

LOGGING WITH A BALANCE SHEET

by

W.S. Corlett

1947

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W. S. Corlett

A thesis submitted in partial fulfillment  
of the requirements for a degree of  
Master of Forestry

University of Michigan  
June, 1947

In years past when the lumberjack, his axe, and his crosscut saw were the Alpha and Omega in the woods they ruled supreme, and there was no question whatever about lumbering being a profitable enterprise. After all, weren't the nation's vast timber reserves far greater than mere man with his puny axe could ever cut? Then truly did the Theory of Inexhaustibility hold full sway in all its destructive glory. The few small voices who raised their notes of warning, urging caution and conservation, were swept aside by the overpowering tide.

Eventually, however, the beautiful bubble burst, and the wild dreams of endless forests were shattered like surf, dashed and dissipated on a rocky beach. Then for the first time the "Great I Ams," the know-it-all Paul Bunyans of destructive logging began to realize the bitter truth about those few small voices, for they were many voices now and far louder, and their words were not, "You'll see" but rather, "We told you so."

It was almost too late before enough people heard and believed the voices to bring about the necessary revolution in the lumberman's viewpoint. Even yet there remain many who lack the fundamentals of conservation, maximum utilization, protection, and management, but the tide has turned and will increase in strength just as certainly as day follows night. The light of understanding and the realization of the need for constructive action has dawned after the darkness of misconception and destruction, and only by this light, carefully nourished and strengthened, can the nation hope to recover a firm footing, maintain lumber production sufficient for its requirements, and keep trees where trees belong.

Hand in hand with the conception of conservation have come closer utilization, the cutting of smaller diameters and poorer trees, and the logging of more difficult chances. All three of these practices, although an integral part of a good logging operation, increase substantially the cost of production and in general produce material of lower quality than the old method of "scraping off the frosting", taking only the best parts of the best and most readily available trees. As a consequence it is becoming increasingly important that any woods operator know how his costs are being incurred so that he can more effectively cope with the pressing problem of controlling them, thereby increasing profits but more important still, allowing him to undertake the poorer chances with a reasonable expectancy of a fair rate of return. The Forestry Committee of the Fifth National Conservation Congress in a report on lumbering as far back as 1913<sup>1</sup> testified to the essential nature of good cost figures in the conduct of any lumbering operation no matter how limited the output and deplored the fact that too few entrepreneurs knew their financial position or kept adequate records.

Today with an ever-increasing share of the nation's lumber production coming from the smaller companies and portable mills, the problems of cost determination and record keeping are growing to a position of real importance because so many operators do not know the economic condition of their enterprise until a given job is completed or until they are faced with bankruptcy.

It is for those who do not need and cannot afford or obtain the full time services of an accountant that this work has been prepared in

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Fifth National Conservation Congress Forestry Committee paper on Lumbering, Washington, D. C., November 1913.

the hope that through the application of a minimum number of accounting principles a sufficiently adequate system of cost keeping may be set up by any individual to suit his particular needs. Since no two enterprises are exactly alike in their economic or physical set-up, no single accounting system can be devised which will, unaltered, fill the needs of every operator. The attempt herein is to draw a mean and to present in simple form, with pertinent examples, the methods of arriving at the cost values which will be of the greatest benefit to the average small logger or mill operator.

To the various members of the faculty of the School of Forestry and Conservation of the University of Michigan who have offered counsel and information and to his wife whose constant assistance and inspiration have been a tower of strength and to whom these efforts are humbly dedicated, the author wishes to express his deepest gratitude.

Accounting, when reduced to its simplest terms, is little more than a method of classifying and recording the financial data of a particular company and presenting from time to time or at specific intervals a report to the interested parties. An orderly method of record keeping besides indicating the economic condition of the enterprise serves also, when necessary, to protect the rights of those participating in the operation of the business should the records or past transactions ever be questioned. Since the fundamental purpose, the "raison d'etre", of any undertaking is profit, it seems apparent that a careful, uniform, and systematic means of determining profit is of prime importance.

Behind any system are two basic classifications into which all data fall: (1) Assets, and (2) Equities. All other classes of data are

ancillary and may be defined in terms of their relationship to these primary categories. An asset may be defined as any possession of a particular enterprise which has a value to that enterprise. With such a definition a wide variety of items can be included as assets, for palpability is not required. Such intangibles<sup>s</sup> as rights, claims, services due from individuals, patents, trade marks, franchises, licenses and easements, and even loyalty of employees and goodwill of customers may legally be included in the assets of a business, but they are important from an accounting standpoint only if an equitable money value can be assigned them. The list can be broadened further to include rights in which the business has a money interest the value of which is capable of being determined in dollars and cents, but there are some limitations. The right to receive money under an executory contract, for example, or the right to receive payment for a customer's order not yet filled may not justifiably be counted assets. Mere physical possession, moreover, does not necessarily make an item an asset of the possessor, for in general, although some legal rights belong to the bailee, no bailment involves actual transfer of legal title.

Although there is a vast number of items which would go to make up a complete list of physical assets, for convenience they may all be considered as belonging to one of the five principal groups following: (1) money itself; (2) natural resources; (3) buildings and other plant structures; (4) machinery and equipment; and (5) inventories.

Natural resources include plant sites, rights-of-way, water rights, timber, and nurseries, tree farms, or other plantations. Group (3) comprises all buildings used for any purpose--bunkhouses, stables,



garages, latrines and other out-houses, offices, bridges, towers, and tanks. Examples of group (4) are especially diversified, including such items as all stationery machines, mobile equipment like trucks, tractors, loaders, wagons, office appliances and furniture, railroad lines and rolling stock, pavements, power lines, tools, and even animals.

The last group takes in all spare parts, fuels and lubricants, paints and varnishes, office and other supplies, as well as finished goods and work in process inventories.

Those assets which are cash or near-cash items such as accounts receivable, finished product inventories, short-term notes receivable, and securities which are readily marketable on short notice are considered to be Current Assets, whereas natural resources, buildings, machinery, and intangibles like patents are known as Fixed Assets. Inventories, priced at cost, which will be used up in production belong in the current group.

The second fundamental division of economic data, as noted above, is the Equities, or ownership classification. An equity is a claim or right in the assets of a business which can be expressed in monetary terms. Taken together the equities represent the total ownership of the assets of the enterprise, and must always, therefore, be equal to the total of the assets, any discrepancy being at once an indication of error or omission.

Among the equities those held by interests outside the enterprise, the rights or claims of creditors, are liabilities, whereas those which express the rights of ownership are the proprietary equities, or Net Worth. In a corporation the net worth section consists chiefly of the Capital Stock and surplus accounts, but in a single-proprietorship or a

partnership the proprietary interests are commonly designated similarly to, "P. D. Quincey--Capital" or "P. D. Quincey--Proprietor."

