting should be done as it is indicated in the following outline.

The methods given for allocating costs are not the only methods that can be used but the simplest ones giving a reasonable degree of accuracy without requiring extra work have been selected. This has led to the use of estimates in many cases which are not meant to be pure guesses, but to be based on the best judgment of the person doing the accounting.

In handling the direct labor the method given in this outline is usually followed but labor is sometimes divided into direct and indirect classes and handled in a more detailed manner which is unnecessary in the local potato business.

Building costs as a rule are always allocated on basis of floor space used, and this system with a modification is recommended here. Other systems such as charging building costs as a percentage on volume of business in each enterprise or according to its importance as a side line or main line; or prorating it on number of labor hours, would give nearly the same results but require more work in keeping records.

The system given for the allocation of equipment costs is based largely

on estimates of use made of machines, power and light. Other systems of keeping separate records for each machine noting exact number of hours it works at each process or enterprise, also a record of the time it stands idle and prorating that charge. Some systems even provide for a separate meter for each machine in order to determine exact use made of light and power. No doubt such systems give far more accurate figures of costs but are too complex to try out in a potato warehouse.

In distributing general office and management costs it is a general practice to distribute them on the basis of direct labor hours spent on each enterprise and process. In the local potato business where most of the overhead expenses for office and management are connected with buying and selling and there is not a sufficient volume of business to set up separate departments as is done by a large business enterprise it is necessary to divide cost between enterprises and processes on some other basis. Estimates are made as to the requirements of each enterprise and as to buying and selling the balance is prorated to processes on the basis of direct labor requirements of each.

PRIMARY ACCOUNTS

Primary accounts are a number of simple debit and credit accounts that are necessary to separate out all items of expenses. The number of these accounts varies considerably depending upon the nature of the business and the analysis wanted.

The following list of primary accounts may be divided into four groups.

I. Balance sheet accounts. No. 44 to 53 inclusive, which are combined with inventories, and prepaid and accrued items of expense to show the net worth.

II. Expense accounts No. 1 to 43 inclusive which are used in determining costs of running business. They are divided between enterprises and processes and from there they are closed into the trading accounts.

III. Merchandising accounts No. 54 to 57 inclusive, which show the accounts paid and received for goods; they are combined with operating expenses into trading accounts, the balances of which are made into a profit and loss statement.

IV. Records No. 58 to 60 which are used in analyzing business and distributing costs to processes and enterprises.

(1) Labor

All charges for labor except for manager and office help	Any amounts received for labor services performed for others

(2) Sacks, Tags and Twine

Opening inventory	All sales of sacks.
All purchases	Closing inventory
Freight, express and drayage	

(3) Rent of Warehouse

Deferred charges	Prepaid rent.
Amounts paid	
Amounts accrued.	

This account is omitted if the warehouse is owned of if it includes only rent on site which is usually owned by railroad. This account may include accounts No. 4 and 6, and No. 17a.

(4) Taxes on Real Estate

Amounts paid	
Amounts accrued	

(5) Personal Property Tax

Amounts Paid	
Amounts accrued.	

This includes taxes on warehouse when located on railroad property.

(6) Insurance on Warehouse and Equipment

Deferred charges	Prepaid Insurance
Amount paid	

(7) Insurance on Goods

Deferred charges	Refunds
Amounts paid	Prepaid

(8) Employees Liability Insurance

Deferred charges	Refunds
Amounts paid	Prepaid

(9) Fuel

Opening inventory	Sales
Purchases	Closing inventory
Freight and Drayage	

If gasoline etc. is used for power it may be well to set up a separate account with it.

(10) Light

Opening inventory	Closing inventory
Purchases of lamps	
Bulbs, current, etc.	

(10) Light (continued)

Accrued charges	

Deferred charges refer to items paid before opening of book for year. Prepaid charges are expenses paid in advance. These items become deferred charges on opening of books next time.

(11) Power

Purchases	
Accrued charges	

When one meter is used light and power may be included in one account. When power is manufactured in warehouse, charges will be included in fuel and supplies.

(12) Linings (car)

Opening inventory	Closing inventory
Purchases	
Freight and drayage	

(13) Repairs on Equipment

Amounts paid	Deferred charges

(14) Repairs on Building

Amounts paid	Deferred charges

Deferred charges here refer to painting, new bolts etc. which last more than one year and ought to have charges spread over more than one year.

(15) Miscellaneous Supplies

Opening inventory	Closing inventory
Purchases	

(16) Miscellaneous Operating Expenses

Any charges which cannot properly be put under other accounts.

(17) Depreciation on Buildings

Amount of depreciation

(18) Depreciation of Equipment

Amount of depreciation | Reserve for depreciation

(19) Depreciation of Office Furniture and Fixtures.

Amount of depreciation | Reserve for depreciation

Goods such as buildings and equipment wear out gradually and therefore a charge must be made each year to cover amount of depreciations for the year. This is determined by dividing the difference between cost and estimated junk value by estimated life in years. The usual rate on frame buildings is 5 to 10 per cent;on equipment 10 to 20 per cent, and furniture and fixtures 5 to 10 per cent.

(20) Managers salary

Amounts paid

Amounts accrued

(21) Offices Salaries and Allowances

Amounts paid

Amounts accrued

(22) Travelling Expenses

All travel charges other than messengering	

(23) Office Salaries

Amounts paid Amounts accrued	

(24) Printing and Stationery

Opening inventory Purchases	Returns and allowances Closing inventory

(25) Postage

Opening inventory Purchases	Closing inventory

(26) Office Supplies

Opening inventory Purchases	Closing inventory

(27) Telephone and Telegraph

Amounts paid Accrued charges	Any fees collected for use of telephone

(28) Licences and Fees

Amounts paid	Prepaid

(29) Office Rent

Amount paid	Prepaid

(30) Advertising and Publicity (includes donations)

Amounts paid

Accrued charges

(31) Market Service

Amount paid

Amount accrued

(32) Miscellaneous Office Expenses

Only charges that cannot properly come under other accounts

(33) Interest on Borrowed Money

Amounts paid

Amounts accrued

Prepaid discounts

(34) Interest on Net Worth

A charge at current rate on average net worth.

This is not truly an expense because it does not have to be paid but it ought to be covered because money invested here could earn such a rate elsewhere. Beginning net worth may be used in place of average but as money is often taken out or put into business during the year the average comes closer to being a fair charge as a general rule.

(35) Bad Debts

All uncollectable accounts with customers

(36) Freight on Shipments of Potatoes

Amounts paid | Claims received

(37) Other Transportation Charges on Potatoes

Amounts paid for switching, etc. Heater and option 2.

(38) Freight and Transportation Charges on Other Produce

Amounts paid

There may be as many accounts of this kind as there are lines of business.

(39) Inspection and Reconditioning Charges

Amounts paid

(40) Commissions and Brokerage

Amounts paid

(41) Messengering

Travelling expenses of messenger.
Fuel and supplies
Wages if special man hired for trip.

(42) Home Office Overhead

Branches share of expense. This applies only to chain or line houses.

(43) Losses in Shipment

Amount of losses

Records should show kind of cars and cause for loss, Frost, shrinkage, etc.

(44) Cash

Amounts received | Amounts paid out

(45) Notes Receivable

All notes held | Notes paid

(46) Accounts Receivable

Book accounts with customers | Amounts paid

(47) Buildings

Cost of buildings | Reserve for depreciation

(48) Equipment

Cost of equipment | Reserve for depreciation

(49) Furniture and Fixtures

Cost of furniture and fixtures | Reserve for depreciation

(50) Real Estate

Cost of property | Reserve for depreciation

Appreciation

Land should be carried at original cost unless there is definite proof as to change in value.

(59) Perpetual Inventory. Dates and amounts of potatoes put in storage. Dates and amounts taken out of storage. This account should try and keep lots as nearly separate as possible so as to show time of storage and shrinkage.

(60) Labor hours. Show number of hours spent on different operations and rate of pay.

Sample form given below

Sample Daily Time Sheet

Name of Co._____ Address _____

Name of worker_____ Manager _____

	Hours of Labor															
	On Potatoes										Other work					
	Buying	Weighing and Receiving	Grading	Sacking	Preparing car	Loading car	Storing	Selling	Messenger-ing	Etc.	Feed	Flour	Fuel	Etc	Idle Time	
Sun.																
Mon.																
Tues.																
Wed.																
Thurs.																
Fri.																
Sat.																
TOTAL																

Remarks _____

A FINANCIAL STATEMENT

A financial statement or balance sheet should be made at close of each year by putting figures from Group I primary accounts into some form as shown below.

Name_____

Financial Statement for_____
(Date)

Assets

Cash ----------

Notes receivable----------

Accounts receivable (less bad debts)----------

Merchandise Inventory ----------

Supplies Inventory----------

Prepaid expenses ----------

Furniture and Fixtures ----------

Equipment ----------

Buildings ----------

Total Assets ----------

Liabilities

Accounts payable ----------

Notes payable ----------

Accrued expenses ----------

Total Liabilities ----------

Net Worth

Capital Stock sold

Plus surplus or minus deficit ----------

The difference between Total Assets and Total Liabilities when everything is properly considered will show the Net Worth. If this is greater

than the paid up capital stock it shows a surplus while if less it shows a deficit or a decrease in net worth from the amount invested.

CLASSIFICATION ACCOUNTS

The secondary or classification accounts are used in collecting the balances of the accounts in Group II of the Primary accounts in order to determine certain group costs which can be divided between enterprises and processes.

The following accounts are necessary

Direct Labor

1. Direct labor	To other enterprises ----------
*5. Employment liability Insurance (part)	To potatoes
(1) 20. Managers salary (part)	Buying ------
(2) 21. Officers salary (part)	Receiving ----
	Grading ------
	Etc. ----------

Direct labor costs are distributed to processes and enterprises on the basis of the number of hours spent on each. The total costs should be divided by the actual number of hours worked and then prorated to the enterprises and the processes on the basis of the actual number of hours worked at each. This will take care of idle time by charging a higher rate per hour worked than was actually paid.

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* Employment Insurance is divided between direct labor, general office and management on the basis of men employed and the number of hours spent at each.

(1) Managers salary is divided between direct labor, office and management costs on the basis of the number of hours spent at each.

(2) Officers salaries should all go to management cost unless they perform some direct labor or office work in which case it should be divided on the basis of the number of hours spent on each.

This method would apply to concerns where the idle time was not due to a lack of volume of business. In cases where most of this idle time would be used on processes if a larger volume were handled and the exact process costs are divided, the charge for idle time at the same rate as for work should be transferred direct to Trucking accounts or to profit and loss.

Building Costs

3. Rent of warehouse	To general office ----------
4. Taxes On Real Estate	To other enterprises -------
5. Personal Property tax (part)(1)	To potatoes
6. Insurance on warehouse (part)(1)	Buying --------
9. Fuel (part)(2)	Receiving -----
14. Repairs on building	Grading --------
15 and 16. Miscellaneous (part)(3)	Etc ----------
17. Depreciation on building	
33. Interest on Borrowed money (part)(4)	
34. Interest on Net Worth (part)(4)	

(1) Taxes and insurance should be divided between building equipment and general office on the basis of the assessed value of each. If taxes or insurance is partly on inventories of merchandise a portion of charge should be carried to other direct costs.

(2) Fuel should be divided between building equipment, general office and messengering on basis of amounts used for each, of no records are available careful estimates will suffice as basis for allocation.

(3) All miscellaneous items should be allocated according to nature of expense.

(4) There are many arguments both for and against charging interest on net worth as a cost, but as most cost accountants are now agreed that interest really is a cost and must be covered by any business concern that is to continue in the business

it is included here as one of the expenses.

The problem at once arises as to the rate of interest to charge on the investment. Should it be the rate at which money can be borrowed and put into this line of business or should it be the rate on reasonably safe long time investments. Another problem comes up, should interest be charged at one rate on borrowed money and at another rate on net worth. Some accountants recommend the setting up of interest accounts and charging a uniform rate on total assets. Accounts receivable may or may not be included and then if money is loaned or borrowed at other rates one may get either a debit or credit balance for these accounts. These accountants say that there is no logical reason why one part of the building or equipment investment should be charged interest at a higher or lower rate than somether part.

In working up the records used in writing this thesis the Bureau of Agricultural Economics followed the system of charging interest on net worth at a uniform rate of 6 percent and interest on borrowed money at the rate that was actually paid and then distributing the charges to the assets in the following manner.

When the net worth is equal to or greater than the value of the buildings and the equipment, interest on the net worth is allocated to building and equipment costs on a basis of their value, and any surplus is carried to general office costs. In this case all interest on borrowed money is charged to general office costs. If the net worth is less than the value of the buildings and equipment, then part of the interest on borrowed money is allocated to equipment and building costs on a basis of the equity not covered by net worth.

The rate on net worth is lower than the rate paid on borrowed money and the policy followed is to charge the lowest rate against the fixed assets (Buildings first, equipment second).

If part of investment consists of inventories, special supplies or goods in storage, carry interest charge against such assets to other direct costs.

Building costs are divided between the potato enterprise, other enterprises and the general office on a basis of the amount of space used for each. The costs charged against potatoes are further divided between processes on the same basis. This is on the assumption that all of the building is of the same construction and value, and that each enterprise or process should bear a portion of the expense on the basis of the amount of space it occupies.

In case some parts of the building are well constructed and the other parts are constructed more cheaply, in the form of sheds used for the handling of feed or other produce, or are used to cover the scales used in receiving produce, then it would not be proper to allocate the costs on the basis of the space used because all space does not cost the same.

In this case allocate the costs to the enterprise or processes using the cheaper parts of the building on the basis of the value of the part of the building used for that purpose. This will give fairly accurate results as most of the building costs are figured as a percentage of the value.

As a matter of fact this latter method gives the same results as the first when all parts of the building are equally well constructed, because under those conditions equal amounts of space would have equal costs. In some cases it is very difficult to determine actual value of different parts of the building and then careful estimates have to be made. For example it is impossible to determine exactly what part of a building cost should be charged to the basement.

Equipment Light and Power

5. Personal Property (part)	Go other enterprises ----------
6. Insurance (part)	To potatoes
9. Fuel (part)	Receiving ----------
10. Light (part)	Grading ----------
11. Power	Sacking ----------
13. Repairs on Equipment	Loading ----------

15-16. Miscellaneous (part)	Etc. ----------
18. Depreciation on Equipment	
33. Interest on Borrowed Money (part)	
34. Interest on Net Worth (part)	

The Division of debit items has been explained under direct labor or building costs.

Equipment costs are allocated to enterprises and processes as nearly as possible on a basis of use. This may be accomplished by determining the use to which the equipment is put and charging the costs to it on the basis of value of equipment. But in some cases this will have to be corrected by careful estimates, example when cheap elevator uses a lot of power.

