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Accounting for Wood-Pulp Paper Industry

BY C. H. AVEYARD

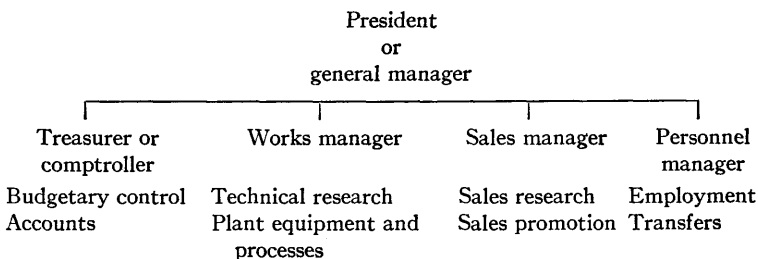
The history of paper-making takes us back beyond the Christian era. The Chinese are credited with the manufacture of paper from vegetable fibers more than 100 years B. C. The ancient Egyptians made paper from papyrus—a tall reed found on the banks of the Nile. European paper-making dates from the 11th century.

For many years cotton and linen rags formed the principal raw material of the paper-making industry. It was not until about 1870 that wood pulp came into favor. Today it is estimated that approximately 95 per cent. of all paper manufactured in this country is made from wood pulp.

In the preparation of this description of the present industry I am indebted to *The Paper Trade Journal* for the many articles on cost accounting that have appeared therein from time to time and also to a treatise issued by the Cost Association of the Paper Industry entitled *A Budget Cost System for Paper Mills*. The information obtained therefrom is gratefully acknowledged.

ORGANIZATION

In the manufacture of paper, as in all industries, there is no greater source of economy than the conservation of human energy through the application of sound principles of efficient organization. This consists of the determination of the scope and limits of action of the men and groups of men whose duty it is to carry out the objects of a paper-manufacturing business. It also comprises the uniting of these men to coöperate for the general good, harmoniously, promptly, efficiently and economically. The following chart illustrates a type of organization suitable for a paper manufacturing business.



Statistics	Preparing instructions	Advertising	Promotion
Cost accounts	Traffic	Warehousing	Training
Payrolls	Production control	Training sales-	courses
Credits and	Stores	men	Health
collections	Cost data and service	Directing sales	Safety
Office management	Planning	force	Recreation
Legal including	Routing		Wages
trade-marks	Preparation		Profit
	Inspection		sharing
	Superintendence and		
	supervision		
	System		
	Purchasing		

The heads of the four columns comprise the executive committee and only these four men report to the general manager. They are responsible for the carrying out of the activities listed in their respective columns.

FACTORY AND WAREHOUSE FACILITIES

In choosing a location for a paper mill the necessity for having a large supply of water at command must be considered. Not only is a large quantity necessary, but it should be free from impurities. In all stages of manufacture of paper the consumption of water is relatively large and the quantity of water used in steam raising is considerable.

Other factors in determining locality include the question of freight on raw and manufactured materials, the cost of coal and the supply of labor.

As to the layout of the plant itself, it is suggested that an arrangement under which all the machinery is on the same floor is about as good as any. The beaters should be in a room by themselves. In the next and largest room of the mill should be the paper machines. Beyond the machine room should be the finishing room in which are situated the cutting machines and hydraulic packing presses, etc. In an annex, close to the beaters, dissolving vats for chemicals, lime and caustic soda, and mixing vats for bleach and clay should be installed. If machinery is used for converting rags into pulp this should be in a separate room, preferably the first room before the beater room. As far as possible the attempt should be to have the manufacture proceed in a straight line through the factory, raw materials entering at one end and the finished product emerging at the other.

There should be a central power station to develop electrical energy with maximum economy. This should contain equipment sufficient to provide electric power for the operation of the entire plant. The power consumption of each unit should be measured, so that costs can be more easily calculated.

The stores should be in close proximity to the factory and it is usually advantageous to have sub-stores at convenient parts of the factory so that the workmen do not have to waste unnecessary time. The pulp and other ingredients should be stored as near to the beaters as possible. Usually a supply of "stuff" or beaten pulp sufficient to keep the paper machine operating for 24 hours, or more, is stored in the stock chests; in the event of delay in the beaters, the paper machine can then continue operations.

The shipping department should be located near the finishing department and at the same time as close as possible to the railroad siding.