Like assets, liabilities are subdivided on a duration-of-existence basis. Consequently there are current liabilities such as accounts payable, wages payable, accrued interest, rent, or taxes payable, and there are long-term liabilities such as mortgages, purchase contracts, and long-term notes issued. In general both assets and liabilities are justifiably considered to be current if their length of life does not or will not exceed one to three months except in the case of accounts receivable or a negotiable instrument whose life is determined either by the terms of its issue or the holder's need for funds. Receivables on open accounts are usually considered to be current until paid or until they are determined to be uncollectable and are written off.

When the asset and equity accounts are presented at the end of an accounting period, they are arranged on a Balance Sheet dated as of the last day of the particular period, say January 31, 1947, and totaled. Sprague has said that the balance sheet is the "groundwork of accountancy . . . the origin and terminus of every account,"<sup>1</sup> for every account starts a given month with the amount shown on the balance sheet for the previous month, and at the end of the month the balance in the account is recorded on the balance sheet for that month.

The balance sheet of Hyatt & Malden, contract loggers, for November 1946 might be as follows:

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Charles E. Sprague, The Philosophy of Accounts, 1908, The author, N.Y.

HYATT & MALDEN  
Balance Sheet, Nov. 30, 1946

Assets		Equities	
Current:		Liabilities:	
Farmers Bank	\$1500	Accounts Payable	\$ 75
Accounts Receivable	950	Notes Payable	675
Supplies & Spare Parts	<u>200</u>	Wages Payable	<u>250</u>
Fixed:	\$2650		\$1000
Buildings	\$ 500	Net Worth:	
Woods Equipment	2650	Hyatt Capital	\$2500
Office Equipment	<u>200</u>	Malden Capital	<u>2500</u>
	3350		5000
	<u>\$6000</u>		<u>\$6000</u>

As a general rule all prepayments; such items as *stumpage* paid in advance on an area where cutting is not anticipated for a month or more, federal or state taxes, rents, and short-term leases, or any of the forms of insurance when paid up in advance are considered to be current assets. A long-term lease, on the other hand, might well be classed as a fixed asset, and in cases where the taxes are capitalized at a fixed rate, the better view would seem to be to add their capitalized value to the value of the land itself rather than attempt to carry a separate account.

Since the vast majority of all assets are acquired by direct and voluntary purchase, it is deemed best to base their value on cost. Valuation of assets is a complex problem, particularly when investments are involved, and the services of an accountant often prove to be the most economical solution. However, under most circumstances arising in the logging industry satisfactory values may be obtained relatively easily. In the case of buildings erected or purchased, the total cost is the value at which they should be carried, and maintenance costs considered separately.

Mobile machinery should be valued at cost, not market value, to avoid discrepancy in the records. For example: Hyatt and Malden own a truck which would bring \$750 on the second-hand market, and a dealer offers to sell them a new truck worth \$1300 for \$475, cash, plus the old truck. When the deal is consummated, the new truck should be entered on the books as a fixed asset valued at \$1225, not the \$1300 market value.

In all cases of acquisition of assets all costs incurred in the procurement should be included. If a new lathe is set up in the machine shop, the cost price of the lathe, the shipping or other transportation costs, and the cost of installation, including labor and any special foundations or provisions to supply the machine with power, all go to make up the valuation at which it should be carried.

The value of land used for building sites of a permanent nature is not subject to depreciation or depletion and is commonly valued at cost plus any buying charges and costs of clearing or any carrying charges involved. Legal fees incurred in clearing title, getting an opinion on the abstract, or whatever may be necessary, and, as noted above, any capitalization of taxes should be included in the valuation.

The subject of valuation of assets herein will concern itself only with the problem as related to acquisition and record keeping. For a complete, authoritative treatment of the valuation of forest land, timber stands, and stumpage the reader is referred to Chapters XIII, XIV, and XV respectively of "Management of American Forests," and for damage appraised to Chapter XX of the same work.<sup>1</sup> Another valuable but less recent and less easily understood work covering these topics is "Forest

<sup>1</sup>

D. M. Matthews, Management of American Forests, 1935, McGraw Hill Book Co., N. Y.

Finance,"<sup>1</sup> in which Professor Chapman approaches the problems from an economic standpoint, presenting chiefly the economic principles of enterprise and forest finance. Professor Matthews, on the other hand, has as his purpose forest management, and his formulas are developed more clearly as a means to that end. Consequently his work is less pedagogical and more practical in its presentation.

Closely allied with the valuation of fixed assets is the depreciation of those assets in such a manner as to spread their decrease in money value fairly over either a period of years or a quantity of production. As a rule straight-line annual depreciation is best suited to buildings and machinery in the logging industry. Assume, for example, that a new truck is put into service which will haul 3M feet board measure per load. Unless that truck is to be used on a sustained yield managed forest, hauling a fixed average distance over roads which permit a fixed average speed, so that the number of trips per day may be calculated in advance with a reasonable degree of accuracy, it is virtually impossible to estimate accurately the quantity of material the truck will haul in its useful lifetime. However, under the straight-line method of depreciation, a truck which costs \$1650 new and has an estimated life of four years with a salvage value of \$50 at that time can reasonably be charged off at the rate of \$400 per annum, the charge being to current operating expenses.

To illustrate the unit depreciation charge, assume a clear-cutting operation which requires one mile of road construction which will never again be used by the operator. The road costs \$500 to build, the

<sup>1</sup>

H. H. Chapman, Forest Finance, 1926, Tuttle, Moorhouse & Taylor Co., New Haven, Conn.

area comprises one section, is to be logged off in less than one year, and has a merchantable stand averaging 8.5M per acre. The total yield, therefore, will be 5,440 M, and apportioning the road cost equally to all units of production gives a depreciation cost of 9.2 cents per M. If, then, in any given accounting period 1000 M were produced, the depreciation charge would be \$92.00, made as before to operating expenses.

Straight-line depreciation, although in almost universal use throughout the United States, is objected to by some because it does not give a reasonable picture if viewed over the entire life of the asset. Assume, for example, a fixed annual depreciation, fixed expenses, and fixed revenue from operation, as in the case of a tractor used an average of eight hours per day, 200 days a year, for five years. Each year as the average investment is reduced by the same amount of depreciation, and the net income remains constant, the rate of return increases radically. That is the same as saying that machinery and other assets earn more per dollar of residual value as they increase in age.