General Office

5. Personal Property tax (part)	To other enterprises ----
6. Insurance (part)	To potatoes
8. Employers Liability Insurance (part)	Buying ----------
9. Fuel (part)	Receiving ------
10. Light (part)	Grading --------
19. Depreciation on Furniture and Fixtures.	Sacking --------
20. Managers salary (part)	Etc. ----------
21. Officers salary (part)	
22. Travelling Expenses (part)(1)	
23. Office salaries	
24. Printing and Stationery	
25. Postage	
26. Office supplies	
27. Telephone and telegraph	

28. Licenses and fees	
29. Office rent (2)	
30. Advertising and publicity	
31. Market service	
32. Miscellaneous expenses	
33. Interest on borrowed money (part)	
34. Interest on net worth (part)	
42. Home office overhead (part) (3)	

(1) Travelling expenses should be divided between general office and management costs on a basis of the nature of each particular trip.

(2) Office rent would only be included when office in separate building is rented. When office is part of warehouse it should be charged with its share of building costs.

(3) No general rule can be given for prorating home office overhead because each concern presents an individual problem depending on the methods of doing business and of keeping the books. The home office expenses include a number of charges, salaries for management and clerical work, office supplies and stationery, depreciation on furniture and fixtures, interest on borrowed money, and on net worth and miscellaneous expenses.

The home office directs buying, finances the business, furnishes office supplies and stationery and does all the selling. The problem is to prorate to each branch its proper share of the expenses and then to divide the branches share between office and management costs. Also to allocate the office and management costs to the various processes.

The following plan was used in distributing home office overhead for one of the wholesale dealers. The same plan with some modifications was used in distributing home office costs of all other wholesald dealers.

The total home office overhead is prorated to the branches on a basis of the number of carloads of potatoes handled, by each branch. This is about the only possible method, but as some branches may handle carloads more efficiently it is not absolutely accurate.

The home office expenses usually include an interest charge on borrowed money and on net worth. The amount of this charge that applies to working capital is determined by an examination of the balance sheet. Most of the working capital is used in paying wages and in financing the carrying of inventories and only a small part for financing potatoes during shipment. An estimate is made of the amount of the interest charge to be made to wages and inventories in local warehouses. This figure is then changed to a percentage of the total. By taking this percentage of the branches share we arrive at a sum which is included as part office expenses of the branches, but which is allocated to processes other than buying and selling on the basis of the direct labor hours used by those processes. This gives a satisfactory distribution as far as investment in labor is concerned. It also gives a satisfactory charge against the inventories because they are included in warehousing. Since about one half of the labor is usually charged to warehousing, this item will be charged with approximately half of the interest expense.

The balance of the branches share of the home office overhead (total minus the above inter charges) is divided between office and management costs. The basis for this division is arrived at by determining which of the items in home office costs are strictly a cost of management and determining what part they are of the total costs. It was found in this case that approximately one half of the costs were charges for management and one half for office costs. These costs were further divided one fourth to buying and three fourths to selling on a basis of estimates made by the dealers.

The local office cost (home office share of costs not included) are divided three fourths to buying and one fourth to selling. This is simply an estimate based on the assumption that most of the act is connected with buying as that is the chief function of the local warehouse. This is not exactly accurate because a small part of office costs are incurred in keeping records of labor, inventories, etc., but as we have no basis for making any estimates no charges are made to other processes.

The local management costs consisting almost entirely of a part of the managers salary is divided one half to buying, one eighth to selling and three eighths to the other processes on the basis of direct labor costs in each process. This estimate is made because the local manager spends most of his time buying, a small part of his time ordering and billing out cars, and the rest supervising the other processes. Estimates would have to be varied to suit local conditions. Where competition is keen the managers often spend most their time buying.

If any item included in general office expense is strictly an office expense but distinctly connected with some particular enterprise or process it should be taken out of the total before allocation is made and charged to that particular enterprise or process. For example if all telegraph charges are connected with the selling of potatoes they should not be included in the total to be divided between enterprises or processes but charged as a separate amount of office expense connected with selling.

General office costs are allocated to the different enterprises on the basis of estimates made by managers as to office requirements of each enterprise and its importance as a side or main line.

The charges to potatoes are divided between processes on the basis of estimated requirements of each. For the average concern doing both buying and selling the following system is recommended: one third to buying, one third to selling and one third divided between other processes on basis of direct labor requirements of each.

Management

8. Employees libbility insurance (part)	To other enterprises ----------
16. Miscellaneous expense (part)	To potatoes
20. Manager's salary (part)	Buying ----------
21. Office salaries (part)	Selling ----------
22. Travelling expenses (part)	Etc. ----------
42. Home office overhead (part)	

Management costs are allocated on the basis of estimates and as a general rule will be divided in same proportions as general office code.

The method of allocation where warehouse is a branch of a wholesaler has been previously described.

OTHER DIRECT COSTS

Other direct costs are charged to enterprises or processes on the basis of the nature of the expense. The balances of each account has to be handled separately.

2. Sacks, tags and twine — Carried to potato trading account
36. Freight on shipments of potatoes — " " " " "
37. Other transportation costs on potatoes — " " " " "
39. Inspection and Reconditioning charges — " " " " "
40. Commissions and brokerage on potatoes — " " " " "
41. Messengering — " " " " "
42. Losses in shipments of potatoes — " " " " "

5. Personal property tax
7. Insurance on goods
23. Interest on borrowed money

Part chargeable to other enterprises is carried to Produce trading accounts. Part chargeable to potatoes is carried to storage process account.

15. Miscellaneous — is divided entirely on nature of expense and

charged to appropriate account.

12. Linings — is carried to preparing car process account.

13. Loss on bad debts — is divided between the enterprises on which they occur and charged to the trading account.

36. Freight and other produce is carried to respective trading accounts.

PROCESS ACCOUNTS

As this outline is primarily for finding costs of handling potatoes only potato processes are included but in large concerns it may be desired to set up process accounts for each enterprise.

The number of process accounts would vary with the analysis wanted and the method of handling potatoes: The following are recommended. Buying, weighing, and receiving, grading, sacking, preparing car, loading car, storing and selling.

The following form would be about the same for all of the accounts except each would have a different name.

Process Costs

Direct labor Building Equipment General Office Management Other direct costs	To potato trading account

Trading accounts show costs of handling merchandise and losses or gains on the operation. A separate account should be kept with each line.

TRADING ACCOUNTS

Merchandise Trading Accounts

54. Cost of merchandise sold	55. Sales of merchandise
Direct Labor	
Building Costs	
Equipment Costs	
General Office Costs	
Management Costs	
Other Direct Costs	
Balance to Profit	Balance to Loss

Potato Trading Account

56. Cost of Potatoes sold	57. Sales of potatoes
Process costs	
Other direct costs	
Balance to Profit	Balance to Loss

In case potatoes are handled on some other basis than buying and selling for cash, the potato trading account may be supplemented or replaced by other accounts. For example, when potatoes are pooled.

Pool Operating Account

Process charges against pool	To pool clearing account

Pool Clearing Account

Advances on shipments	Net receipts from shipments
Pool operating charges	
Commissions charged	
Balances to be distributed	

Profit and Loss

Losses from trading accounts	Gains from trading accounts.
Other losses	Other sources of income

Balance shows net gain or loss for year

Summary of cost of handling potatoes

Costs	Units handled	Cost per unit
Buying		
Weighing and Receiving		
Grading		
Sacking		
Preparing car (include linings)		
Loading car		
Storing		
Losses in storing		
Sorting		
Selling		
Messengering		
Freight		
Other transportation costs		
Sacks, tags, and twine		

CHAPTER III

ANALYSIS OF COST DATA

The purpose of this analysis is to determine the amount and causes for the variations in total costs per hundred weight for handling potatoes in the local markets. These costs were determined and arrived at by putting the original data obtained from each of the twenty-six concerns thru the cost accounting system outlined in Chapter II. Table I shows the average prime costs to each type of concern and also the percentage of each prime cost to the total costs. In analysing the costs each of the prime costs will be discussed separately.

Labor Costs

Labor costs consists of all payments made for direct labor applied in handling potatoes and that portion of the managers salary which corresponds to the time he spends in performing direct labor. The division of the managers time between direct labor, office and management is based on estimates made by the manager. The labor cost per hundred weight is made up of two elements, the rate of pay per hour and the number of hours worked. The records from which these data were obtained show only the total amounts paid for labor and not the number of hours worked or the rate per hour. Where the manager was paid a large salary and he performed a large part of the direct labor it makes the rate per hour very high and causes a variation in labor costs per hundred weight. The rate paid laborers also influences labor costs per hundred weight, but there does not appear to be as great a variation in wages of laborers as in salaries of managers.

Table II shows the weighted and unweighted average cost per hundred weight for handling potatoes by each type of concern.

TABLE II

Labor Costs

	Number	Hundred weight handled	Average per warehouse	Per hundred weight	
				Weighted average	Unweighted average
Cooperatives	11	14603	$ 971.55	$.0665	$.0693
Independents	2	36880	1715.15	.0365	.0423
Local wholesalers	5	11894	757.16	.0636	.0652
Wholesalers	8	15868	816.55	.0515	.0542
Total all Concerns	26	16338	917.01	.0561	.0626

For cooperative associations the labor cost averaged $971.55 per warehouse which is 26.4 percent of their total costs. Table I shows that this is the highest percentage for any type of concern indicating that on the whole the cooperative associations use more labor than the other concerns. Table II shows the same fact in another way; the weighted average labor cost per hundred weight is 6.65 cents which is almost half a cent more than that of the next highest, the local wholesalers, whose cost is 6.36 cents and it is more than one cent higher than the weighted average for all the concerns.

The labor costs per hundred weight for the cooperative associations ranged from 4.70 to 11.43 cents. When the labor costs per hundred weight are platted on Graph I there is a distinct tendency for the costs to vary with the volume of business. This tendency is more evident if the associations are divided into two groups; each group shows a tendency for costs to increase as volume decreases (but one group handling the same volume on a more efficient basis). The reason for this is clear when the efficient concerns are considered independently. Number 6 handled only potatoes and a low salaried manager performed most of the direct labor. Extra labor was hired only as needed. Number 7 handled other produce and it charged very little of the managers salary to direct work on potatoes and hired

Graph I

Relation of labor costs to volume of business

• = Cooperatives
X = independents
⊙ = Local Wholesalers
⊡ = Wholesalers.

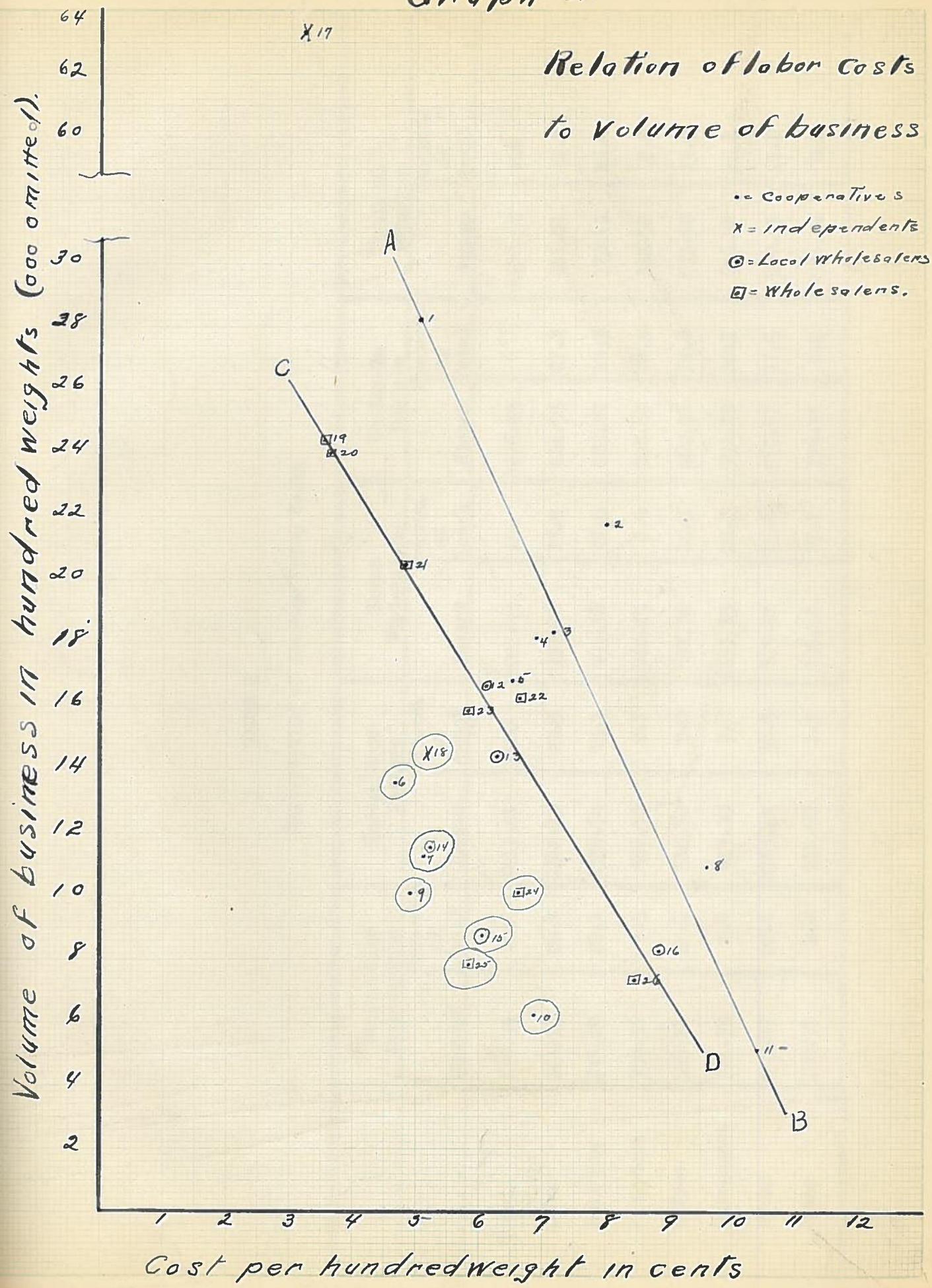


TABLE I

Distribution of Average Prime Costs

	Cooperatives Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		Total 26 Concerns	
	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total
Total	$3679.95	100	$6813.81	100	$4022.45	100	$4776.85	100	$4330.54	100
Labor	971.55	26.4	1718.15	20.5	757.16	18.8	816.55	17.1	917.01	21.1
Building	741.24	20.1	1336.64	19.3	445.36	10.9	688.20	14.5	713.51	16.4
Equipment	350.56	9.5	556.30	8.1	308.84	7.6	201.60	4.2	312.52	7.2
Office	392.11	10.6	618.60	9.0	491.78	12.3	862.06	18.0	573.30	13.2
Management	311.79	8.4	489.00	7.0	1153.15	28.7	991.10	20.7	696.24	16.1
Sacks	833.47	22.6	2365.12	34.9	669.32	16.6	860.97	17.5	920.49	21.2
Other	100.97	2.4	110.00	1.7	196.58	5.1	356.18	8.0	206.22	4.8

extra labor only as needed. Number 9 operated the warehouse as a side line of an elevator and charged practically all of the idle time to the elevator. Number 10 paid the manager a commission of ten cents per hundred weight and as he had to furnish all the labor he was forced to economise in the use of labor.

The other group may show too high a cost; this is especially true in the case of number 2 and number 8 when the managers were paid a larger salary and they performed a large part of the direct labor. All the cooperative associations in this group show higher labor costs per hundred weight than the other types of concerns. This would indicate that they did not use their labor as efficiently as the others.