A very important factor in the factory and shipping department is the atmospheric condition. Paper is susceptible to every change in the atmosphere and as it absorbs moisture it has a tendency to expand across the grain of the sheet. In absorbing moisture the fibers expand and in drying shrink. The amount of moisture in the air has also a marked effect on the reaction of paper to static electricity with which it often becomes charged as a result of friction caused by the contact of the paper with the steel rollers. A simple method of minimizing this trouble is to keep the press-room warm and to humidify the air. This can easily be done by opening a pet cock in a steam radiator.

RAW MATERIALS

Paper is made from cellulose, the predominant constituent of plant tissues. Many plants and trees are suitable for paper making, but the commercial value of each is determined by the cost of separating the cellulose from resins, fatty substances and other non-fibrous material. Length and strength of the fiber and such important factors as transportation, storage and regularity of supply must also be taken into account.

The materials mostly used in paper making are wood pulps, linen, cotton, hemp, jute, esparto, straw and waste paper. In the manufacture of paper boards, bagasse, the waste material of sugar cane after the juice has been pressed out, is being increasingly used.

Wood pulps. In the United States, nearly all paper is made from wood pulp. The conversion of wood into paper pulp is a process distinct from the manufacture of paper and it is not within the scope of this article.

The supply of pulp comes almost entirely from four species of trees, viz., spruce, hemlock, balsam and poplar. These species grow in the northeastern and lake states where most of the paper mills are located. Large supplies of pulp are, however, imported from Norway and Sweden.

Linen and cotton. The best linen and cotton rags are used for the highest grades of writing, bond and ledger papers. Papers made from cotton are softer than those made from linen.

Hemp, jute, esparto and straw. In Europe various kinds of grasses and straw have long been in use for paper making. Hemp and jute are used to a small extent. Esparto is used in England for the making of featherweight paper used to give bulk to volumes. Straw is used in considerable quantities for pasteboard, cardboard and wrapping paper.

Material of this type usually represents seasonal crops and presents difficult problems of storage. Susceptibility to decay is also a serious factor.

Waste paper. It is estimated that for every ton of waste paper that can be substituted in paper manufacturing, there will be a saving of eight trees of mature growth required to produce a ton of wood pulp. A great variety of old paper is used by the paper industry. In nearly all mills damaged and useless paper is returned to the beaters and used as pulp. This is known as "broke."

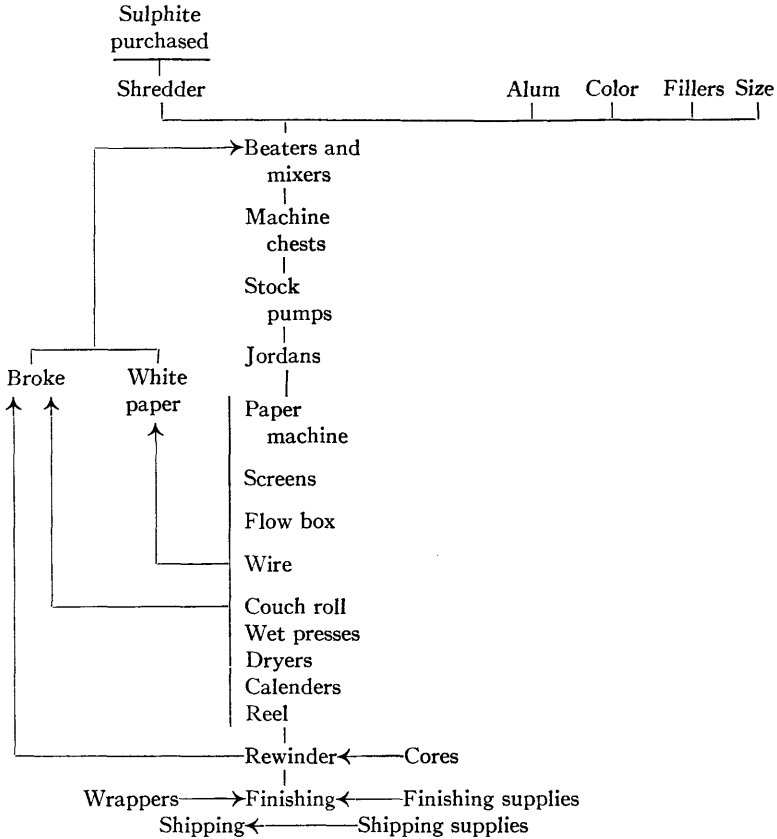
The diagram on page 175 will serve to indicate in condensed form the processes of manufacture of paper.