There are three answers to such criticism. In the first place the assumption of fixed revenue and expenses would indeed, for all its desirability, be a rare occurrence in business. Almost without exception older equipment requires more frequent repairing and is less efficient because of wear and breakage. The tendency would be for revenue to fall as the time out of service for repairs increased, and with increased expenses the net income and rate of return could not help but fall also.

Secondly, it would certainly be a unique situation to find all the physical assets of a particular enterprise depreciating at the same

rate and all advanced to the same stage. Instead, the typical picture shows a variety of units being depreciated at various rates and in various stages of service life. As a result, the apparent increase in the rate of return on part of the equipment, should it exist on the books through any combination of ideal circumstances, would tend to be minimized in the over-all average of the plant assets.

The third answer is a third method of apportioning depreciation which derives its justification and support from the fact that it does meet the criticism leveled at the straight-line plan. The so-called interest method makes use of compound interest calculations premised on what might be termed the "service concept" of assets. Under this method the initial cost of a unit, less any estimated salvage value, is taken to represent the value of its services, to be realized throughout its useful lifetime. At the end of each period the balance after depreciation is considered to be the value of the services remaining, discounted by applying the interest rate selected as appropriate. For example, Hyatt and Malden purchase a unit of equipment for \$1500, delivered and ready for use. The estimated service life is twenty years and the salvage value negligible. The annual depreciation will be a fixed annuity which at a given rate of interest, say 6%, will accumulate to \$1500 at the end of twenty years plus the applicable interest charge. To determine the value of the annuity Prof. Matthews' Compound Interest Formula No. 5<sup>1</sup> may be used as follows:

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D. M. Matthews, op. cit., pg. 222.

$C_n = \frac{a(1.0p^n - 1)}{0.0p}$  where (Cn) is the cost value,

(a) is the annuity, (n) is the number of years, and (p) is the interest rate chosen. Then:

$$1500 = \frac{a(1.06^{20} - 1)}{.06}$$

From compound interest tables the value of  $1.06^{20}$  is shown to be 3.2071, so:

$$1500 = \frac{a(3.2071 - 1)}{.06}$$

$$1500 = 36.7856 a$$

$$a = 40.7071 = \$40.71$$

Therefore the depreciation would be as follows:

Year	Annuity	Interest	Tot. Ann. Chg.	Depe. Accrued
1	40.71		40.71	40.71
2	40.71	2.44	43.15	83.86
3	40.71	5.03	45.74	129.60
4	40.71	7.78	48.49	178.09
5	40.71	10.69	51.40	229.49
10	40.71	28.07	68.78	536.60
15	40.71	51.33	92.04	947.58
20	40.71	82.46	123.17	1499.94

There are obvious objections to this means of apportionment; its complexity, particularly where the number of units is large and the life expectancies varying, and the unreasonableness of an increasing depreciation charge in the years of declining productivity being chief among them.

One other form of the production method of spreading depreciation is based on engine hours or miles driven. Assume, for example, that eight new motors complete with controls are purchased to drive garage or shop repair machinery. The total cost, installed and ready for use, is



\$500, and the estimated net salvage value is \$150. The supplier states that his experience has been that similar motors used similarly have given at least 6625 hours active service on the average. Under normal operating conditions that would mean approximately five years service for this purchaser.

The depreciation charge per running hour per motor would be:

$$\frac{350/6625}{8} = 0.66 \text{ cents.}$$

The rate at which the asset is depreciated depends upon the amount of use to which it is put. If, then, during the first year the motors were run as per the below schedule, the depreciation would be as indicated.

Motor No. 1	1350 hours @	.66¢	\$ 8.91 per year
2	1200 "	.66¢	7.92 " "
3	1000 "	.66¢	6.60 " "
4	1050 "	.66¢	6.93 " "
5	1445 "	.66¢	9.54 " "
6	1510 "	.66¢	9.97 " "
7	1250 "	.66¢	8.25 " "
8	1345 "	.66¢	8.88 " "
	<u>10150</u> hours		<u>\$67.00</u> per year

During shut-downs or periods of relative inactivity the depreciation charge is correspondingly reduced, a fact which does tend to stabilize production costs since a small output need not bear the same depreciation charges as a capacity output, and therefore unit costs do not rise disproportionately in slack periods. But by the same token that which is at one moment the main advantage to the system is at the next moment its greatest disadvantage, for one cannot by mere disuse of an item forestall the ravages of time, the elements, and obsolescence.

Therefore if the production method is deemed desirable in a particular case, maximum realization of its advantages can be made and the

objections to it minimized if it is combined with the straight-line method. If, in the above instance, it were decided to charge off \$8.75 yearly on each motor ( $\$350 \div 8 \times 5$ ) in view of the estimated five-year life expectancy, it could be done by charging the same 0.66 cents per running hour based on a yearly average of 1325 hours.

Under this plan the depreciation might be, by quarters, as follows:

Quarter	Total Hours Run	Charge per Hour	Total Charge
1	335	.66¢	\$2.21
2	330	.66¢	2.18
3	320	.66¢	2.11
4	340	.66¢	2.25
	<u>1325</u>		<u>\$8.75</u>

If the charge thus determined were consistently higher ~~as~~ lower than the desired \$8.75, either the rate or preferably the life expectancy in years and therefore the annual charge should be altered. Such would only be the case if the number of anticipated operating hours per year were materially over or underestimated.

Thus it can be seen that the method elected is a matter of suitability in the opinion of the entrepreneur. Any method which is considered applicable will serve to charge depreciation to the periodic operating expenses, and as long as it accomplishes that task reliably, a method is satisfactory.

The preferred method of recording the amount of depreciation charged off on any asset is by means of a special allowance account, entitled "Buildings--Allowance for Depreciation" or a similar title appropriate for the particular asset to which it pertains. Assume, for example, that on Jan. 1, 1944 the Marquart Lumber Co. purchased a truck with a

depreciable value of \$2250 to be spread over a five year service life. The following would be how the asset and allowance accounts would appear on Jan. 1, 1947:

EQUIPMENT -- TRUCK NO. 3			
Jan. 1, 1944	<u>2250</u>	<u>2250</u>	Balance
Jan. 1, 1945 Balance	<u>2250</u>	<u>2250</u>	Balance
Jan. 1, 1946 Balance	<u>2250</u>	<u>2250</u>	Balance
Jan. 1, 1947 Balance	2250		

*not clear*

TRUCK NO. 3 -- ALLOWANCE FOR DEPRECIATION			
Dec. 31, 1944	* <u>450</u>	<u>450</u>	1944 Depreciation
		450	Balance Jan. 1, 1945
Dec. 31, 1945	* <u>450</u>	<u>450</u>	1945 Depreciation
		900	Balance Jan. 1, 1946
Dec. 31, 1946	* <u>450</u>	<u>450</u>	1946 Depreciation
		<u>1350</u>	Balance Jan. 1, 1947

\* This amount is transferred at the close of each accounting period to the depreciation expense account for that period and thus is recorded and deducted from periodic income.