For the local wholesalers the labor costs averaged $757.16 per warehouse or 18.8 percent of their total costs. This appears to be less than for the cooperative associations and independent dealers but this is because the total cost is higher relative to the volume of business handled which makes the labor cost per hundred weight smaller. Table II shows the weighted average cost per hundred weight is 6.36 cents which is almost as high as the cost for the cooperatives and higher than for the other two types of concerns.

As shown on Graph I the costs per hundred weight range from 5.21 to 8.74 cents. These concerns really divide themselves into two groups the same as do the cooperative associations. Number 14 was supplied with very complete labor saving equipment which seems to have reduced the labor cost per hundred weight. Number 15 operated only during the busy season in the fall and avoided all the labor costs due to idle time during the winter months. The other three, Nos. 12, 13 and 16, operated at a slightly lower cost than did the cooperatives association handling the same volume of business. This is probably due (may be) to the fact that they were better managed.

The labor cost for the independents dealers averaged $1718.15 or 20.5 percent of the total costs. Too much attention, however, should not be given to this cost since an average in this case cannot be given very much as there are only

two dealers in this class and since one of them handled a very large volume on a very efficient basis. Table II shows an unweighted average labor cost of 4.25 cents and a weighted average of only 3.65 cents. This is due to the fact that the dealer handling the largest volume made more efficient use of the labor. Graph I shows No. 17 in a class by itself representing what the labor costs might be if a sufficient volume of business were handled. Number 18 is completely equiped with labor saving equipment and that puts it into the group of Cooperative Associations and local wholesalers already discussed as having very low labor costs due to unusual conditions.

The average cost of labor to the wholesalers is $316.55 or 17.1 percent of their total costs. The average total costs for the wholesalers is greater than for the other types except the independents. This probably accounts for the fact that the percentage of the total costs to labor is less. The wholesalers handled a larger average volume of business than either the cooperatives or the local wholesalers, therefore their average labor costs per hundred weight is 3.15 cents which is about one and one half cent less than for those concerns.

When the labor costs per hundred weight are platted on Graph I they show a distinct tendency to vary with the volume of business. Number 25 had a laborer hired at only $2.50 per day while other concerns were paying about $3.50 per day. This puts this concern into the group with abnormally low costs. Number 24 had a very efficient laborer who was paid a rather low salary. The manager spent practically all his time buying and charged very little of his time to direct labor. This puts number 24 about midway between the lowest and normal costs. The rest of the wholesalers average a little less than the cooperatives which tend to show that they were better managed and made more efficient use of their labor.

The total for all concerns shows an average labor cost of 917.01 or 21.1 percent of the total costs. This shows that labor constitutes about one fifth of the total cost of handling potatoes and is one of the chief factors in causing a variation in total costs per hundred weight of handling potatoes.

The two straight lines plotted on the graph are to show the tendencies for costs per hundred weight to vay with the volume of business. One line is drawn for both types of wholesale dealers and one for the cooperative associations. The line AB for the cooperative associations shows that labor costs per hundred weight decrease about 125 of a cent per 1000 hundred weight as volume increases. The line CD drawn for the wholesalers shows that their labor costs decrease a little more rapidly, about .31 of a cent per 1000 hundred weight as volume increases.

Undoubtedly the concerns which we have ruled out as being abnormal in plotting these lines are not entirely abnormal and if we had enough associations they would show a curve relationship; the costs increasing fastest for a volume less than 10,000 hundred weight.

TABLE III

Distribution of Labor Costs to Processes Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$972	100	$1418	100	$757	100	$835	100	$917	100
Receiving	68	7.0	86	6.1	50	6.6	46	6.6	59	6.5
Grading	221	23.3	234	16.5	174	23.0	134	16.4	189	20.5
Soaking	208	21.4	410	28.9	166	21.9	218	26.7	219	23.9
Warehousing	354	36.4	443	31.2	266	35.2	305	37.3	330	35.9
Preparing Car	8	0.9	44	3.1	18	2.3	11	1.4	14	1.5
Loading Car	107	11.	201	14.2	83	11.0	103	12.5	106	11.7

Table III shows that the distribution of labor costs for all types of concerns is nearly uniform. The small variations are due mainly to the difference in the estimates made by the managers as to the labor requirements of each process.

Building Costs

Building costs are made up of interest on investment which constitute about 40 percent of the total depreciation which constitutes about 30 percent of the total costs, and taxes, insurance, repairs, fuel and least of site from the railroad which make up 30 percent of the total. Interest on investment is figured at 6 percent except where a higher rate is paid on borrowed money, in which case it is calculated at the rate paid. Depreciation is usually figured at 5 percent on frame buildings and 3 or 4 percent on other kinds. Where the building is rented the rent covers all of these costs with the exception of fuel. Depreciations in most cases is figured on the cost of construction but where the buildings were purchased second hand and the cost of construction is not known, depreciation is figured on the purchase price.

For the cooperative associations the building costs averaged $741.24 or 20.1 percent of the total costs. As shown in Table I this is the largest percentage for any type of concern. This is due to the fact that more of the cooperative associations built or bought warehouses during the period of high prices, than other types of concerns.

The weighted average building costs per hundred weight is 5.28 cents.

TABLE IV

Building Costs of 26 Potato Warehouses

	No. of warehouses	Volume of Business	Average Cost per warehouse	Average Cost per hundred weight	
				Weighted	Unweighted
Cooperatives	11	14603	$ 741.24	$ .0528	$ .0534
Independents	2	38880	1336.64	.0344	.0663
Local wholesalers	5	11894	445.36	.0374	.0381
Wholesalers	8	15868	688.20	.0434	.0440
All concerns	26	16338	713.81	.0436	.0482

Table IV shows that this is considerably higher than for the other types of concerns. When the building costs are plotted on Graph II they show a range from 2.04 to 9.91 cents per hundred weight. This great variation in costs per hundred weight can but be explained by an analysis of the individual concerns whose location is shown on Graph I. Number 2 built a $16,000.00 cement block warehouse during the period of high prices which could be replaced now for approximately one half of that cost. Number 4 purchased a frame building second hand at a cost greater than present replacement cost. Number 6 bought a frame building the floor of which is settling so depreciation was figured at a much higher rate than for the other warehouses. Number 7 was bought second hand at approximately one half of its replacement cost. Number 8 built a $6,000.00 warehouse with money that was deeply borrowed and paid unusually high taxes. Number 9 was rented at an abnormally low rate. Number 10 had a cheap shed that was not constructed for potato storage. Number 11 was rented but the rent is no higher than the building cost would have been if the building had been owned.

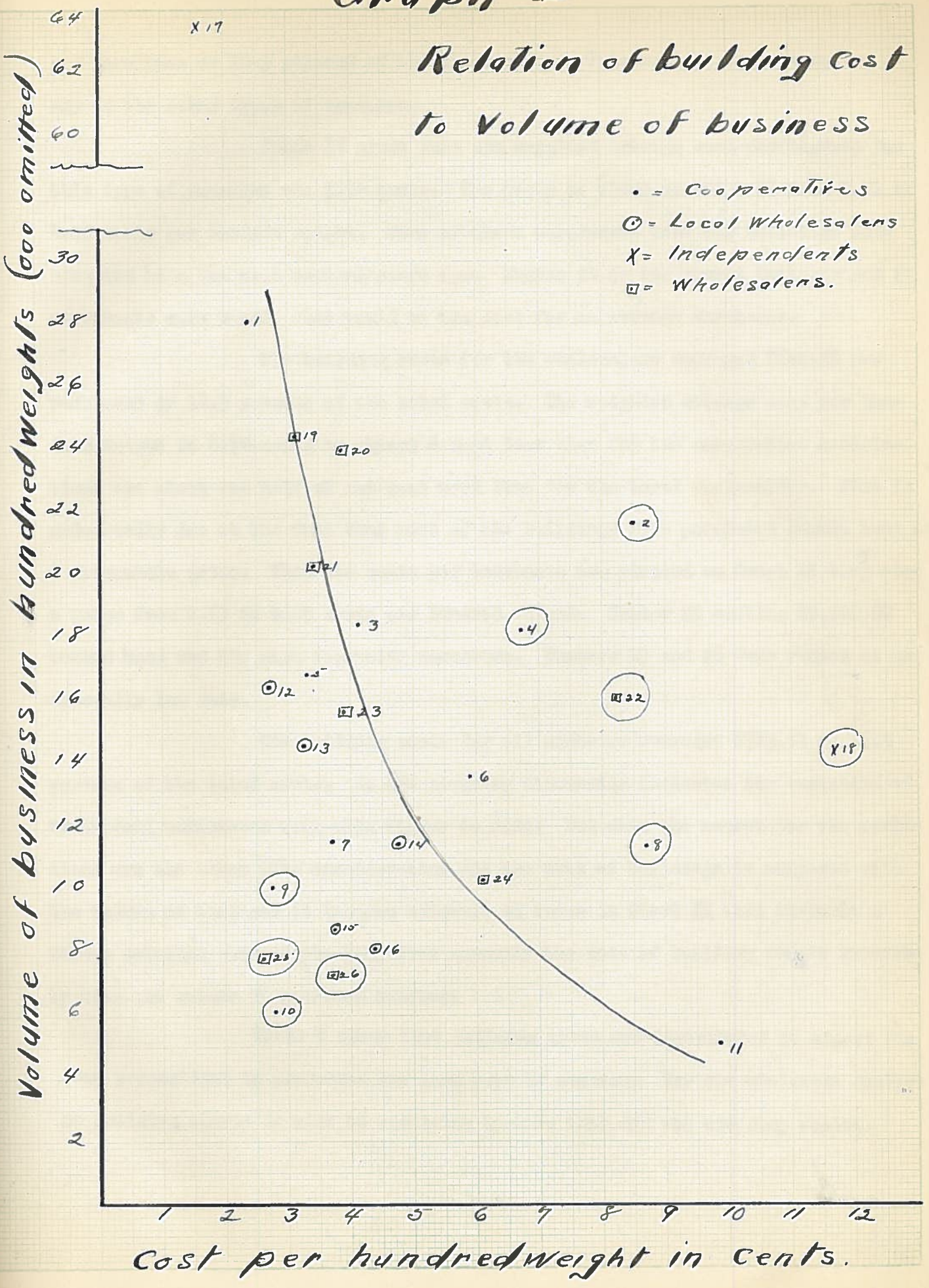
For the independent dealers the building costs averaged $1336.64 or 19.3 percent of the total costs. This is a slightly smaller percentage than for the cooperative associations. If records had been available from a sufficiently large number of independent dealers to provide more representative data it is probable that the building costs of this class would have been lower. Table IV shows the unweighted average cost per hundred weight as 6.63 cents and the weighted average as only 3.44. This is due to the wide range from 1.56 to 11.70 cents per hundred weight as shown in Graph II. Number 17 of this independent group of warehouses had a well constructed moderately priced warehouse, while number 18 had a hollow tile warehouse constructed during the years of high prices on a privately owned piece of land. In the latter case both taxes on land and interest on investment in land are accordingly included as building costs.

For the local wholesalers the building costs average $445.36

Graph II

Relation of building cost to volume of business

• = Cooperatives
⊙ = Local Wholesalers
X = Independents
⊡ = Wholesalers.



per warehouse or 10.9 percent of the total costs. This cost is lower than for any of the other types of concerns.

Table IV shows that the weighted average cost per hundred for this type of concerns was 3.74 cents. The costs as shown on Graph II from 2.71 to 4.60 cents per hundred weight. Four of these warehouses were old buildings constructed at a low cost several years ago. Number 24 is the newest building and it represents more nearly what would be the cost for an average warehouse.

The building costs for the wholesalers averaged $668.20 per warehouse or 14.5 percent of the total costs. The weighted average cost per hundred weight is 4.34 cents or almost a cent less than for the cooperative associations and about one half of one cent more than for the local wholesalers. This is undoubtedly due to the fact that most of the buildings were purchased second hand at a reasonable price. When the costs per warehouse are plotted on Graph II they show a range from 2.63 to 8.25 cents per hundred weight. Number 22 costing $9,000.00 second hand was the most expensive warehouse. Numbers 25 and 26 were rented at an unusually low rate.

The building costs for all concerns averages $713.61 or 16.4 percent of the total costs. As the pregoing discussion indicates the variation of individual warehouses from this figure is wide. But when the causes for the variations are all taken into consideration and the cost of buildings is compared with the volume of business it becomes evident, as shown in Chart II that there is a direct relation between the two, that normally the cost of building varies inversely with the volume of potatoes handled.

Table V shows that building costs are distributed in almost the same proportions to processes for each type of concern. For the wholesale dealers no building charge is made to receiving because they did not use dump scales.

TABLE V

Distribution of Building Costs to Processes Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$741	100	$2673	100	$757	100	$688	100	$714	100
Receiving	35	4.7	89	6.6	18	4.1			25	3.5
Grading	114	15.4	216	16.3	89	18.8	111	16.1	119	16.2
Sacking	991	12.3	158	11.8	64	14.4	120	13.9	95	12.9
Warehousing	501	67.6	872	65.3	280	62.7	482	70.0	490	67.4

Equipment Costs

The elements of equipment costs are depreciation, about 50 percent of the total, power about 20 percent of the total, and interest on investment insurance, taxes, light and repairs, about 30 percent of the total. Depreciation is usually figured at 15 percent of the original cost of the equipment.

Table I shows that for the cooperative associations the equipment costs average $350.56 or 9.5 percent of the total costs. This is a higher cost than for either the local wholesalers or the wholesalers. It is a little less than for the independent dealers, but as stated before the average for the independents does not mean very much as there are only two in the group.