As a general proposition, it may be stated that no by-products result from the manufacture of paper. Spoilt paper can usually be cut down into smaller sheets and certain types of paper, notably tissues, can be cut into those very narrow strips used for packing chocolates, etc., known technically as "excelsior." Paper that is unsalable is put back into the beaters and used as pulp.

MATERIAL RECORDS

Records should be maintained classifying all materials, equipment and supplies used, and these should contain information as to what the prices are and the names of the suppliers. A cata-

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logue cabinet should be provided with card indexes by class of material and by name of supplier.

Materials on hand are best recorded on cards. Information should be afforded of the quantities received and issued and the balance on hand; maximum and minimum quantities should be set up and rigidly observed. It is usually found convenient also to record the location and classification number as well as the description of the stock. Columns are often provided for values in addition to quantities, the cards thus tying in with the ledger control. For the recording of supplies (as distinct from pulps and other raw materials) space should be provided for supplies ordered and also supplies apportioned. In addition to these cards, another record is kept, in quantities only, in the stores. This system consists of a bin ticket attached to each bin or other

form of storage. The bin tickets usually can not be made to serve as the record of stock on hand, but in addition to recording quantities on hand in a compact form they have a disciplinary effect in that each stockman can be required to enter his initials on the bin ticket every time he withdraws stock. By specifying minimum quantities on the bin tickets and requiring the stockman to notify the regular stock-record clerk when minimum quantities are reached, a double check is provided against overlooking low stocks.

STOREKEEPING AND INVENTORY PROCEDURE

The materials should be stored in bins, racks, etc., and it will be found desirable to store pulps in a dry place, otherwise variations will occur in the air dried content and incidentally in the weight of the pulp.

Under modern methods of manufacture, a "furnish" is prepared, giving full information of the quality and quantity of the material required for each run or order, and the order number to which it is to be charged. A copy of this goes to the storekeeper as his authority for issuing the material and another copy passes with the other papers to the factory, representing the foreman's authority to withdraw the material. Supplies are issued on requisitions signed by a foreman. The storekeeper inserts the standing order number indicating the account to which the supplies are to be charged, and after he has made his record on the bin ticket the requisitions are passed to the stores clerk for record on the cards and subsequent entry in the materials-distribution book.

To achieve simplicity in handling the stores, a system of account numbers should be used. This avoids a long detailed description of each kind of material and provides a means of finding quickly the various accounts in the stores ledger.

All purchases should be made through the purchasing department, the functions of which include the securing of the most satisfactory material at the lowest prices, coupled with the best terms of payment and the most desirable delivery. Purchases will fall broadly into two classes, (1) raw materials and (2) general supplies. Raw materials will consist of different grades of pulps, chlorine, size, alum, etc. These are usually purchased on forward contracts, which, in the case of pulps, may call for delivery of specified quantities monthly over a period of one or two years.

Often the contract will not begin to operate until a date a year or more ahead. General supplies comprise the usual machinery, parts, etc., incidental to any manufacturing business. Usually dry and wet felts, referred to under manufacturing processes, form a substantial part of the supplies inventory.

The receiving department should be provided with a copy of all purchase orders and deliveries should be endorsed on it. The receiving slips should be ruled to show the date received, name of consignor, date of shipment, number of outward order and car number. In the case of raw materials, columns should be provided to record the markings and weights of each bale. Usually about 20 per cent. only of the bales are weighed and if the average weight thus established does not vary by more than 1 per cent. from the weight according to invoice, no claim is made. Tests are also made of the percentage of air dried contents of the pulp (i. e. the percentage of moisture which the pulp contains) and if this does not correspond with the reputed percentage in the contract, a claim should be made.

The sampling and moisture testing of the pulp must be done according to one of the recognized methods. The auger method is best suited for baled hydraulic pressed pulp in sheets, and rolled pulp. At least 10 per cent., preferably 20 per cent., of the shipment should be sampled. Samples must be drawn from sound and intact bales and from different sections of a shipment. The sample is taken by boring into a bale to a certain depth with a special instrument known as an auger which cuts a disc about 4" in diameter. The samples as taken are immediately placed in a metal can with tight fitting cover and the net weight is obtained. The wet samples are next placed in an oven at 212° F. until they are what is termed "bone dry" and the weight is again determined. By dividing the percentage "bone dry" by .9, the air-dry percentage is obtained. The percentage of moisture should be noted on a tag and put on the bales.