It will be noted that the balance in the asset account remains constant, the figure in the right column being inserted periodically in order to balance and rule the account and bring it forward to the subsequent period.

In the general ledger, which contains all the control accounts, such as all equipment or all buildings in single accounts showing their cumulative total value, the total of the amounts depreciated from all items of equipment is recorded in a single expense account, as indicated in the above example, but in order to maintain accuracy it is essential that each item, each tractor and truck have a separate machinery history, and type of equipment should have separate allowance account. A glance, then, will reveal: (1) initial cost; (2) maintenance expenditures; (3)

hours of use; (4) depreciated value; (5) residual value; (6) balance of estimated service life, and such other data as the owner may want recorded. The asset and allowance accounts appear together, the former showing always the initial value of the asset, the latter the cumulative amount by which depreciation has reduced that value. With the accounts so arranged, one may at once easily determine the present, or residual, value.

Sooner or later all depreciating assets come to the end of their useful life and must be retired and replaced. In almost every case there is some financial gain or loss involved, resulting as a rule from one or more of the following: (1) misestimation of a proper rate of depreciation; (2) premature removal from service because of irreparable damage or total destruction; (3) misestimation of the salvage value; (4) obsolescence or disuse.

If the depreciation rate of a particular machine were placed too high and/or the salvage value placed too low, the amount realized from its sale at the end of the allotted period would be greater than anticipated and would represent a gain. The reverse, of course, would be the case if the rate were too low and the salvage value too high, and a loss would result. If the Mulder Lumber Co., for example, purchased a flooring machine with an estimated life of fifteen years, salvage negligible, the yearly depreciation would be 6.67% of the value. At the end of ten years should the company decide or be forced to cease production of flooring, unless the machine could be sold for one-third its original value--an unlikely prospect--a loss would be suffered.

By far the most common case, however, is one such as the following in which a truck is to be replaced. Assume: (1) initial cost \$1750, (2) depreciation for four years at \$375 per year, (3) dealer's allowance of \$200 on trade-in, (4) cost of new truck \$2175. The following entries in the books would be in order:

Truck -- Allowance for depreciation	\$1500
Dealer's Account (to record trade-in allowance)	200
Loss on Retirement	50
Equipment--Truck	\$1750

To remove the old truck from the accounts and clear out the allowance account which had a credit balance of  $4 \times \$375 =$  \$1500

Also:

Equipment--Truck	\$2175
Accounts Payable (also Dealer's account)	\$1975
Dealer's Account	200

To place the new truck on the books and acknowledge amount due the dealer. The loss is carried as such and ultimately entered as a special deduction on the periodic income summary.

It is an unfortunate fact that the Bureau of Internal Revenue has decided that in cases of exchanges of assets such as this neither profit nor loss shall be recognized for income tax purposes. Therefore, for tax purposes the cost of the new equipment is the net book value of the old equipment plus the amount paid or payable on the new. In the above example this would mean a tax valuation as follows:

Old truck initial cost	\$1750	
Less accrued depreciation	<u>1500</u>	
Net Book Value		\$ 250
Cost of new truck	\$2175	
Less dealer's allowance	<u>200</u>	
Payable to dealer		<u>1975</u>
Valuation (B.I.R.)		\$2225

Before the effect of the transactions made during any given period can be determined it is necessary to collect all expenses incurred which apply to the production of that period as well as all applicable revenues. This is accomplished in an Expense & Revenue account which is merely a summary of receipts and expenditures placed opposite each other for comparative purposes. An expense is an amount of money or other asset given up, used up, or converted in any phase of the production of a marketable commodity. Money and depreciation are given up, fuel and supplies are used up, and stumpage is converted in the process of logging.

A cost, on the other hand, in the strict accounting sense, is the total of the expenses involved in acquiring an asset or in preparing the product for sale and / or selling it, depending upon whether cost of production, selling cost, or cost of sales is required. Rent, insurance, depreciation, interest, and utilities, to list a few, are, in themselves, expenses. Taken summarily with wages, salaries, raw materials, shipping, and other expenditures they make up the cost of production, the total cost of creating the finished product ready for use by the purchaser.

Almost without exception expense accounts are closed out completely to Expense and Revenue at the end of each accounting period, be it a month, a quarter, or a year. Like asset accounts they have debit (left-side) balances, and all increases or additional expenditures are entered on the left side of the account.

All liability accounts carry, as a rule, credit (right-side) balances, and every credit entry in any account has an equal debit entry

which should be made simultaneously to avoid error. Under this so-called Double Entry system of accounting, errors if made may be located and corrected with relative ease.

To illustrate some of the principles discussed and the methods recommended, assume that on January 1, 1947 the accounts of the Mulder Lumber Co. stood as follows:

	Debits	Credits
Cash	\$ 5,000	
Accounts Receivable	20,000	
Materials	10,000	
Work in Process	5,000	
Finished Goods (50 M @ \$100)	5,000	
Land (mill site and seasoning yard)	13,500	
Buildings (net book value)	19,000	
Equipment (net book value)	22,500	
Accounts Payable		\$ 15,000
Notes Payable (6%)		25,000
Interest Accrued on Notes		375
Payroll--Direct and Indirect		1,125
Capital Stock		50,000
Surplus		8,500
	<u>\$100,000</u>	<u>\$100,000</u>

All production is sold to manufacturers who specify air dry stock and pay \$100 per M, No. 1 Common and better, at a maximum moisture content of 18%.

The following summarizes the business transacted during the ensuing three months:

- (1) Materials purchased on account, \$25,000.
- (2) Direct labor cost incurred, \$20,000.
- (3) Indirect labor charges, \$5,000.
- (4) Maintenance and other mill overhead paid in cash, \$2,000.
- (5) Selling and shipping costs paid in cash, \$3,000.
- (6) General and administrative costs paid in cash, \$2,500.
- (7) Payments to employees, direct labor, \$20,500; indirect labor, \$4,750.
- (8) Payroll taxes and workmen's compensation contributions accrued and paid, \$1,000.
- (9) Payments to creditors on accounts payable, \$20,000.
- (10) Sales, on account, \$50,000.

- (11) Collections from customers, \$55,000.
- (12) Depreciation on buildings per quarter, \$190; on equipment, \$450; all assumed chargeable to operations. The allowance method is not being used: asset value is reduced directly.
- (13) Estimated value of materials in decks, pond & in transit, \$15,000.
- (14) Inventory of work in process on green chain and in seasoning yard, \$8,000.
- (15) Inventory of finished goods ready for shipment, \$7,000.
- (16) Notes are brought up-to-date on March 31 by payment of 6 month's accrued interest.
- (17) A dividend of 1% (\$500) is declared payable on April 15 to all stockholders registered as of March 31, 1947.