Table VI shows that the weighted average costs per hundred weight for the local wholesalers was 2.59 cents which is slightly more than for the Cooperative Associations which averaged 2.40 cents. The independent dealers have a low weighted average cost per hundred weight because one of them handled

TABLE VI

Equipment Costs

	No. of warehouses	Volume of Business	Average Cost per warehouse	Average Cost per hundred weight	
				Weighted	Unweighted
Cooperatives	11	14603	$ 350.56	$ .0240	$ .0238
Independents	2	38880	556.30	.0143	.0265
Local wholesalers	5	11894	308.84	.0259	.0271
Wholesalers	8	15868	201.60	.0127	.0141
All concerns	26	16338	312.52	.0191	.0216

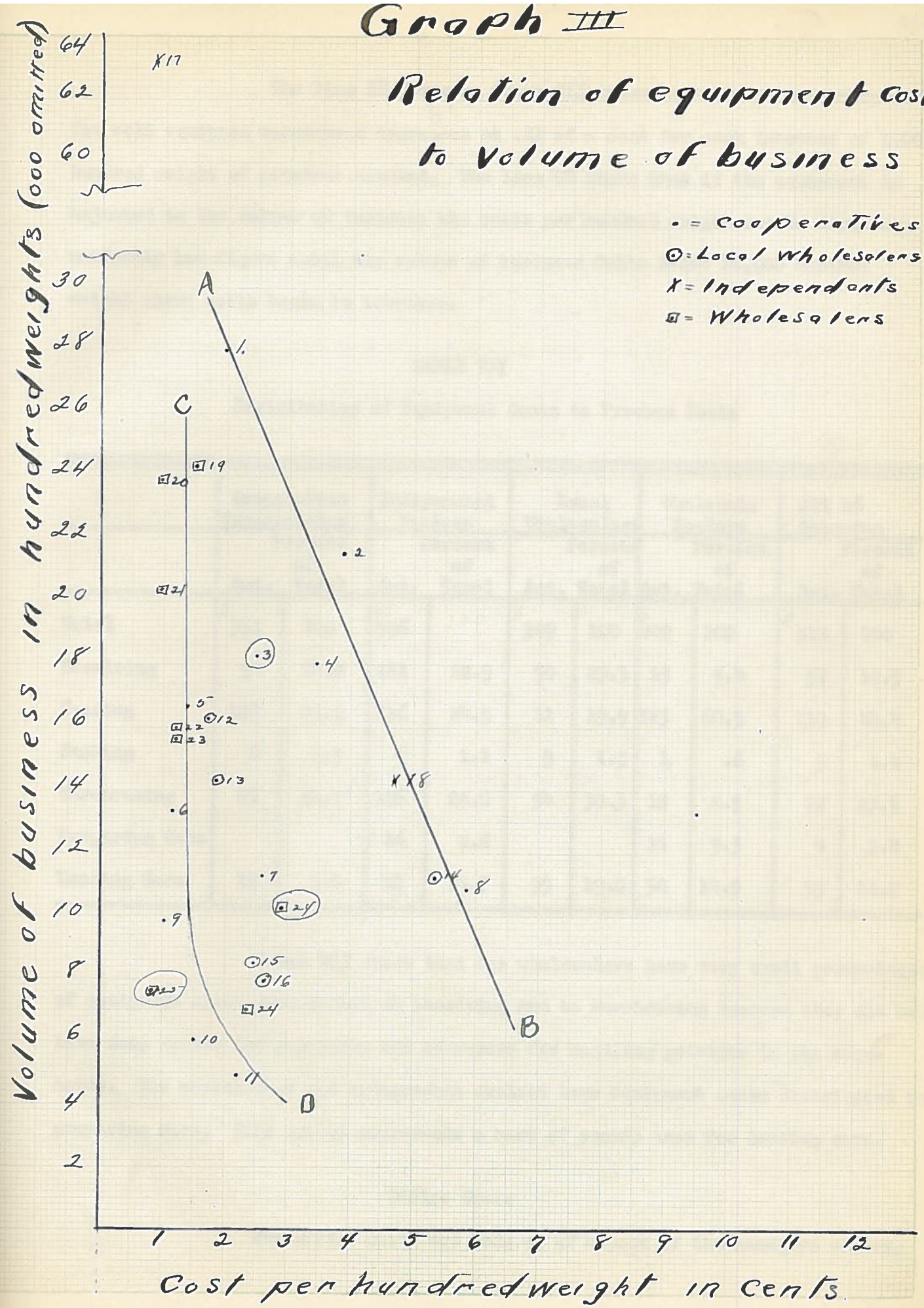
a very large volume of business. The weighted average cost per hundred weight for the wholesalers is only 1.27 cents because they economized on the amount of equipment used.

When the costs for all 26 concerns are plotted on Graph III they show a range from .7i of a cent to 5.75 cents. All of the concerns may be divided into two groups on the basis of the amount of equipment used. The first group, representing most of the concerns, try to adjust the amount of equipment to their volume of business. The second group, including numbers 1, 2, 4, 15, 14 and 8 have very complete equipment for handling a very large volume of business. As several of the cooperative associations fall in this class, it makes their weighted average cost per hundred weight high. Number 3 is high because it had an unusually high charge for power. Four of the local wholesalers adjusted the amount of their equipment to their volume of business but they had more expensive equipment than the wholesalers. The wholesalers excepting number 24, kept only the minimum amount of equipment, where they have their largest investment in equipment. Number 25 rented the equipment with the building at a very low rate.

Graph III

Relation of equipment cost to volume of business

• = Cooperatives
⊙ = Local Wholesalers
X = Independents
⊡ = Wholesalers



The line AB drawn on Graph III shows that the equipment costs for well equipped warehouses decreases at .21 of a cent for each increase of 1000 hundred weight of potatoes handled. The line CD shows that if the equipment is adjusted to the volume of business the costs per hundred weight can be kept at a uniformly low figure until the volume of business falls below 10,000 hundred weight where costs begin to increase.

TABLE VII

Distribution of Equipment Costs to Process Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$351	100	$556	100	$309	100	$202	100	$313	100
Receiving	52	14.8	161	28.9	90	29.3	19	9.4	57	18.5
Grading	187	53.2	136	24.5	61	19.9	123	60.9	139	44.4
Sacking	6	1.9	6	1.1	5	1.5	1	.6	5	1.4
Warehousing	86	24.7	156	28.0	94	30.3	18	8.9	72	23.1
Preparing Cars			16	2.8			11	5.3	4	1.4
Loading Cars	19	5.4	81	14.7	59	19.0	30	14.9	35	11.2

Table VII shows that the wholesalers have very small percentages of equipment costs distributed to receiving and to warehousing because they did not have dump scales for receiving nor conveyors for handling potatoes in the warehouse. The wholesalers and independent dealers have equipment costs distributed to preparing cars. This charge represents a cost of stoves used for heating cars.

Office Costs

The office costs are made up of a part of the managers salary,

interest charges on working capital and other miscellaneous items, as explained under office costs in Chapter II.

Table I shows that for both cooperative associations and independent dealers the office costs are about 10.0 percent of the total costs. For local wholesalers the office costs are 12.3 percent of the total costs and for wholesalers 18.0 percent of the total costs. The cooperative associations and the independent dealers are alike in the respect that they have no central office expense and they cannot be compared with the wholesalers where the central office costs make up the major part of the office costs. The wholesalers really perform a part of the central marketing function and since it is impossible to separate the local and the central costs with the data that are available their office costs are shown as being higher.

Table V shows the average office cost for each type of concern. The independents have a greater average cost per warehouse and a smaller weighted cost per hundred weight than the cooperatives because they handled a larger volume of business. The local wholesalers on the other hand have a smaller average office cost than the wholesalers because the central office was also used for other business while the central office of the wholesalers was used only for the marketing of potatoes.

TABLE VIII

Office Costs

	No. of warehouses	Volume of business	Average Cost per warehouse	Average Cost per hundred weight	
				Weighted	Unweighted
Cooperatives	11	14603	$ 392.11	$ .0269	$ .0290
Independents	2	38880	618.80	.0159	.0198
Local wholesalers	5	11894	491.76	.0413	.0402
Wholesalers	8	15868	862.06	.0543	.0530
All concerns	26	16338	573.30	.0351	.0378

Graph IV shows the relation of office costs per hundred weight to the volume of business. The cooperative associations show a tendency for costs per hundred weight to be fairly constant for associations of different sizes. Number 4 has an unusually high cost per hundred weight because it is the only concern that hired a special bookkeeper. Number 8 estimated a very small part of its managers time to office costs. Number 7 may have estimated too large a portion of its office requirements to potatoes in dividing office requirements between enterprises.

TABLE XX

Distribution of Office Costs to Process Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$392	100	$619	100	$491	100	$826	100	$573	100
Buying			165	26.7	306	62.3	260	30.2	*263	*46.5
Receiving	145	36.9	9	1.5			8	.9	643	11.2
Grading	27	6.8	23	3.8			22	2.6	20	3.5
Sacking	22	5.2	42	6.8			36	4.2	23	4.0
Warehousing	42	10.7	50	8.0			48	5.5	36	6.3
Preparing cars		.1	4	.6			2	.2	1	0.2
Loading cars	7	1.9	21	3.3			16	2.0	10	1.8
Selling	150	38.4	305	49.3	185	37.7	469	54.4	267	46.5

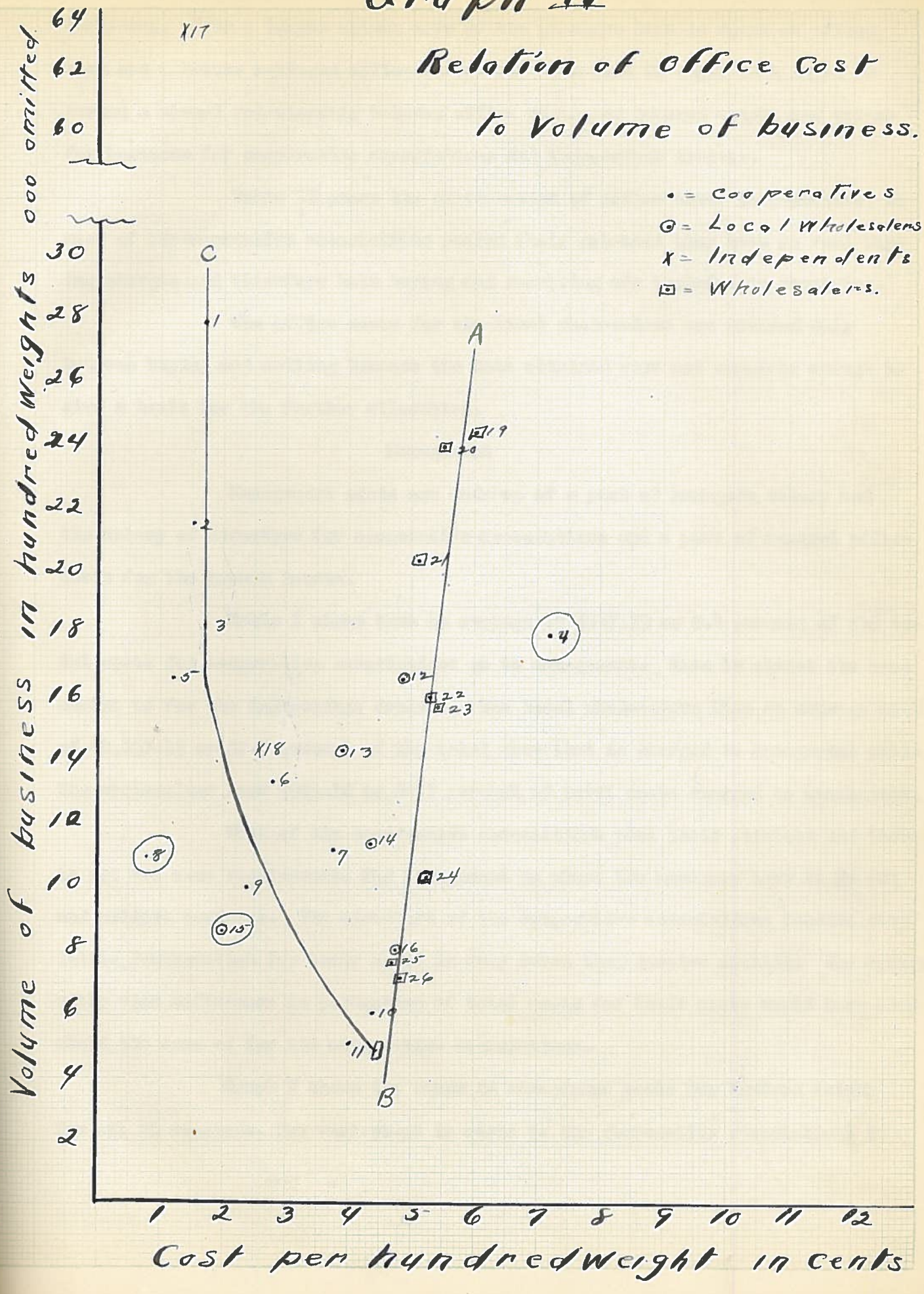
* Average of all except cooperative associations.

The per hundred weight costs of both the local wholesalers and the wholesalers run quite uniform with the exception of number 25 which is a branch house, that is operated only in the fall. The line AB drawn on Graph IV shows that the office costs of branch houses tend to increase slightly as volume

Graph IV

Relation of office cost to volume of business.

• = Cooperatives
⊙ = Local Wholesalers
X = Independents
⊡ = Wholesalers.



increases. With a larger volume more of the managers time is spent at office work and a better equipped office is needed. The line CD shows what might be termed a normal relationship between office costs per hundred weight and volume for business for cooperative associations and independent dealers.

Table IX shows the distribution of office costs to processes. As most of the cooperative associations pooled their potatoes they have no real buying charges and therefore both buying and receiving are included in receiving.

The office costs for the local wholesalers are divided only between buying and selling because the data obtained were not complete enough to give a basis for the further allocation.

Management

Management costs are made up of a part of managers salary and the salary of directors for cooperative associations and a part of central office costs for the branch houses.

Table I shows that an average of $317.79 or 8.4 percent of the total costs for cooperative associations go to management. This is almost the same amount as for the independent dealers. The local wholesalers have an average cost of $1,153.15 or 26.7 percent of the total cost that is charged to management while the wholesalers have $991.10 or 20.7 percent of total costs charged to management.

Most of the cooperative associations pool their potatoes and there is not the same requirements for management as where the managers have to go out and solicit business. The directors of the cooperative associations receive very little remuneration for their work: in many cases they receive nothing. The apparently wide difference in percentage of total costs for their costs would have been about the same as for the cooperative associations.

Graph V shows the range in management costs per hundred weight for all 26 concerns. The variations in costs to the cooperative associations is

due mainly to the range in salaries paid the manager and to the variations in the estimates as to the division of their time. Number 6 was divided so that it had a very low office cost and a very high management cost. Central office costs were prorated to the branches on the basis of the volume of business which gives a uniform basis for distribution. The variations in costs per hundred weight are entirely due to differences in salary paid to the local managers and to the differe ent estimates given of their time spent in managing. Number 15 was operated only for a short period in the fall.

Number 24 is located in a place were competition is very keen so the manager charged practically all of his time to managing.

The curves on Graph V show that there is a tendency for management for local wholesalers and thi wholesalers is probable due to the differences in allocation of costs to management and office. If we add the office and management costs for each type of dealer, we discover that they are very nearly alike for both.