PRODUCTION

It is absolutely imperative that the condition of the manufacturing department, its percentage of uncompleted work and the factory's capacity for further orders be always known. The task of laying out in detail all work to be done and maintaining a perfect record of progress of work on all orders should be centered in one distinct department.

Departmental reports. A report should be made up by the factory at the end of each day or shift showing the number of pounds of paper manufactured on each machine during the preceding eight hours, with a notation of the order number, date, machine number, etc. Comment should be added of any breakdown or hold-up, etc., stating the time lost and reason for the delay. Weekly reports showing orders sent to the factory, orders completed, orders shipped, etc., made up to Saturday of each week should also be prepared. A general monthly summary somewhat like the following will be found very useful.

General monthly summary	193..
Total no. of lbs. shipped to date this year
" " " " " " " last "	
Total no. of lbs. ready for shipment this date last year	
" " " " " " " " " this "	
Total no. of lbs. still to be shipped at this date this year	
" " " " " " " " " last "	

Costs

The determination of material costs would be simple if the weight and moisture content of pulp did not show such a wide variation. The first roll of pulp may weigh 75 lbs. air dry, the next one 50 lbs., and so on. Each roll should have a tag affixed to it showing average weight and moisture content, and it is then only necessary for the beater-man to report the number of rolls put in the beater. Alternatively the material should be weighed at the time of its use and a report made of the quantity used. From such reports the number of dry lbs. of pulp used can easily be calculated. The percentage of moisture in the pulp is the first figure absolutely necessary in determining material costs.

If one grade of paper only is manufactured the simplest method of costing for materials is to divide the cost of materials used for any given period by the total output in pounds or tons for that period. The quantity of materials used during any period will be ascertained from the "furnishes" for the like period (the "furnish" is the equivalent of the bill of materials).

Where many grades of paper are manufactured, it will be found that each machine, as far as practicable, is used for the manufacture of the same grade of paper and changes are made as seldom as possible. In this case the basis of the costing should be per run or per order. Cost of materials used, calculated from re-

ports, for the run (or order) will be divided by the lbs. (or tons) contained in the run (or order) to establish the cost per pound or other unit of weight of the particular grade. A run may be one order or several orders or a given quantity, etc.

The various process supplies, such as glue, rosin and alum, must be determined in some convenient unit as "pounds per gallon" and the "furnish" should record the number of pounds used.

Wherever it is possible, direct labor should be included with manufacturing burden to establish an inclusive departmental rate known as the "cost of conversion" rate. The labor in the first place should be allocated to departments such as conversion and finishing, steam, building expense, power, maintenance, etc. Such part of the labor as is attachable to productive departments should be distributed directly to the machine producing the material on which the labor was expended. Cost of auxiliary departments will be allocated to the machines.

In the manufacture of paper, time is a vital factor. Some pulps are "beaten" longer than others, according to the grade of paper required. Again the output per minute of the paper machine is determined by the quality of the paper being run off, etc. Overhead should, therefore, be allocated on a machine-hour or man-hour basis, preferably the former.

The expenses should be distributed to individual departments and then to individual machines. In computing the machine-hour rate, the manufacturing expenses for a given period are allocated to the machines. The total manufacturing expense thus attachable to each machine is then divided by the number of normal operating hours for the given period to establish the machine-hour rate. The number of "normal" operating hours will vary with the policy of the management; in one plant eight hours a day may be normal while in another sixteen or twenty-four hours a day may be more nearly normal.

It is common practice in paper mills to establish a "cost of conversion." This is an "all-in" rate which includes labor cost as well as overhead. To determine the cost of conversion of a certain "run" or order, the number of hours involved, from the time the pulp is put in the shredder or beater until finished paper sufficient to complete the "run" or order is made, must be ascertained. The cost of conversion rate multiplied by the hours involved gives the total cost of conversion for the "run."

In the paper industry as all the product passes through one principal conversion process, the simplest method for allocating general mill burden is on an auxiliary conversion machine-hour basis. It will be necessary to estimate the number of machine-hours, assuming normal production, for a given period. Total general mill burden for the period divided by estimated machine-hours for the same period will establish the auxiliary rate.