To record these summary transactions and close the books for the quarter it is necessary to open skeleton accounts (T accounts) and record therein the balances as of January first. Twelve additional accounts will be required of which eleven will be closed out, being merely expense accounts or methods of collecting revenue data. They are: (1) Direct Labor; (2) Indirect Labor; (3) Mill Overhead; (4) Selling & Shipping Cost; (5) General & Administrative Cost; (6) Payroll Taxes; (7) Sales; (8) Mill Cost of Sales; (9) Expense & Revenue; (10) Interest Charges; (11) Income; (12) Dividends Payable. Beginning and ending balances are indicated by a check (✓), and it should be noted that in closing an account an ending debit balance is added to the credit side and vice versa in order that the two columns in each account may total alike and the new balance be set up as shown. Cash and Bank are used herein as synonymous to reduce the number of accounts needed and to simplify disbursements and collections.

In this exemplary problem the entries in the accounts bear the the number assigned in the summary of business given so that both debit and credit entries for each transaction may be easily located. In actual practice, of course, transactions would be recorded when made rather



MULDER LUMBER CO.

SKELETON ACCOUNTS JAN. 1 - MAR. 31, 1947

CASH		LAND		PAYROLL - DIRECT & INDIRECT	
✓	5,000 (4)	2,000	✓	13,500	(7) 25,250 ✓ 1,125
(11)	55,000 (5)	3,000			(2) 20,000
	(6)	2,500			✓ 875 (3) 5,000
	(7)	25,250			<u>26,125</u> <u>26,125</u>
	(8)	1,000			✓ 875
	(9)	20,000			
	(16)	750			
	✓	<u>5,500</u>			
	<u>60,000</u>	<u>60,000</u>			
✓	5,500				
ACCOUNTS RECEIVABLE		BUILDINGS		CAPITAL STOCK	
✓	20,000 (11)	19,000 (12)	190		✓ 50,000
(10)	50,000 ✓		<u>18,810</u>		
	<u>70,000</u>		<u>19,000</u>		
✓	15,000	✓	18,810		
MATERIALS		EQUIPMENT		SURPLUS	
✓	10,000 (13)	22,500 (12)	450	(f) 15 ✓	8,500
(11)	25,000 ✓		<u>22,050</u>	✓	<u>8,485</u>
	<u>35,000</u>		<u>22,500</u>		<u>8,500</u>
✓	15,000	✓	22,050		<u>8,500</u>
WORK IN PROCESS		ACCOUNTS PAYABLE		INDIRECT LABOR	
✓	5,000 (14)	(9) 20,000 ✓	15,000	(3) <u>5,000</u>	(13b) <u>5,000</u>
(13)	20,000	✓	<u>20,000</u>		
(13a)	20,000		<u>40,000</u>		
(13b)	5,000		✓ 20,000		
(13c)	2,640 ✓				
	<u>52,640</u>				
✓	8,000				
FINISHED GOODS		NOTES PAYABLE		DIRECT LABOR	
✓	5,000 (15)	(16) <u>375</u> ✓	<u>375</u>	(2) <u>20,000</u>	(13a) <u>20,000</u>
(14)	44,640 ✓				
	<u>49,640</u>				
✓	7,000				
INTEREST ACCRUED ON NOTES		SELLING & SHIPPING COSTS			
				(5) <u>3,000</u>	(a) <u>3,000</u>

MILL OVERHEAD	
(A) 2,000	(13c) 2,640
(12) <u>640</u>	
<u>2,640</u>	<u>2,640</u>

INTEREST CHARGES	
(16) <u>375</u>	(x) <u>375</u>

GENERAL & ADMINISTRATIVE EXP.	
(6) <u>2,500</u>	(b) <u>2,500</u>

EXPENSE & REVENUE	
(a) 3,000	(e) 50,000
(b) 2,500	
(c) 1,000	
(d) 42,640	
(y) <u>860</u>	
<u>50,000</u>	<u>50,000</u>

PAYROLL TAXES	
(8) <u>1,000</u>	(c) <u>1,000</u>

INCOME SUMMARY	
(17) 500	(y) 860
(x) <u>375</u>	(f) <u>15</u>
<u>875</u>	<u>875</u>

SALES	
(e) <u>50,000</u>	(10) <u>50,000</u>

DIVIDENDS PAYABLE	
(17) 500	

MILL COST OF SALES	
(15) <u>42,640</u>	(d) <u>42,640</u>

MULDER LUMBER CO.  
 INCOME SHEET  
 FOR QUARTER ENDING MARCH 31, 1947

SALES :		\$ 50000 00
OPERATING EXPENSES :		
MILL COST OF SALES	\$ 42640 00	
SELLING AND SHIPPING COSTS	3000 00	
GENERAL & ADMINISTRATIVE EXPENSES	2500 00	
PAYROLL TAXES	<u>1000 00</u>	
		<u>49140 00</u>
NET OPERATING REVENUE		860 00
INTEREST CHARGES		<u>375 00</u>
NET PROFIT TO STOCKHOLDERS		<u>485 00</u>
DIVIDENDS DECLARED		500 00
SURPLUS DECREASE		15 00
BEGINNING SURPLUS	8500 00	
DECREASE	<u>15 00</u>	
ENDING SURPLUS		\$ <u>8485 00</u>

MULDER LUMBER CO.  
 BALANCE SHEET  
 MARCH 31, 1947

CURRENT ASSETS :

CASH	\$	5500 00	
ACCOUNTS RECEIVABLE		15000 00	
MATERIALS		15000 00	
WORK IN PROCESS		8000 00	
FINISHED GOODS		7000 00	
		<u>7000 00</u>	\$ 50500 00

FIXED ASSETS :

LAND	\$	13500 00	
BUILDINGS		18810 00	
EQUIPMENT		22050 00	54360 00
		<u>22050 00</u>	
			<u>\$104860 00</u>

TOTAL ASSETS

CURRENT LIABILITIES :

ACCOUNTS PAYABLE	\$	20000 00	
NOTES PAYABLE		25000 00	
PAYROLL ACCRUED PAYABLE		875 00	
DIVIDENDS PAYABLE		5000 00	
		<u>5000 00</u>	\$ 46375 00

NET WORTH :

CAPITAL STOCK	\$	50000 00	
SURPLUS		8485 00	58485 00
		<u>8485 00</u>	
			<u>\$104860 00</u>

TOTAL EQUITIES

than in summary form, but the principles are the same, the brevity herein detracting nothing from the exemplary value.