TABLE IX

Management Costs

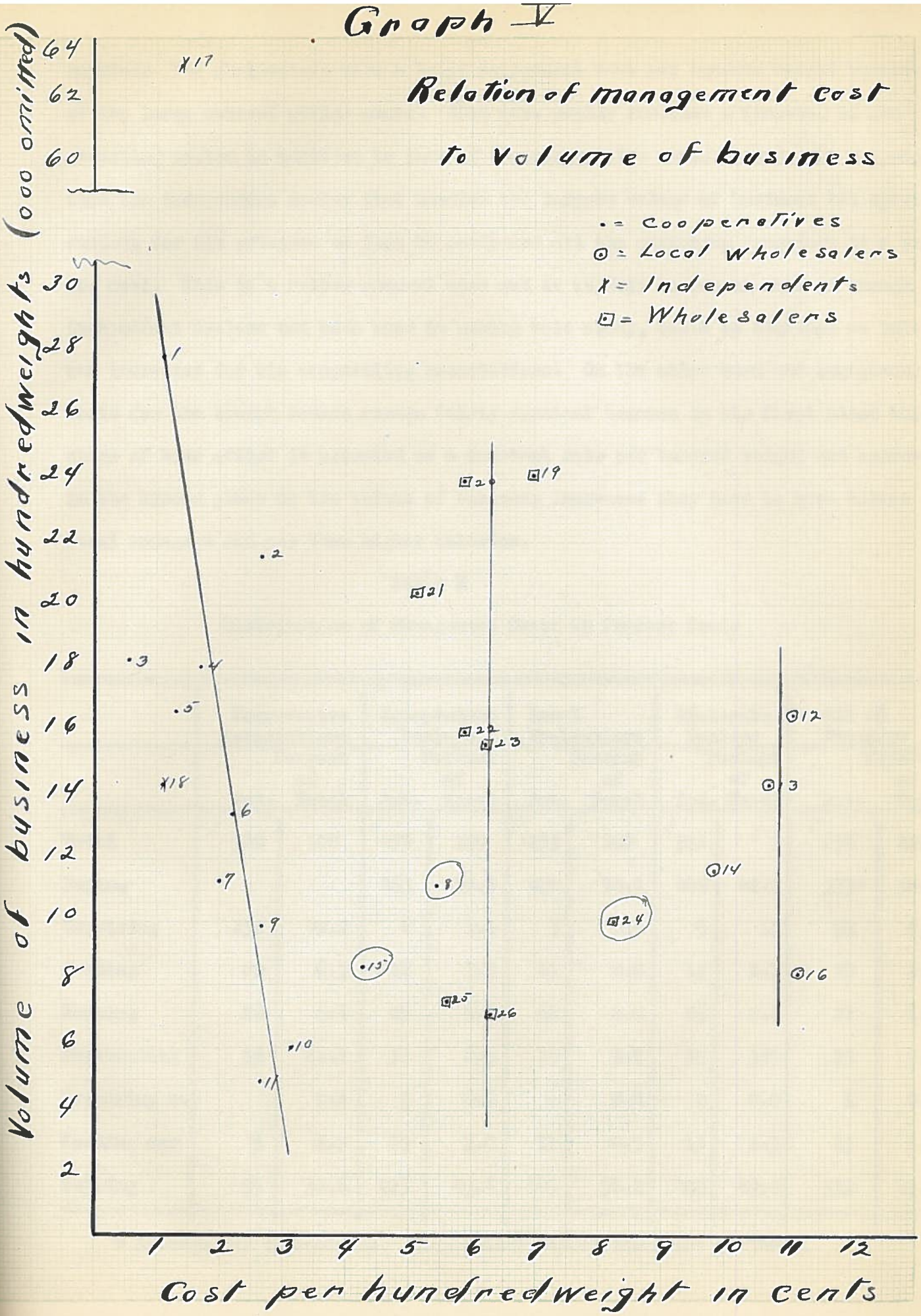
	No. of warehouses	Volume of business	Average Cost per warehouse	Average Cost per hundred weight	
				Weighted	Unweighted
Cooperatives	11	14603	$ 311.79	$.0214	$.0225
Independents	2	38880	489.00	.0125	.0117
Local wholesalers	5	11894	1153.15	.0969	.0932
Wholesalers	8	15868	991.10	.0625	.0625
All concerns	26	16338	696.24	.0426	.0476

Table IX shows that the independent dealers had the lowest management costs per hundred weight. This is due mainly to the large volume

Graph V

Relation of management cost to volume of business

• = Cooperatives
⊙ = Local Wholesalers
X = Independents
⊡ = Wholesalers



handled. The wholesalers have a large management cost per hundred weight because of the large central office costs. This cost really includes a function in the marketing system in addition to that of the cooperative associations. It happened that the independent dealer that handled the largest volume of business had special outlets for his potatoes so that he performed all the marketing functions at a very low cost. This is a rather unusual case and it is fair to assume that if enough independent dealers had been used in making this study, costs to decrease as volume increases for the cooperative associations. On the other hand the management costs for the branch houses remain fairly constant because in the first place this share of home office is prorated as a constant rate per hundred weight and because in the second place as the volume of business increases they have to have better local managers and pay them higher salaries.

TABLE X

Distribution of Management Costs to Process Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	₡ 312	100	₡ 489	100	₡ 1153	100	₡ 991	100.	₡ 696	100
Buying			163	33.3	404	35.1	409	41.2	375*	38.3*
Receiving	132	42.2	6	1.3	7	0.6	5	.5	59	8.5
Grading	22	6.9	17	3.5	23	2.0	17	1.7	20	2.9
Sacking	19	6.1	29	6.1	55	2.0	25	2.6	23	3.2
Warehousing	35	11.1	32	6.5	35	3.1	35	335	35	5.0
Preparing car		0.2	3	0.7	2	0.2	2	0.2	1	0.2
Loading car	9	2.9	15	3.0	11	0.9	13	1.3	15	1.6
Selling	95	30.6	223	45.6	649	56.1	485	49.0	332	47.6

* Average for 15 concerns. Cooperative associations not included.

In Table X both buying and receiving are included together for the cooperative associations because most of them pooled their potatoes. Both types of wholesalers have a higher percentage of total management cost charged to buying than the independent dealers because a part of central office costs are allocated to buying. They also have higher selling costs because they perform the function of the central market middlemen.

Sacks

Sacks are included as one of the prime costs and are not distributed to the process costs.

TABLE XI.

Cost of Sacks

	Number of warehouses	Average per warehouse	Unweighted average per hundred weight
Cooperative Associations	11	$ 833.47	$ .0596
Independent Dealers	2	2365.12	.0623
Local Wholesalers	5	669.33	.0555
Wholesalers	8	860.97	.0558
All concerns	26	920.49	.0579

The independent dealers paid more for their sacks than the other concerns. This may be due to the fact that they bought directly and in smaller quantities. Most of the cooperative associations purchased their sacks thru the Minnesota Potato Exchange and received some reduction in price. The wholesalers bought their sacks in large quantities and distributed them from the central office.

The small range of a few cents per hundred weight in sacks for individual warehouses may be explained by the variations in the market price of

sacks and the freight charges to the various stations. The cost of sacks does not effect the range in total costs per hundred weight but it is a fairly constant cost for all concerns.

Other Costs

Other costs as listed in Table I include charges for insurance on potatoes in storage, linings for preparing cars, messengering commissions and a few miscellaneous charges which apply only to a few warehouses, such as demurrage on cars, claims, inspection etc.

For the cooperatives these charges are ohly for insurance on potatoes in storage, linings, in a few cases, and messengering for one concern.

For the independents this cost is made up of linings and commissions on a few cars.

For both types of wholesalers this cost consists mainly of commissions paid for selling potatoes in other markets. This is really a central marketing cost and should have been excluded in making comparisons with costs to cooperative associations.

Process Costs

The process costs as given in this analysis represent the best possible distribution of the process costs from the data available. They are analyzed separately in the order that they appear in Table III. The total costs used in the tables showing process costs are the total of all prime costs with the exception of the cost of sacks.

Buying Costs

In most cases the cooperative associations do not buy in the sense that they do not solicit business by competition bidding; they merely receive potatoes brought to warehouse. This is especially true of associations that pool

TABLE XII

Distribution of Average Total Costs Less the Cost of Sacks to Processes

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$2846.51	100	$4528.69	100	$3353.12	100	$3940.95	100	$3810.06	100
Buying			327.98	7.2	710.66	21.2	669.21	16.8	638.58*2	16.7*2
Receiving	436.33*1	15.3*1	350.55	7.7	167.58	5.0	94.37	2.4	272.83	8.0
Grading	574.90	20.2	628.30	13.9	341.72	10.2	406.69	10.2	482.41	14.1
Sacking	345.44	12.0	646.87	14.3	257.16	7.7	376.60	9.6	361.25	10.6
Warehousing	1051.74	37.1	1552.41	34.4	675.13	20.1	886.04	22.3	971.32	28.3
Preparing cars	32.35	0.7	168.65	3.7	31.55	1.0	42.04	1.0	56.97	1.2
Loading cars	142.19	5.0	318.06	7.0	153.93	4.7	162.80	4.0	164.00	4.8
Selling	245.75	8.6	528.52	11.7	834.16	24.8	954.23	24.0	596.65	17.6
Commissions	*3		7.50	0.1	125.19	38.	329.00	8.3	125.77	3.5
Miscellaneous	29.41	1.0			52.83	15.	47.65	1.4	29.08	0.9

*1 - Includes buying for cooperative associations.
*2 - Average of 15 concerns, cooperative associations not included.
*3 - Commissions were deducted from sales and so do not appear as a cost.

but it is almost equally true for those that pay cash. Whatever costs arise in connection with buying for cooperative associations have therefore been included with receiving in preparing the tables. This makes the receiving costs for cooperative associations higher than for other types of concerns. In analyzing individual warehouses an attempt was made to separate buying from receiving for all cooperative associations that did not pool.

Table XII shows that for the independent dealers, the buying costs is only 7.2 percent of the total as compared with 16.8 percent and 21.2 percent for the local wholesalers and wholesale dealers respectively. Where a central office is needed to direct the buying, the buying costs are greatly increased. The buying costs for the local wholesalers is 4.4 cents higher than for the wholesale dealers because their office costs were divided only between buying and selling.

TABLE XIII

Elements of Average Buying Costs

	Independent Dealers		Local Wholesalers		Wholesale Dealers		All 15 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$328	100	$710	100	$669	100	$638	100
Office	166	50.3	306	43.1	260	38.9	263	41.8
Management	162	49.6	404	56.9	409	61.1	375	58.2

Table XIII shows that the office costs and management costs are combined in approximately equal proportions to form buying costs. The variations shown in Table XIII are due to the difference previously explained in method of allocating the costs for these different types of concerns.

Graph VI

Relation of buying cost to volume of business

• = Cooperatives
◎ = Local Wholesalers
X = Independents
⊡ = Wholesalers.

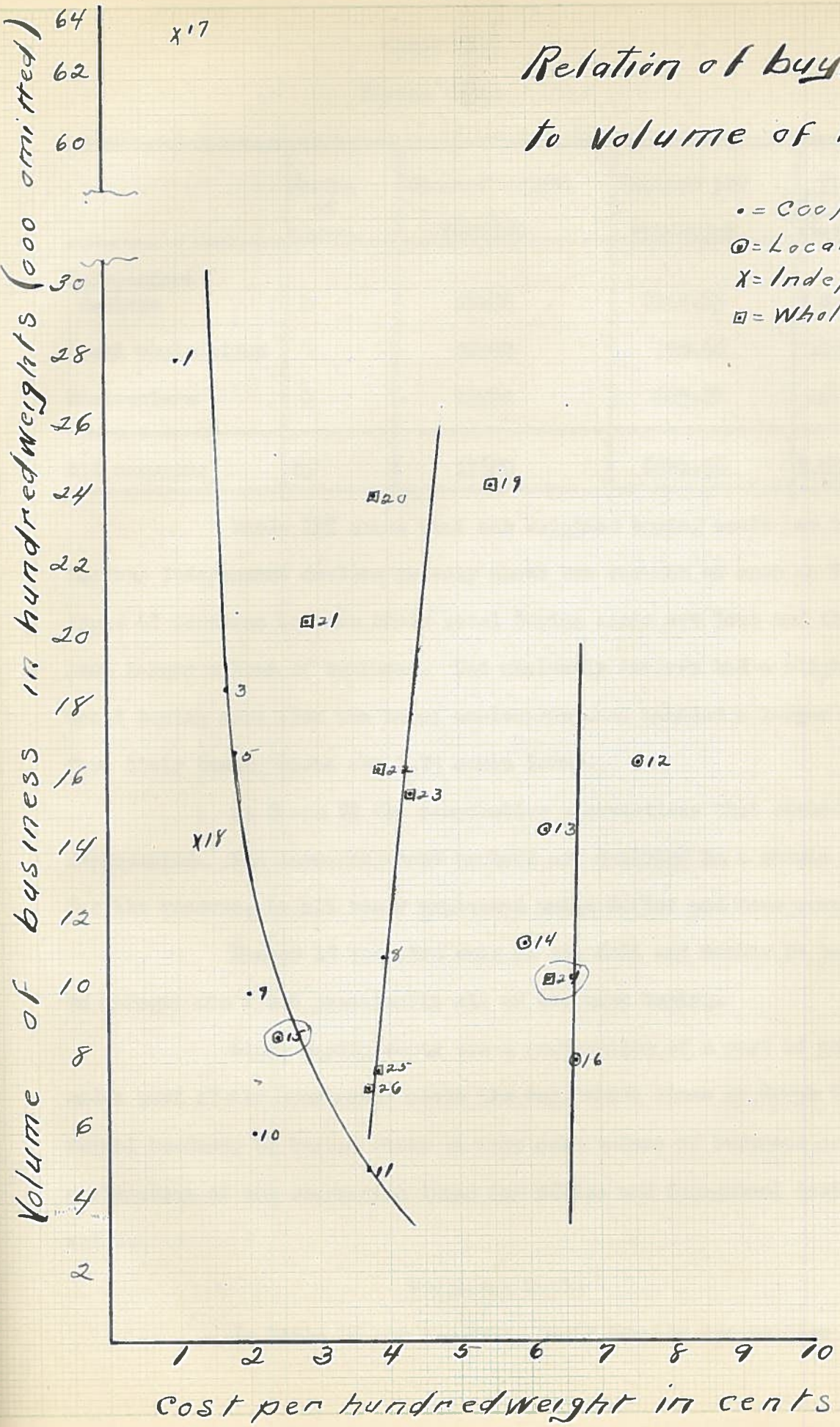


TABLE XIV

Buying Costs

	Number of wheas.	Hundred weight handled	Average per warehouse	Per hundred weight	
				Weighted average	Unweighted average
Independent dealers	2	35880	$318.65	$.0084	$.0106
Local wholesaldrs	5	11694	710.66	.0597	.0569
Wholesalers	8	15868	669.21	.0422	.0420
All concerns	15	17600	$641.96	$.0366	$.0428

Table XIV shows that the weighted buying costs per hundred weight for the independent dealers is only about one seventh as much as for the other types of concerns because their total buying costs are less and they handled a much larger volume of business. The wholesale dealers had a slightly smaller total buying cost than the local wholesalers and handled a larger volume: therefore their buying costs are 1.75 cents lower.

In Graph VI the cooperative associations that pooled have not been represented. The concerns whose numbers are enclosed in a circle are out of line for the reasons, as all ready explained under Office and Management Costs.

Number 15 operated only in the fall and number 24 had a high salaried manager who spent practically all of his time buying.

Since buying costs are a combination of a part of the office costs and a part of the management costs the regressive lines on Graph VI showing the normal tendency of buying costs to vary with volume of business are practically a combination of the regression lines for office and management costs on Graphs IV and V.

Receiving Costs

In Table XV the receiving costs for the cooperative associations

include buying and therefore cannot be compared with the other concerns. For the independent dealers and the local wholesalers the equipment and building costs constitute about 75 percent of the receiving costs because they used special receiving equipment.

TABLE XV.