In passing, it may be well to remark that costs determined as described would necessarily fluctuate with output, as much of the burden is fixed and varies little with quantity of product manufactured. Actual costs should therefore be supplemented by pre-determined costs. These establish that the conversion cost of a certain grade of paper is so much, based on normal operating capacity. This will be the scheduled cost of conversion for the ensuing quarter or other period. In addition it is necessary to estimate the cost of the "furnish," the "broke" made and the invisible loss, and this is the total cost per ton and is the scheduled cost.

"Furnish" materials must be known to a nicety and definite factors for conversion to dry weight must also be set up. The time necessary for beating must be known and controlled in actual operation. The paper machine output in each weight and quality must be kept in mind and that output and that weight must be controlled.

The following tabulation indicates in a general way how cost and selling price are determined:

Raw material used at beaters	20,000 lbs.	\$1,000.00
Conversion departmental cost, 14 hours at \$20 per hr.		280.00
Material weight	20,000 lbs.	1,280.00
Broke from machine	1,000 lbs. (5%)	30.00
Total rough paper cost	17,000 lbs. 18,000 lbs.	1,250.00
Invisible waste	2,000 lbs. (10%)	
Finishing material		45.00
Finishing department 150 hours		150.00
		1,450.00
Finishing broke from 17,000 lbs.	850 lbs. (5%)	25.00
		1,425.00
Inventory value 16,150 lbs.		42.00
General mill burden 14 hours		42.00

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Mill cost	\$1,467.00
Selling expense	29.00
Freight and cartage outward	34.00
Delivered cost	1,530.00
Profit 14 hours at \$20 per hour	280.00
Net selling value	\$1,810.00

DEPRECIATION

The depreciation rates adopted by a paper mill must have reference to the number of hours per day worked and to the policy adopted in dealing with renewals. Many paper mills work 24 hours a day and seven days a week. The wear and tear in such a case is necessarily heavier than when the machinery is used 48 hours a week. Overtime affords less opportunity for ordinary repair and replacement and when a machine is operated for two or three shifts a day, it is under the supervision of a different person during each shift, and there is a tendency for each to leave minor adjustments or matters involving a stoppage to his successor.

The bureau of internal revenue has recently issued a preliminary report on depreciation studies outlining suggested rates of depreciation for many different industries. In a foreword to the report, it is stated that these statistics represent the results of the bureau's depreciation studies over a five-year period, made with the coöperation of a number of trade associations and corporations. For the pulp and paper industry, the following rates are suggested:

	Probable useful life	Depreciation rate
Absorbing system, milk of lime	10 yrs.	10 %
Balers	15	6 $\frac{3}{4}$
Barkers:		
Drum	10	10
Hand	15	6 $\frac{3}{4}$
Beaters	20	5
Bins, storage, chip	30	3 $\frac{1}{3}$
Bleachers	15	6 $\frac{3}{4}$
Blowers for chips and refuse	10	10
Blower systems for heating	15	6 $\frac{3}{4}$
Burners, sulphur, acid plant	12	8 $\frac{1}{2}$
Calenders	22	4 $\frac{1}{2}$

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	Probable useful life	Depreciation rate
Chests, storage:		
Concrete	30 yrs.	3 1/3 %
Steel	22	4 1/2
Wood	15	6 2/3
Chippers	20	5
Conveyers:		
Inside	15	6 2/3
Outside	12	8 1/3
Cockers	20	5
Coolers	10	10
Cranes, heavy, hoist and traveling	20	5
Crushers, wood	13	7 1/2
Cutters	20	5
Cylinder machines, for paper and paper board	20	5
Deckers	20	5
Diffusers	25	4
Digester linings	7	14
Digesters:		
Indirect	22	4 1/2
Rotary	20	5
Vertical, stationary	25	4
Drainers	30	3 1/3
Dust collectors	20	5
Dusters	17	6
Elevators	15	6 2/3
Evaporators:		
Disk	17	6
Multiple effect	25	4
Fourdrinier machines	20	5
Furnaces, rotary	17	6
Grinders	20	5
Hoods, machine, paper:		
Asbestos	20	5
Wood	10	10
Jordans	18	5 1/2
Knotters	15	6 2/3
Kollergangs	20	5
Layboys	12	8 1/3
Linings (wood) for blow pits	8	12 1/2
Machine-shop equipment	20	5
Melters, sulphur	8	12 1/2
Pans:		
Causticizing	15	6 2/3
Wash	25	4
Pits, blow:		
Concrete	30	3 1/3
Steel tank	20	5