Items number (12), (13), and (16) require, perhaps, some explanation. Depreciation when chargeable to manufacturing operations constitutes a part of overhead, to be apportioned in that way to all units of production. Since the allowance method of recording depreciation has previously been illustrated, the straight write-off method was used in this case problem, although it is not the preferred method.

Item (13) states that the inventory of materials on March 31 was \$15,000. Therefore \$20,000 worth must have been started down the green chain to the yard and possibly even sold. In addition to materials, mill overhead, direct labor, and indirect labor all go to make up the cost to the operator of the finished goods produced, so those accounts must be "closed" to "Work in Process" (13a) (13b) and (13c) before that account can be closed to Finished goods, leaving the balance indicated in item (14).

Item (16) provides for the payment of \$375, interest charges accrued from the previous quarter, and \$315, interest charges deductible from the net operating revenue of the current quarter. Both amounts are a reduction of the cash account, but \$375 is a debit to Interest Accrued on Notes, and \$375 is a debit to the current quarter's Interest Charges. Only the latter, it should be noted, appears on the Income Sheet since it alone applies to the period covered in the report, Jan. 1--Mar. 31, 1947.

The Dividends Payable account will be carried as a current li-

ability until paid, at which time it will be closed out as follows:

Dividends Payable	\$500.00	
Cash		\$500.00

To leave a zero balance in the Dividends Payable account.

The entries necessary to close out, or summarize, the accounts and prepare the data for presentation on the Income Sheet and Balance Sheet are lettered rather than numbered to distinguish them from the recorded business transactions.

Any system of accounts no matter how elaborate or extensive which does not have behind it an adequate means of collecting data is a castle built on sand, and no operation plan based on faulty or inadequate information can, except by chance, prove to be what its promulgators intended. Consequently any good system of records, except of course, for an enterprise which does only mill work starting with the logs, begins in the woods. It deals with times and rates and distances; it deals with men and machines as individuals, checking their productivity against their cost to the company; and it deals with unit costs of production, construction, and operation.

In general log making costs may be divided into three broad groups: (1) direct labor, (2) supervision and other costs reasonably fixed per unit of production, (3) fixed and over head costs such as improvements, developmental costs, and administration. No tree should be cut which will not at least pay class (1) and class(2) costs. Once they have been determined, the minimum diameter can be set or changed on the spot to fit different situations of stand, topography, and labor.

The breakdown of total operating or working time can be accom-

plished, if desired, by time studies, but besides being costly they tend to be inaccurate because a man is inclined to work somewhat faster when he has a stop-watch held on him, and the timer may not get too representative a sample in his effort to complete the survey and to keep from upsetting the crews. Total time and total production will yield an average unit time satisfactory for most purposes and cheaper to get than by a direct time study. It takes longer to get, however, and is not applicable to all phases.

A man hoeing corn at 90¢ per hour earns \$7.20 in an eight hour day. Exclusive of any depreciation on the hoe, the machine rate for that man is \$0.90 per hour, or 1.5¢ per minute. A machine rate is the cost of owning and operating a machine for a period of time, usually expressed per hour or per minute. It should be determined as accurately as possible since it is the basis of many cost formulas. It must include the fixed ownership costs such as initial cost, depreciation, license, insurance, property tax and interest, and storage; all maintenance and repair costs; and all operating costs such as fuel, lubricants, gasoline, and wages of personnel (operator and helper, if any).

Machine rate times unit time gives unit cost in units of production or units of distance as in road construction. Therefore it can be seen that the degree of accuracy attained in planning and record keeping depends in large part upon the extent to which operating time is broken down into unit times.

For each machine there should be kept a Daily Operating Summary complete enough in its form to reduce recording time to a minimum. Some

form similar to that shown on page 23a is recommended. It should cover an entire month, if possible, in order to reduce the size of the record file needed and to simplify the entries on the Quarterly Synopsis shown on page 23b. This form may be expanded, if desired, to include quantities of fuels and lubricants consumed, but that information appears in the monthly totals on the Daily Operating Summary and so can be made readily available without cluttering the Quarterly Synopsis.

In addition to the above records there should be kept a Machinery History Card covering all the components of the machine rate for the service life of the machine. Thereby a good survey picture of the cost of owning and operating the equipment as well as its changing machine rate is presented in compact form. The suggested form on page 23c is for a unit whose estimated useful life is three years. The fixed charge data are easily obtained and determined, and the operating data come from the Daily Operating Summary and Quarterly Synopsis. By this means an operator can compare various types of equipment and determine for himself what kinds are best suited to his type of operation or the general uses to which he puts them and so plan his replacements to his financial and productive advantage.

Hand in hand with machine rate and machine hours are, of course, wages and man hours, and nowhere in an entire operation are they of more importance than in felling, limbing, swamping, and bucking. In all calculations time must be allowed, in addition to those items just enumerated, for delay time walking between trees and for undercut time. On no two operations are these times alike, nor are they subject to accurate calculation, for they depend upon climate, topography, stand conditions,



## DAILY OPERATING SUMMARY

Machine : .....  
 Location : Note 2. ....

Month : ..... 19.....  
 Operator's Wage : .....  
 Helper's Wage : .....

Date	Operating Time Hrs.	Maintenance		Idle Time Hrs.	Diesel Fuel		Gasoline		Lube Oil		Grease		Repair Parts Part No. Cost	Misc.	Remarks
		Hrs.	Cost		Gals.	Cost	Gals.	Cost	Lbs.	Cost					
1															
2															
3															
4															
6															
7															
8															
9															
10															
11															
13															
14															
15															
16															
17															
18															
20															
21															
22															
23															
24															
25															
27															
28															
29															
30															
31															
Total															

1. Weekly totals are often of administrative value and may be included.
2. For job cost analysis.



## MACHINERY HISTORY CARD

Machine: .....  
 Maker: .....

Date of Purchase: .....  
 Initial Cost: .....  
 Estimated Salvage Value: .....

	FIRST YEAR					SECOND YEAR					THIRD YEAR				
	QUARTER				TOTAL	QUARTER				TOTAL	QUARTER				TOTAL
	1	2	3	4		1	2	3	4		1	2	3	4	
Fixed Charges:															
Depreciation															
Ins, Int, & Taxes															
Maintenance															
Parts															
Total															
Operating Charges:															
Operator's Wage															
Helper's Wage															
F.O.A.B, etc.															
Diesel Fuel															
Gasoline															
Lube Oil															
Grease															
Misc.															
Total															
Total Days Operated															
Total Hours Operated															
Total Days Out of Service															
Total Hours Out of Service															
Hourly Machine Rate															

and labor relations unless the crews are on a piece work basis, and labor relations are of no practical effect.