Elements of the Average Receiving Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$436	100	$351	100	$165	100	$ 94	100	$282	100
Labor	69	15.9	86	24.5	50	30.4	46	48.2	59	21.7
Building	35	8.0	89	25.3	18	11.8	*		25	9.2
Equipment	52	11.9	161	45.8	90	54.4	19	20.1	57	21.1
Office	148	33.6	9	2.6	*		8	8.1	64	23.7
Management	132	30.6	6	1.8	7	4.	5	5.8	58	21.8
Other costs							16	17.8	7	2.6

* Available data did not permit allocation.

The wholesalers have a very small average cost for receiving because they let the farmers perform the work of unloading the potatoes themselves. Other costs as listed under wholesalers are charged paid for weighing potatoes in city scales.

Table XVI shows that the receiving costs per hundred weight for the wholesalers was .32 of one cent lower than for the independents who handled a large volume, because they let the farmers perform most of the work. It cost the local wholesalers 1.41 cents per hundred weight to receive potatoes because they had special receiving equipment and did not handle a large volume of business.

Graph VII

Relation of receiving cost to volume of business.

• = Cooperatives
⊙ = Local Wholesalers
X = Independents
⊡ = Wholesalers.
=•= = Includes buying for Cooperatives that pool

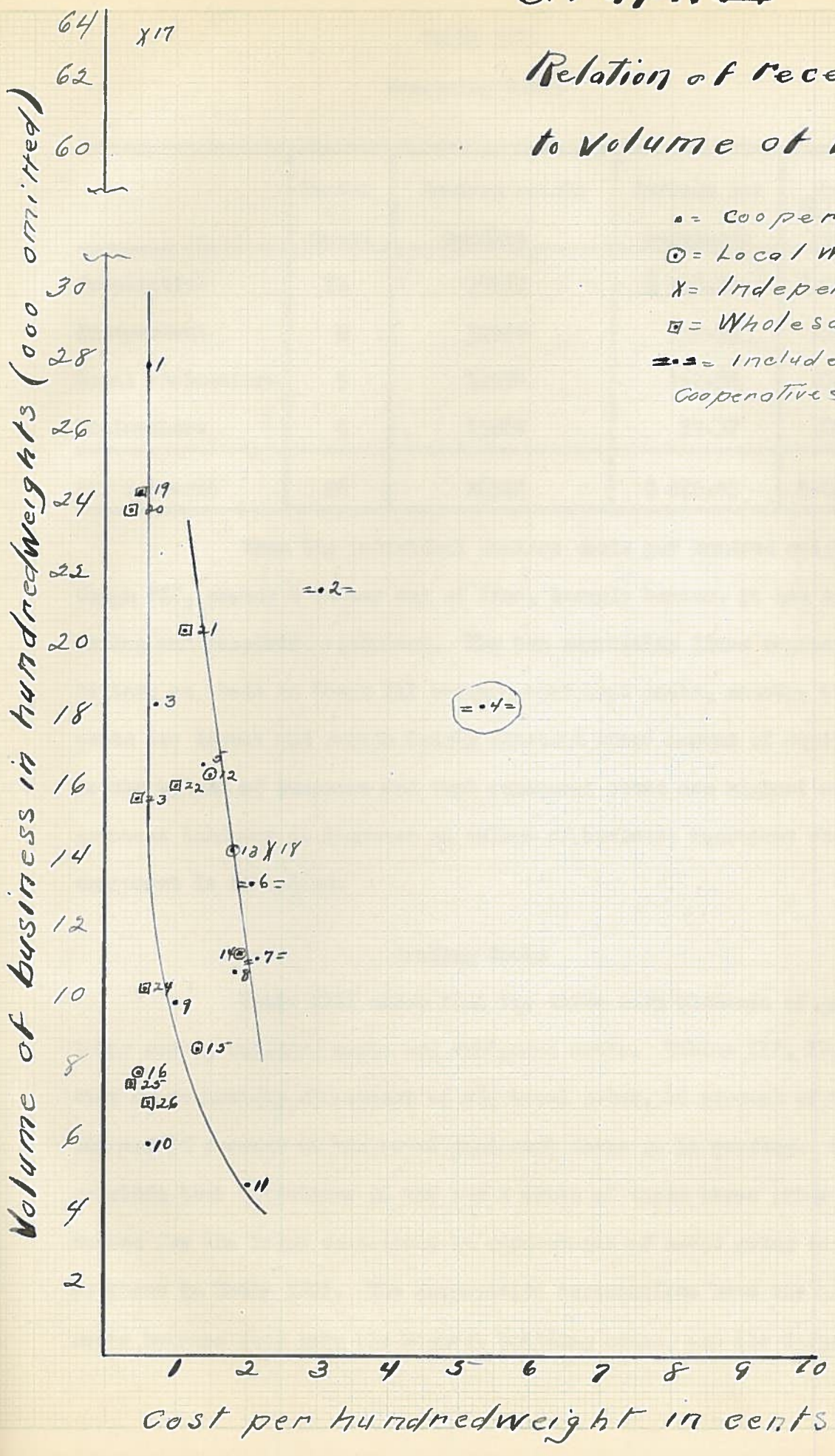


TABLE XVI.

Receiving Costs

	Number of wheas.	Hundred weight handled	Average per warehouse	Per hundred weight	
				Weighted average	Unweighted average
Cooperative	11	14603	$ 436.33	$.0298	$.0326
Independent	2	38560	350.55	.0091	.0138
Local wholesalers	5	11894	167.58	.0142	.0134
Wholesalers	8	15868	94.37	.0059	.0056
All concerns	26	16388	$ 272.83	$.0169	$.0093

When the individual dealers costs per hundred weight are plotted on Graph VII, number 4 is way out of line, largely because it has two sets of dump scales and receiving equipment. The two regression lines represent the same conditions as those on Graph III showing equipment costs, namely, that equipment costs are lowest and remain fairly constant where amount of equipment is adjusted to the volume of business and that equipment costs are highest and show the greatest tendency to decrease as volume of business increases where complete equipment is installed.

Grading Costs

Table XVII shows that the three main elements of grading costs are labor costs, building costs and equipment costs. Tables III, IV, and VII show that approximately 20 percent of the total labor, 16 percent of the total building and 50 percent of the total equipment costs go to grading. From this we may conclude that variations in the total costs of these three prime factors are the causes for the large variations in percentages of costs going to grading costs, as shown in Table XVII. The cooperative associations have the highest grading costs because they have the highest building costs, and the largest equipment

costs and because they make the least efficient use of their labor.

TABLE XVII

Elements of Average Grading Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$575	100	$628	100	$342	100	$407	100	$482	100
Labor	222	39.3	234	37.5	174	50.9	134	32.9	186	39.1
Building	115	19.9	218	34.9	84	24.5	111	27.3	118	23.9
Equipment	188	32.4	136	21.8	61	18.0	123	30.2	138	28.8
Office	28	4.6	23	3.9	*		22	5.5	20	4.1
Management[1]	22	3.8	17	1.9	23	6.6	17	4.1	20	4.1

*

TABLE XVIII

Grading Costs

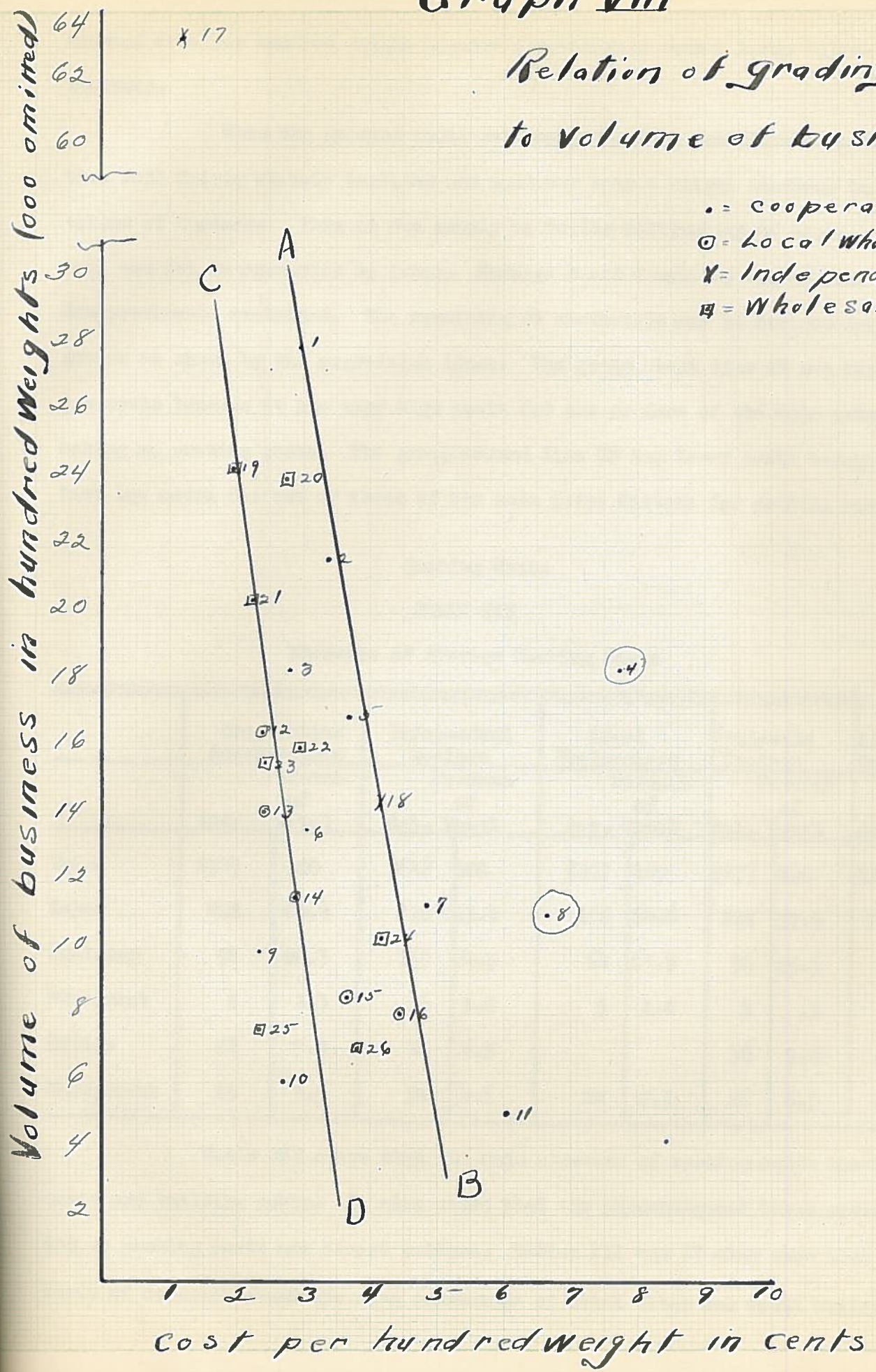
	Number of wheas.	Hundred weight handled	Average per warehouse	Per hundred weight	
				Weighted average	Unweighted average
Cooperative	11	14603	$ 574.90	$.0388	$.0410
Independent	2	38880	628.30	.0167	.0205
Local wholesalers	5	11894	341.72	.0287	.0304
Wholesalers	8	15868	406.69	.0256	.0274
All concerns	26	16388	$ 482.41	$.0295	$.0336

Table XVIII shows that there is very little difference between the per hundred weight costs for grading by the two types of wholesalers. The independent dealers have the highest total average grading cost but the lowest weighted

Graph VIII

Relation of grading cost to volume of business

.= cooperatives
⊙= Local Wholesalers
X= Independents
⊡= Wholesalers.



average cost per hundred weight because they handled such a large volume of business.

When the grading costs per hundred weight are plotted on Graph VIII they fall fairly closely together and indicate only a slight tendency to vary with volume of business. This is due mainly to better utilization of space and equipment and not to economies in labor. Numbers 4 and 6 are way out of line for reasons previously explained. The remaining 24 warehouses may be divided into two groups as shown by the regression lines. The group about line AB has high grading costs because it has very high costs for one or more of the main prime factors making up grading costs. The group around line CD has lower costs because they have low costs for two or three of the main prime factors for grading costs.

Sacking Costs

TABLE XIX

Elements of Average Sacking Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$545	100	$647	100	$257	100	$377	100	$361	100
Labor	208	60.4	410	63.4	166	64.6	218	57.9	218	60.5
Building	91	26.3	159	24.5	64	24.9	96	25.3	94	25.6
Equipment	6	1.9	6	1.0	5	1.8	1	.3	5	1.3
Office	22	5.9	42	6.5			36	9.6	22	6.3
Management	19	5.5	30	4.6	22	8.7	26	6.9	22	6.3

Table XIX shows that the main elements of sacking costs are labor costs and building costs. It also shows that the percentagesof these costs making up sacking costs are almost uniform. Tables III and IV also show that for all types of concerns about the same percentage of total labor and total building costs

go to sacking costs. This may be explained by the fact that the estimated time for sacking by different concerns is nearly the same and that approximately the same amount of building space is charged to sacking in each warehouse.

TABLE XX.

Sacking Costs

	Number of wheos.	Hundred weight handled	Average per warehouse	Per hundred weight	
				Weighted average	Unweighted average
Cooperative	11	14603	$ 345.44	$.0237	$.0267
Independent	2	36680	646.87	.0166	.0212
Local wholesalers	5	11894	257.16	.0216	.0230
wholesalers	8	15868	376.60	.0237	.0251
All concerns	26	16388	$ 361.25	$.0221	$.0251

Table XX shows that for three types of concerns the weighted costs per hundred weight is nearly the same. It also shows that the independent dealers by handling a very large volume can make enough more efficient use of its labor and space to reduce sacking costs about .6 of one cent per hundredweight.

Graph XX shows that the sacking costs show very little tendency to vary with volume of business. The range in costs as shown are due entirely to variations in estimates of time required to sack a hundred pounds of potatoes and to the variations in building costs.

Warehousing Costs

The term warehousing as used in this analysis is very indefinite. It really includes a number of processes for which sufficient data were not obtained to make a separate analysis. It includes the cost of storage, reconditioning, resorting, hand picking, resacking, and all the miscellaneous operations about the warehouse.

Graph IX

Relation of sacking cost to volume of business

• = Cooperatives
⊙ = Local Wholesalers
X = Independents
⊡ = Wholesalers.