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	Probable useful life	Depreciation rate
Platers	13 yrs.	7½%
Presses:		
Bark	7	14
Filter	15	6⅔
Hydraulic	20	5
Pumps:		
Acid	5	20
Centrifugal	15	6⅔
Plunger, duplex or triplex	18	5½
Pressure	15	6⅔
Vacuum	15	6⅔
Reels	15	6⅔
Rifflers:		
Concrete	30	3½
Wood	18	5½
Save-alls	20	5
Screens:		
Sliver	12½	8
Rotary	15	6⅔
Shredders	12	8⅓
Slashers	14	7
Smelters, sulphate process	7	14
Splitters	20	5
Stackers, pulpwood	14	7
Tanks:		
Causticizing	20	5
Leeching	22	4½
Mixing (wood)	12	8⅓
Mixing (wood) for clay	20	5
Storage, acid	12	8⅓
Storage or washing (concrete)	30	3⅓
Storage or washing (wood)	15	6⅔
Thickeners	20	5
Thrashers	14	7
Towers, absorbing system	15	6⅔
Trimmers, paper	15	6⅔
Trucks, hand	10	10
Washers, bleach or paper stock	20	5
Wet machines	18	5½
Winders	15	6⅔

The English inland revenue authorities allow 5 per cent. on the reducing-balance method for paper-mill machinery working during the day and only 7½ per cent. for machinery working both day and night.

ORGANIZATION FACILITIES AND MARKETS

In practice it will be found that the selling policy of the particular factory must determine the methods of organization. A factory may manufacture one kind of paper only or it may manufacture several kinds. Again a factory may manufacture to order only or it may manufacture first and sell after, or it may combine the two policies.

For example in a factory manufacturing to order one type of paper only, e. g. tissues, research might be made to ascertain new uses for the particular paper, as for paper napkins or as packing papers, etc. The possibilities of the paper as a good subject for coating or crêping might be exhausted also. Incidentally sales of paper for new uses might be promoted and new markets opened to advantage. The policy of advertising must of necessity be determined by the special circumstances of the case. In the particular case of tissues made to order samples might be sent with advertising matter to prospective customers.

Adequate warehouse accommodation should be provided where the paper can be stored pending shipment. Even in cases where paper is made to order it will be found that a small stock is carried, arising from cutting paper down into smaller pieces and also from damaged or "culled" rolls. If a roll of paper has soft ends, it may be entirely unsuited for the purpose originally intended, but after cutting off the ends the remainder may be perfectly good. Such rolls may be cut down into sheets and sold. If the paper is sold in rolls these can be stored on the floor—no special facilities are necessary. If the paper is cut into sheets, shelves will be necessary to provide adequate accommodation. The warehouse should be situated as close to the railroad siding as practicable to avoid hauling heavy rolls of paper over unnecessary distances. The warehouse should be equipped with trucks and cranes and any other tackle needed in the lifting and hauling of heavy rolls or bales, etc. Special consideration should be given to the atmospheric conditions within the warehouse and to their effect on paper.

The market for paper is world wide and limited only by the question of prices and tariff.

USES OF PAPER

The uses of paper are too well known to require mention. They vary from bank notes to blotting paper and newspaper print to hand-made stationery. Because of the varied nature of

the finished product there is a tendency for mills to specialize in one particular type. Tissues, for example, are used quite extensively and include many forms of light packing paper, napkins, handkerchiefs, fancy crêpe papers, coated papers, etc., etc.

METHODS OF DISTRIBUTION AND DISTRIBUTION COSTS

Paper is distributed either by railroad or water. It is loaded on freight cars or freighters at the warehouse and conveyed to its destination at home or abroad. Rolls of paper are covered with brown packing paper, with special cardboard protectors over the ends of the rolls to protect them. Local sales are distributed by truck.

Packing expense may be considered either as a manufacturing expense or as a distribution expense. If the paper is packed at once after it is manufactured, the expense is usually considered as a manufacturing expense, but if the packing is deferred until the paper is shipped, the expense is often considered as a distribution expense. As a rule it is preferable to consider the expense as inseparable from manufacturing, to classify it as a manufacturing expense.

ACCOUNTING

In the financial records, accounts will be carried for inventories of raw materials, supplies and finished product, work-in-process, cost of sales, manufacturing, administrative and distribution expense controls, etc. Raw materials and supplies issued to factory will be transferred from inventory to work-in-process, monthly. Labor applicable to manufacturing, both direct and indirect, will be accrued monthly and charged to work-in-process. Manufacturing expense will be transferred monthly from manufacturing expense control to work-in-process. As the paper is finished a transfer is made from work-in-process to finished-goods inventory and on sale from finished-goods inventory to cost of sales.