In an article on logging and sawmilling labor costs based on production in terms of man-hours per M, B. P. Kirkland, principal economist, U. S. Forest Service, gives the results of fifteen studies carried out in eastern forest regions during the past ten years.<sup>1</sup> The following is an excerpt from Table L--Felling & Bucking Time: by Diameter Classes.

Diameter Class	Sugar Maple, Wisconsin		Time in Man-hours per M bd. ft. lumber tally
10	3.68	} 3.43	} 3.58
12	3.48		
14	3.14		
16	2.84	} 2.64	} 2.70
18	2.64		
20	2.57		
22	2.52		
24	2.54		
26	2.61		
28	2.68		
30	2.73		} 2.86

Other cost data included in the article show that when trees 15" and larger only were cut in yellow birch, sugar maple, basswood, and elm in Wisconsin, the average production time per M board feet lumber tally was 18.51 man-hours, 16.7% less than the cost of cutting the same species 14" and under but only 1.5% lower than the cost of taking all tree sizes. This would indicate that trees smaller than 14" should be cut only with silvicultural intentions, the aim being toward stand improvement and sustained yield. The small trees cut should be diverted along with rejected sawlogs to other uses such as fuel, pulpwood, posts,

<sup>1</sup>

B. P. Kirkland, Productivity of Logging and Sawmill Labor As Affected by Tree Size, Journal of Forestry, vol. 41, No. 12, December 1943, pp. 869 ff.

or mine timbers since they have a reduced value as sawlogs and require, according to Table I above, at least 8 man-hours per M longer to produce.

Making allowances for 2 men at 60¢ per hour, social security, unemployment compensation, direct and maintenance supplies, maintenance labor, supervision and over head, depreciation, interest, taxes, and insurance, Mr. Kirkland arrived at the figure of 85¢ total cost per man-hour per eight hour day for felling and bucking; in short a machine rate for those crews used in the study. In manual operations more so even than in machine operations the delay and idle times are the items to watch, and their reduction should be a primary aim in planning. Assume, for illustrative purposes, a grossly exaggerated case. A truck on which the annual depreciation is \$500 is used to haul the logs made by a 2-man crew who cut an average of .74 M per hour (270 man-hours per M from Table I above) or 148 M per 250 day year. This means that depreciation alone amounts to 33.8¢ per M. By assigning to the truck an additional crew, the output would average 2960 M, and the depreciation charge would be reduced to 16.9¢ per M merely by reducing the idle time of the machine. The one thing which prevents this illustration from being completely ludicrous is the pathetic fact that the writer knows of instances which display very nearly as flagrant a disregard of the basic principles as this given. It is in large part because many an operator does not take such considerations into account that his margin of profit, if any, is less than it might otherwise be. The finest, most modern, most efficient piece of machinery ever invented loses money for its owner every hour during which it stands idle. In this respect it is the role of administration through

cognizant planning to reduce the costs of production. Thus it can easily be seen that an insufficient expenditure on the fixed and overhead costs such as improvements and administration will almost certainly result in excessive field costs including both labor and supervision.

A. A. Hasel has reported the results of an interesting study made in the Blacks Mountain Experimental Forest in California.<sup>1</sup> Daily felling, limbing, and bucking output was kept separately for each crew on a card filled out daily by the men themselves. The unit of time was a day and included all rest periods, travel time from tree to tree, time for tool sharpening, and all miscellaneous time with the exception of transportation and lunch times. All trees were numbered and tallied to aid in record keeping.

This method of cost keeping Mr. Hasel compared with the direct timing method, presenting the comparison in graphical form, plotting Time in man-minutes over Diameter, breast high in inches. Both curves were based on the same 365 trees cut in 25 days and are virtually coincidental, except in the smaller diameters. Undoubtedly had the study been prolonged and records of more than 25 days been used, the results would have been in even closer agreement merely because of better sampling. Detailed timing by individual trees required 25 man-days, whereas the cost of keeping daily output records was almost nil.

A daily log output card for each crew, a yarding and loading time record, and skidding and hauling time records supply the essential information without entailing the use of additional men and undue expenses. Particularly in a small operation, that is an invaluable feature.

1

A. A. Hasel, Logging Cost as Related to Tree Size and Intensity of Cutting in Ponderosa Pine, Journal of Forestry, Vol. 44, No. 8, August 1946, pp. 552 ff.

The required records should be as few and easily kept as possible. The accounting forms recommended herein have been selected to simplify and reduce to a practical minimum the amount of work necessary to present periodically the economic data consistent with the keeping of adequate records.

In an attempt to consolidate some of the methods herebefore outlined the necessary basic data will be assumed for a given logging operation, the necessary cost calculations made, and appropriate entries made in the operator's books. All formulas used are among those developed by Professor Matthews.<sup>1</sup>

The cost calculations which will be illustrated are those which form the basis of sound planning. On pages 31, 32, and 33 appear computations for loading cost, fixed and variable skidding costs, road construction costs, and hauling costs. The formulas involved are fixed, and the solutions are mechanical. It is the values substituted in the formulas which apply them to a specific case, and those values can be considered reliable only when adequate records are kept of economic data.

The operating records provide the information needed to compute the machine rate which in turn is necessary in the calculation of the various unit costs of skidding, loading, hauling and road construction. From the invoices

<sup>1</sup> D. M. Matthews, Cost Control In The Logging Industry, 1942, McGraw-Hill Book Co., N.Y.

and corresponding Journal entries come the values which in conjunction with the month-end inventories of, for example, fuels and lubricants establish the monthly consumption. Consumption can then be calculated per operating hour - an integral part of the machine rate.

Take, for example, Diesel fuel. From the Journal entries of January 2nd and 18th, recording purchases and the beginning and ending inventories, pages 29 and 38 respectively it can be seen that the consumption during the month was:

Beginning Inventory Jan. 1	35 gals.
Purchased Jan. 2	250 gals.
Purchased Jan. 18	250 gals.
Total goods during month	<u>535</u> gals.
Ending Inventory Jan. 31	55 gals.
Monthly Consumption	<u>480</u> gals.

Two tractors operating an average of 20 X 8 or 160 hours each per month would consume Diesel fuel at the rate of 1.5 gals. per tractor per hour. Each Journal entry bears the purchase price as shown on the invoice, and so the inventories can be accurately priced and a value placed on consumption. In this problem prices of items such as fuels purchased recurrently were assumed to be constant.