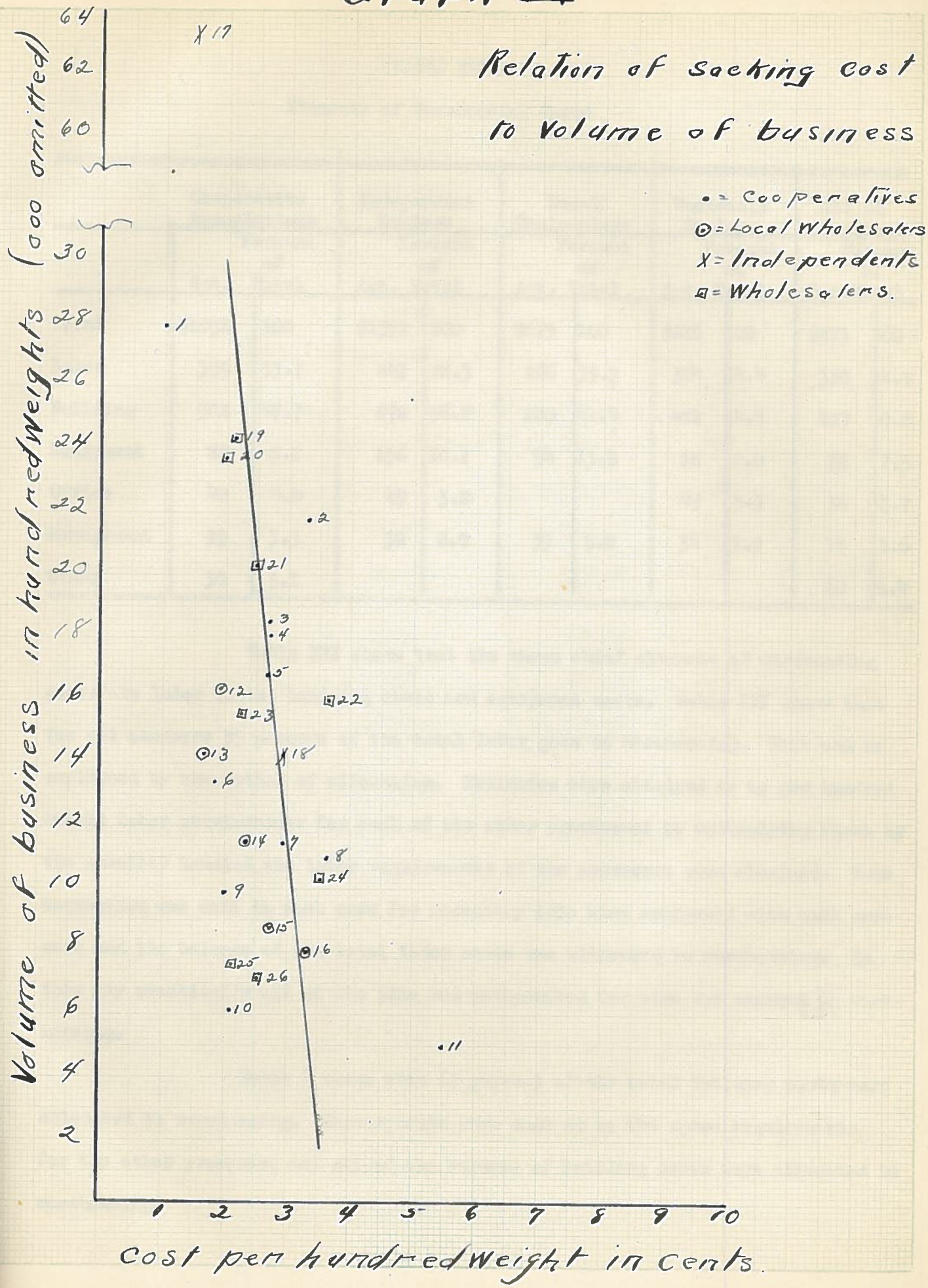


TABLE XXI

Elements of Warehousing Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$1051	100	$1552	100	$675	100	$886	100	$971	100
Labor	355	33.7	443	28.5	266	39.5	304	34.4	330	34.0
Building	502	47.7	872	56.2	280	41.4	481	54.4	489	49.8
Equipment	87	8.2	156	10.1	94	13.9	18	2.0	72	7.5
Office	42	4.0	49	3.2			49	5.3	36	3.7
Management	35	3.3	32	2.0	35	5.2	34	3.9	34	3.6
Other	30	3.1							10	1.4

Table XXI shows that the three chief elements of warehousing costs are labor costs, building costs and equipment costs. Table III shows that for all concerns 35 percent of the total labor goes to warehousing. This can be explained by the method of allocation. Estimates were obtained as to per hundred weight labor requirements for each of the other processes: by multiplying these by the quantity handled the labor requirements of the processes were obtained. Some connection was made in each case for necessary idle time connected with each process and the balance of the total labor costs was allocated to warehousing. In this way practically all of the idle and unaccounted for time was charged to warehousing.

Table V shows that 67 percent of the total building costs were allocated to warehousing. Measurements were made as to the space requirements for the other processes and all of the balance of building costs were allocated to warehousing.

Table VII shows that 23 percent of equipment costs for all concerns went to warehousing. The equipment charges are highest in those warehouses having complete conveyor equipment for moving the potatoes about the warehouse. In case of the wholesalers where the equipment cost is small, the warehouses have no conveyers. The charge for warehousing is mainly for such miscellaneous equipment as hand truck and stoves.

TABLE XXII

Warehousing Costs

	Number of whses.	Hundred weight handled	Average per warehouse	For hundred weight	
				Weighted average	Unweighted average
Cooperative	11	14603	$ 1051.74	$.0720	$.0755
Independent	2	38680	1552.41	.0399	.0704
Local wholesalers	5	11894	675.13	.0568	.0573
Wholesalers	8	15868	886.04	.0558	.0606
All concerns	26	16388	$ 971.32	$.0591	$.0671

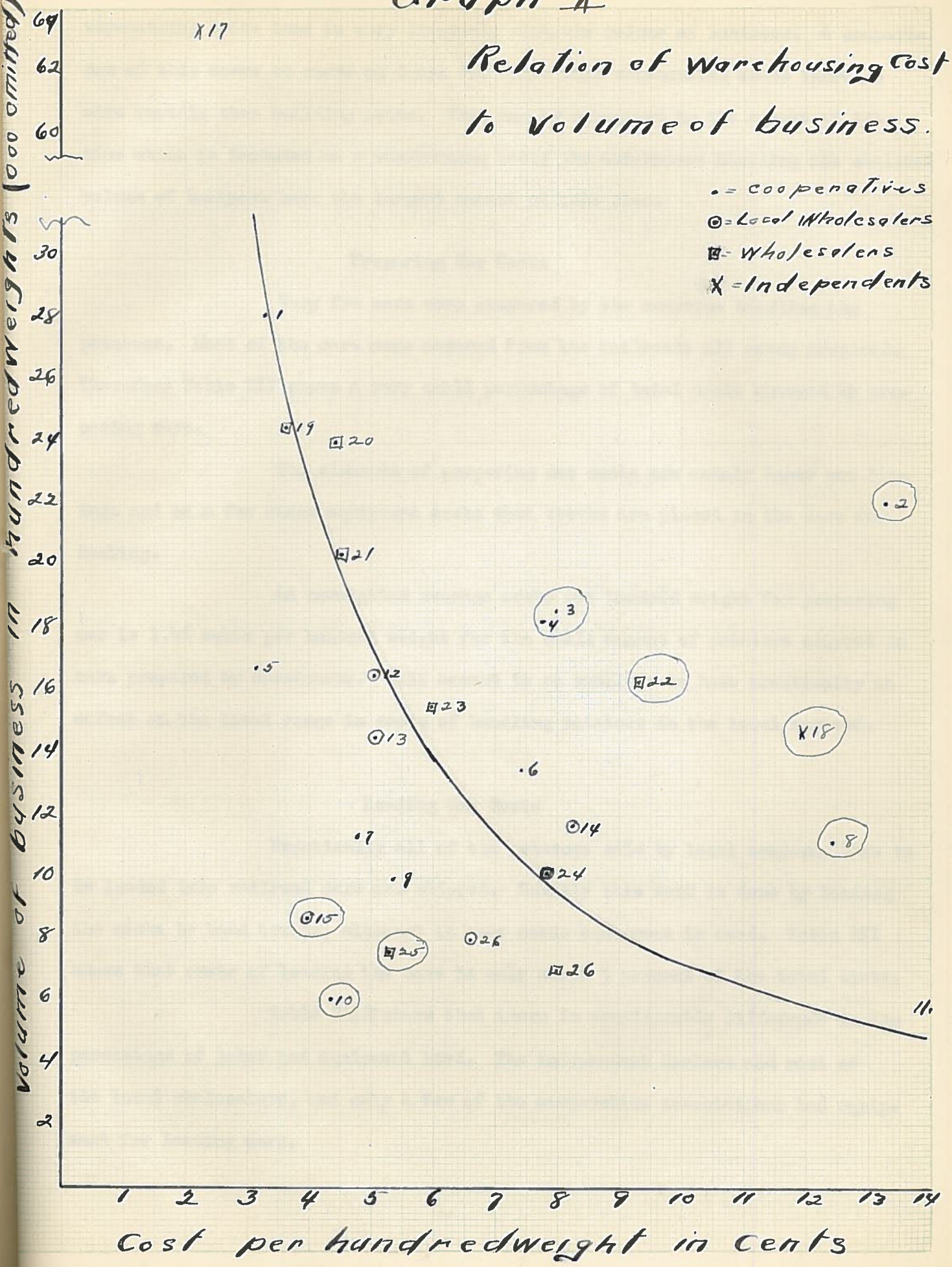
Table XXII shows that the warehousing costs per hundred weight is a very large factor of cost when compared to the other processes. The cooperative associations have the highest average costs. One would expect this since they have the highest costs for the three prime factors, labor, building and equipment, which make up most of the warehousing costs. As building costs are practically constant costs the per hundred weight cost of warehousing can be greatly reduced by handling a larger volume as is shown in the case of the independent dealers with a weighted average cost of only 3.99 cents.

When the costs per hundred weight are plotted on Graph X they show a very wide range. But by omitting all warehouses that have been explained as being out of line on Graphs I, II and III a curve can be drawn to show that

Graph X

Relation of Warehousing Cost to Volume of business.

• = Cooperatives
⊙ = Local Wholesalers
⊡ = Wholesalers
X = Independents



warehousing costs tend to vary inversely with the volume of business. A comparison of this curve to curve on Graph III shows that warehousing costs increase more rapidly than building costs. This may be explained by the amount of idle time which is included as a warehousing cost; the warehouses handling the smallest volume of business have the largest amount of idle time.

Preparing Car Costs

Very few cars were prepared by the concerns handling the potatoes. Most of the cars were ordered from the railroads all ready prepared. Therefore Table XII shows a very small percentage of total costs charged to preparing cars.

The elements of preparing car costs are mainly labor and linings and in a few cases equipment costs when stoves are placed in the cars for heating.

An unweighted average costs per hundred weight for preparing car is 1.46 cents per hundred weight for the small amount of potatoes shipped in cars prepared by warehouses. This amount is so small as to have practically no effect on the total range in costs of handling potatoes in the local markets.

Loading Car Costs

Practically all of the potatoes sold by local concerns have to be loaded into railroad cars and shipped. Usually this work is done by loading the sacks by hand trucks, although in some cases equipment is used. Table XII shows that costs of loading the cars is only about 5 percent of the total costs.

Table XIII shows that there is considerable difference in the percentage of labor and equipment used. The independent dealers and most of the local wholesalers, and only a few of the cooperative associations had equipment for loading cars.

TABLE XXXII

Elements of Average Loading Car Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$142	100	$318	100	$153	100	$163	100	$164	100
Labor	107	75.1	201	63.3	83	54.5	103	62.9	107	65.8
Equipment	19	13.4	82	25.7	59	38.4	30	18.5	33	21.3
Office	7	5.2	21	6.5			18	10.8	10	6.2
Management	9	6.3	14	4.5	11	7.1	12	7.8	14	6.7

Table XXIV shows that the average costs of loading were very small for all concerns and highest for both types of wholesalers, since they handled a smaller volume of business.

TABLE XXIV

Cost of Loading Cars

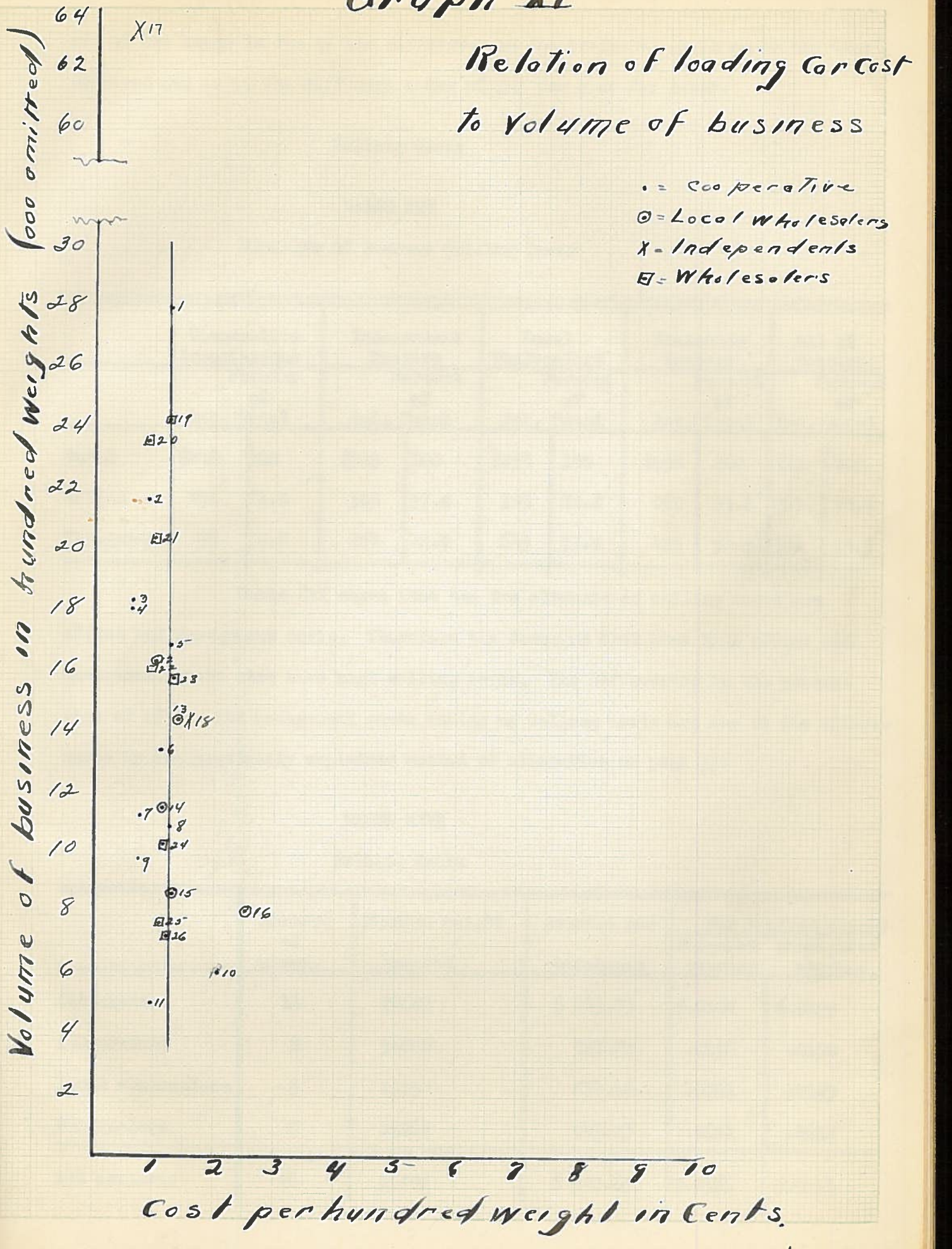
	Number of wheen.	Hundred weight handled	Average per warehouse	Per hundred weight	
				Weighted average	Unweighted average
Cooperative	11	14603	$ 142.19	$.0097	$.0103
Independent	2	38880	318.06	.0081	.0111
Local wholesalers	5	11894	153.93	.0128	.0141
Wholesalers	8	15868	162.80	.0103	.0106
All concerns	26	16388	$ 164.00	$.0101	$.0104

Graph XI shows that the costs of loading for individual warehouses do not vary to any extent with differences in volume of business. Practically

Graph XI

Relation of loading Car Cost to Volume of business

• = Co operative
⊙ = Local Wholesalers
X = Independents
⊡ = Wholesalers



all of the change is due to the difference in the estimates given as to the time required and as to the different rates of pay per hour for labor.