In the factory ledger, accounts are maintained for work-in-process, direct and indirect labor, the principal classes of burden and general ledger control. Materials used will be charged to work-in-process and credited to general ledger control. Labor at piece work or day rate and burden at standard burden rates will also be transferred from their respective accounts to work-in-process. As the details of labor and burden are furnished to the factory they will be charged to their respective accounts and

credited to general ledger control. When the paper is finished, work-in-process is credited and general ledger control is debited.

Control is maintained over the factory ledger by the work-in-process account. This has its reflection in the general ledger control in the factory ledger. The balance of the work-in-process account in the general ledger represents the aggregate of the open balances on the factory ledger.

SPECIAL AUDITING FEATURES

Special auditing features arise chiefly from the inventory, the chief of which are discussed below:

Raw materials. In calculating the quantity of pulp, the weight is based on percentage of air dried content. Thus, 100,000 pounds of Dexter pulp with an air dried content of 53.70 per cent. would mean 53,700 pounds of actual pulp, the balance being moisture. It is on this air dried content that the price is based and this figure must be used for the purpose of valuing the inventory. The extension will be made on a basis of 53,700 pounds and not 100,000 pounds. In taking inventory, the bales of pulp are usually scheduled according to their average contents, as set up on receipt of the pulp by weighing a certain percentage of the bales. Strictly, in addition to scheduling weights, a test should be made of a certain number of bales to ascertain the air dried content, as it is possible that the pulp may have absorbed more moisture since receipt. A difference usually exists between the quantities shown by the books and those revealed by the physical count.

Forward contracts for pulps, etc. It will usually be found that contracts have been entered into for the delivery of pulps, chlorine, starch, coal, etc., over the ensuing year or two. The contracts themselves should be inspected and the undelivered quantities should be scheduled. A register is usually kept showing quantities under contract and already delivered under each contract. If it is thought advisable, confirmation may be obtained from the vendor. If goods in transit are set up at the date of the balance-sheet, care should be taken to see that such goods have been adjusted in the undelivered quantities under the forward contracts. It will be found that the contracts are for various prices and it is a fine point to determine whether or not these prices are above market price at the date of the balance-sheet. Determination of a fair market price at the date of the balance-sheet may be no simple matter. It is interesting to compare the prices accord-

ing to the contracts for future delivery with the average price paid for pulp during the period under review, on which the profit or loss for that period has been made. Often a contract entered into at a high price may be canceled in consideration of a new contract made for, say, double the amount for twice the period. Thus at the date of the balance-sheet there may be an outstanding contract for the delivery of 1,200 tons of pulp over a period of a year at the rate of 100 tons a month. The contract price may be \$24 a ton and the market price at the date of the balance-sheet \$22. Between the date of the balance-sheet and the date of the audit the price of pulp may have dropped to, say, \$20 and the original contract may have been cancelled and a new one entered into for 2,400 tons at \$21.85 per ton, a slight reduction in price from the old contract in consideration of increasing the quantities to be delivered. The new contract may call for delivery over a period of two years. In such a case as this the price under the new contract is less than the market price on the day of the balance-sheet, but may be higher than the market price likely to prevail during the life of the contract. In the circumstances, it would seem wise to set up a reserve for the difference between the price stipulated in the old contract and the market price on the day of the balance-sheet. Should it be considered that the dip to \$20 was purely temporary and as a fact the new contract had been secured on exceptional terms, there may be grounds for contending that no reserve is necessary.

Finished paper. The quantity of finished paper carried will be determined by the policy of the management. Some mills manufacture only to order, while others manufacture for stock. Whatever the policy pursued, all mills carry "cull" rolls and cut down pieces. It is the auditor's duty to see that these are valued at a fair market price, which may be considerably less than the price for paper in perfect condition. The paper on hand turned out in the last day or two before the balance-sheet, which may be classified either as work-in-process or as finished paper, can usually be verified with the daily production reports sent to the office after each shift.

It is often possible to reconcile total production with sales and establish the correctness of the inventory of finished paper. Production, in tons or pounds, can be ascertained from the monthly summaries of the daily production sheets and the sales, in tons or pounds, from the monthly summaries of sales.