Selling Costs

TABLE XXV

Elements of Average Selling Costs

	Cooperative Associations		Independent Dealers		Local Wholesalers		Wholesale Dealers		All 26 Concerns	
	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total	Amt.	Percent of Total
Total	$246	100	$529	100	$834	100	$954	100	$598	100
Office	151	61.0	305	57.8	185	22.2	469	49.1	267	44.7
Management	96	39.0	224	42.2	649	77.8	485	50.9	331	55.3

Table XXV shows that the two elements of selling costs are office and management costs. Therefore the concerns that have high office and management costs also have high selling costs. The differences in the percentage of office and management costs making up selling costs are due to the differences in the previously explained method of allocation on page 33.

TABLE XXVI

Selling Costs

	Number of wheas.	Hundred weight handled	Average per warehouse	Per hundred weight	
				Weighted average	Unweighted average
Cooperative	11	$4603	$ 245.75	$.0168	$.0199
Independent	2	38880	528.52	.0136	.0130
Local wholesalers	5	11894	834.16	.0701	.0679
Wholesalers	8	15868	945.23	.0601	.0618
All concerns	26	16388	$ 598.65	$.0366	$.0414

Graph XII

Relation of Selling Cost to Volume of business.

• = Cooperatives
⊙ = Local Wholesalers
X = Independents
⊡ = Wholesalers

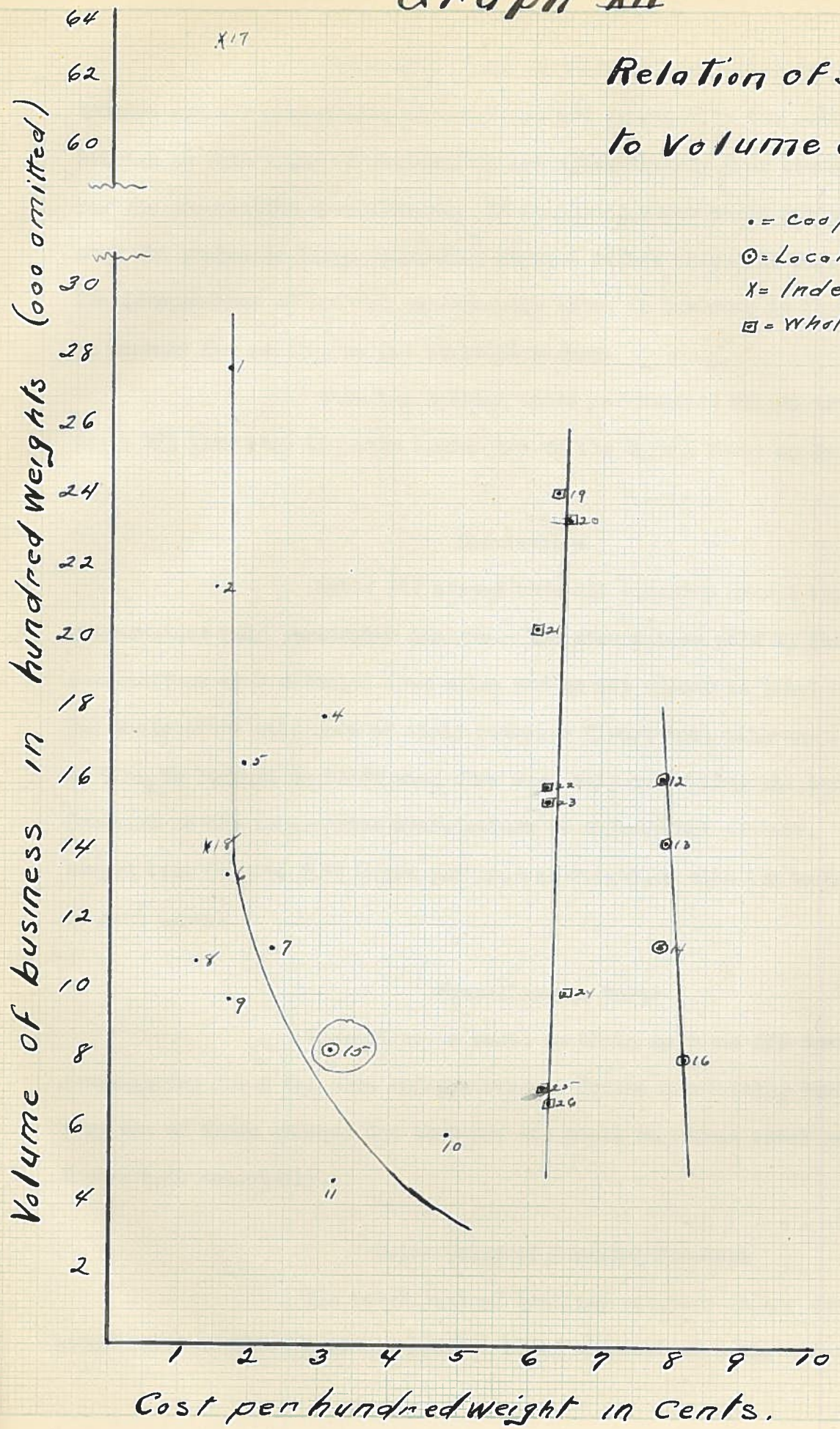


Table XXVI shows that the selling costs for the independent dealers and the cooperative associations are practically the same. The costs of selling by both types of wholesalers are approximately four times as great as for the cooperative associations. In comparing these costs one must remember that the wholesale firms maintain a central office which the cooperatives and the independents do not and consequently there is included in their selling cost an expense for selling at the terminal market.

When the selling costs per hundred weight are plotted on Graph XII they show the same tendencies as the buying costs on Graph VI

Commissions

Table XII showed that all concerns except the cooperative associations paid commission charges. The commissions paid by the cooperative associations were deducted from sales and do not appear as local marketing costs. The wholesalers sold most of their potatoes direct too, although they sold some of them to brokers in which case they were only performing the same marketing function as the cooperative associations or independent dealers. The commissions ranged from 2.55 to 5.55 cents per hundred weight,as with the unweighted average of 2.25 cents.

Miscellaneous Costs

Miscellaneous costs as shown in Table XII include mostly messengering for a few cars and demurrage. Potato warehousing concerns have very few of these charges and they are too small to effect total costs per hundred weight materially.

Total Costs of Handling Potatoes

The total cost of handling potatoes is the sum of all the prime costs or the sum of the process costs and cost of sacks. The sum of the

causes for variations in prime or process costs equals the total causes for variations in the total costs

TABLE XVII.

Total Costs - Including Sacks

	Number of whses.	Hundred weight handled	Average per warehouse	Per hundred weight	
				Weighted average	Unweighted average
Cooperative	11	14603	$ 3679.95	$.2520	$.2622
Independent	2	38880	6893.81	.1784	.2300
Local wholesalers	5	11894	4022.45	.3382	.3378
Wholesalers	8	15868	4776.85	.3011	.3075
All concerns	26	16388	$ 4330.54	$.2650	$.2882

Table XVII shows that the independent dealers handled potatoes at a considerably lower cost than the other types of concerns. One independent dealer handled potatoes at a total cost of only 14.62 cents per hundred weight, including sacks, or only 8.57 cents without sacks. This shows how costs can be reduced by handling a large volume of business.

The cooperative associations handled the potatoes about 5 cents cheaper per hundred weight than the wholesalers, largely because they did not have the large overhead central office expense.

The weighted average for all concerns of 26.50 cents per hundred weight represents fairly accurately the margin which most warehouses should have to cover their costs of operation.

When the total costs per hundred weight are plotted on Graph XIII they show a range from 14.62 cents to 37.90 cents. The causes for this range as all ready explained are the causes for the variations in the prime or process costs. Therefore by adding all the normal costs for the prime factors as represented by

(51) Notes Payable

Notes paid	Notes outstanding

(All accounts with notes should show names of parties, date made, amount, date of maturity).

(52) Accounts Payable

Amounts paid	Amounts owed

(53) Capital Stock or Proprietorship

Deficit	Amount of stock sold
	Surplus

(54) Cost of Merchandise Sold

Opening inventory	Returns and allowances
Purchases	Closing inventory

(55) Sales of Merchandise

Returns allowances	Amount of sales

(56) Cost of Potatoes Sold

Opening inventory	Closing inventory
Purchases	

(

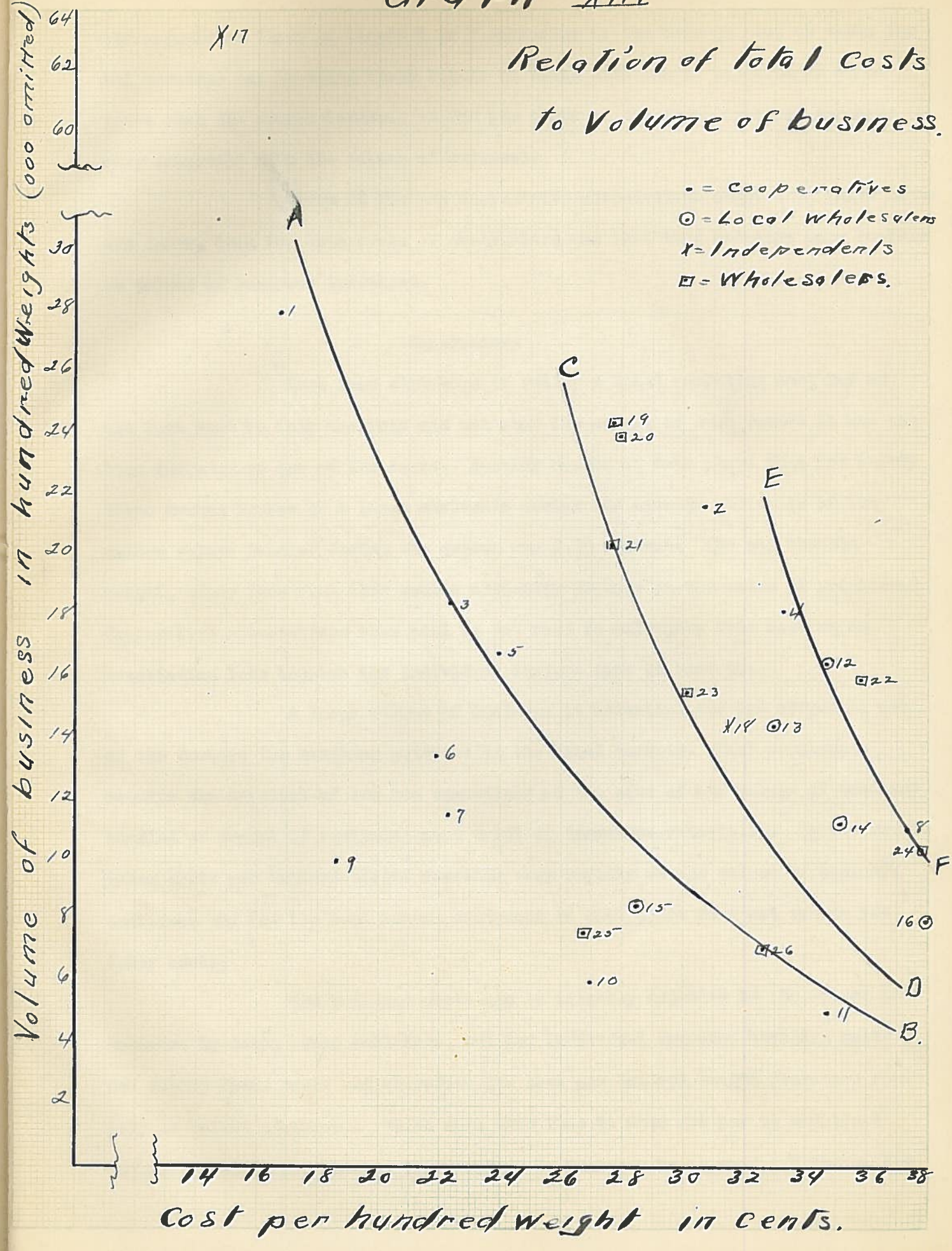
(57) Sales of Potatoes

Allowances	Amount of sales

(58) Record of losses in quantity of saleable potatoes showing exact amount of loss from each cause.

Graph XIII

Relation of total Costs to Volume of business.



the regression lines on Graphs I to V inclusive to the average cost of sacks for all concerns and plotting these totals on Graph XIII can be constructed which shows that the normal tendency is for the costs of the three types of concerns to vary inversely with the volume of business.

Curve AB for the cooperative associations shows that their costs are lower, than for both types of wholesalers and that they decrease more rapidly as volume of business increases.

Conclusions

Loss from shrinkage is really a local marketing cost but as the data used in this analysis did not show the amount of such losses it has not been included as one of the costs. Another source of data shows that for thirty three branch houses of a large wholesale dealer the average shrinkage of the entire volume handled during the season was 2.25 percent. The per hundred weight, money loss from this source obviously depends on the value of potatoes. Cooperative associations that pool do not need to calculate this loss as an association loss because the individual farmers have to bear it.

A large volume of business is essential for the efficient use of the factors for handling potatoes in the local markets. Most warehouses require the services of two men regardless of the size of the volume of business handled or amount of equipment used until it increases materially. Therefore the labor costs per hundred weight decrease very rapidly as the volume of business increases and for the same reason equipment in most cases does not reduce the labor costs.

The building costs can be slightly adjusted to the volume of business by using cheap buildings, but for individual concerns building costs are really fixed costs and therefore the cost per hundred weight decreases rapidly as volume increases. These data show that it does not pay to construct expensive buildings unless a large volume of business is assured. A reasonable

investment in buildings for a local potato concern is about $4,500. A building of this cost should handle an annual volume of at least 25,000 hundred weight.

Equipment costs can be adjusted to the volume of business and from the standpoint of costs to the individual concern it does not pay to install complete equipment unless the concern is certain of a large volume. From the farmers point of view this may not be the case. Because of the time he saves by being able to unload his potatoes in a few minutes where dump scales equipment are used instead of being obliged to wait in line to unload his potatoes, the farmer's lost labor time may be worth more to him than the added expense of the equipment to the concern handling the potatoes. This may account for the fact that most of the cooperative associations have more and better receiving equipment than their competitors.

Office and management costs per hundred weight remain fairly constant regardless of the volume of business handled. In this respect the cooperative associations and independent dealers have a bid advantage over the branch houses.

Undoubtedly there are too many warehouses at some country shipping points but the exact number necessary to handle the crop during the busy harvesting and marketing season in the fall is not known.

It seems reasonable to conclude however, that if all the warehouses at each shipping point were owned cooperatively or by one independent dealer and run by one competent manager, that the costs of handling potatoes in the local markets could be materially reduced.

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