The cost of doing business; the operating expenses, as they have been in the past; the cost of pro-



duction on units which have been sold; these are the aspects of an operation whose histories are found in the accounting phase. They are the tangible evidence of past experience, the foundation upon which future plans should be built, and they must, therefore, be sound and reliable. A cost calculation based upon a faulty machine rate is not only valueless, but misleading, and its use may result in costly errors.

The calculation of unit costs for the following operation has been inserted chiefly in an illustrative capacity to present the formulas and to demonstrate the principle which states that economic spacing of roads equalize skidding and road construction costs per M. bd. ft. Cost calculations are the planning phase of logging, the estimates of costs on proposed operations. They aid in determining whether or not an undertaking would be successful, doubtful, or unsuccessful if attempted. In that capacity they have been applied to the data available on a second tract of timber which the operator plans to log upon exhaustion of the present stand.

Since cost calculations are speculative in nature, they are in some measure distinct from the records of actual costs incurred, but planning without retrospect is as unsatisfactory as the mere function of keeping

records without thought to the future. It is, rather, in the sound combination of these two phases that there lies the ideal situation.

Operations should be planned in reliance upon the cost calculations. As the logging progresses, if records are kept in the manner suggested, more reliable data is available upon which to base cost calculations for subsequent operations. And so goes the cycle, each phase complimenting the other, improving its accuracy and reliability.

The Balance Sheet on page 35 shows the financial status of the organization at the beginning of the month. The transactions listed on pages 37 and 38 are subsequent thereto and lead to the Balance Sheet on page 41.

This operation is planned in the Lake States Region using information applicable to that area. It is assumed that a full work week consists of 44 hours and that the felling, limbing, and bucking are being handled by two-man crews, requiring an average of 2.9 crew-hours per M.<sup>2</sup> Skidding is being done by Allis Chalmers HD-5 tractors, delivering an average of 12 to 13 M per day to the landings. Hauling is done with Dodge 2-Ton semi-trailer trucks with dual axles, rated load 15 T, which leaves a one ton margin on the average when

<sup>2</sup> A. A. Hasel, Op. Cit.

hauling 3M northern hardwoods. Loading is accomplished by A jammer the cost of which is negligible and not carried as an asset on the books.

Wages are based on data determined for the Lake States and soon to be published by the Society of American Foresters.

The crew consists of:

20 fallers	--	\$ 0.80 per hour
2 tractor oper.	--	1.50 " "
2 chokers	--	.75 " "

2 truck drivers -- \$ 1.50 per hour  
 1 teamster -- 1.25 " "  
 1 Foreman -- 2100 " year

Also there are:

1 cook \$ 200.00 per month  
 1 cookee 90.00 " "  
 1 mechanic 45.00 " week  
 1 blacksmith 40.00 " "

Light and power are supplied by a 3000 watt, no-battery, AC,

Powerlite unit, carried as follows:

Initial cost	\$519.00
Starting batteries (2-6 Volt.)	14.00
Freight charges from Minneapolis	10.40
Tax on freight charges	.31
Labor, mountings, etc.	16.29
Total cost, installed	<u>\$560.00</u>

Fuel consumption is one-half gallon of gasoline per operating hour.

Life expectancy, 20 years.

All equipment and buildings were purchased or constructed by Jan. 1, 1945, and depreciation has been accrued since that date.

The commissary department is not separated from the other financial transactions of the business. Meals are served at cost, averaging \$1.40 per man per day, payable weekly on payday.

The average monthly consumption of fuels & lubricants is as

follows:	2 Trucks	2 Tractors	Powerlite	Total	Cost	Total Cost
Gasoline	640 gals.	40 gals.	240 gals.	920 gals.	.18	\$165.60
Lube Oil	64 qts.	80 qts.	6 qts.	150 qts.	.12	18.00
Grease	16 lbs.	160 lbs.	1 lb.	177 lbs.	.05	8.85
Diesel		480 gals.		480 gals.	.098	47.04
						<u>\$239.49</u>

\$239.49 plus \$7.18 sales tax = \$246.67

The inventory on Jan. 1, 1947 was as follows:

Gasoline	50 gals.	@.18	9.00
Diesel	35 gals.	@.098	3.43
Lube Oil	30 qts.	@.12	3.60
Grease	40 lbs.	@.05	2.00
			<u>18.03</u> + 3% = \$18.57

To an organization of this size and nature in Michigan the following state and federal taxes based on payroll are applicable:

Federal Employers Tax (F.O.A.B.)	1%
Unemployment Compensation	4%
Federal Excise Tax	<u>1%</u>
Total	6% of payroll

All taxes have been paid through Dec. 27, 1946.

Machine Rate for HD-5 Tractor

Initial Cost	\$4,000.00
Salvage Value in 4 years	150.00
Average Operating Year	1900 hours

Fixed Charge:		Per Hour
Depreciation: \$3850 ÷ (4 x 1900)	\$0.51	
Interest, taxes, insurance, etc.	0.15	
Repairs: \$900 per year	<u>0.474</u>	
		\$1.134

Operating Cost:		
Operator	\$1.500	
Choker	.750	
FOAB etc. @ 6%	.135	
Fuel (1.5 gal. per hr. @ 9.8¢)	.147	
Gasoline (1 gal. per day @ 18¢)	.0225	
Lube Oil (2 qts. per day @ 12¢)	.030	
Grease (4 lbs. per day @ 5¢)	.025	
Sales tax on fuels & lubricants @ 3%	<u>.007</u>	
		<u>2.617</u>
		\$3.751

Average load .3125 M

Average Round-trip speed .97 min. per station

## Machine Rate for Truck

Initial Cost, complete		\$3,500	
Cost of tires	\$1000		
Salvage value in 4 yrs	100		
		<u>1,100</u>	
		\$2,400	
Average Operating Year	1900 hours		
Fixed Charge:			Per Hour
Depreciation: \$2400 ÷ (4 x 1900)		\$ .316	
License & Insurance: \$185 ÷ 1900		.097	
Operator		1.500	
F.O.A.B. etc., @ 6%		<u>.090</u>	
			\$2.003
Operating Cost:			
Fuel (2 gal. per hr. @ 18¢)		\$ .360	
Lube Oil (1/5 qt. per hr. @ 12¢)		.024	
Grease (8 lbs. per month @ 5¢)		.0025	
Sales tax on fuel & lubricants @ 3%		.0116	
Repairs & Maintenance: \$600 per year		.316	
Tires \$1000 ÷ 1200 hrs.		<u>.833</u>	
			<u>1.547</u>
Total hauling cost per hour			\$3.55
Average daily production 12M			
Cost per trip, \$7.10			
Cost per M delivered to mill, \$2.37			
Distance to mill 8.25 miles -- Cost per M per mile, 28.7¢			
Loading time, 36 min.			
Unloading time (- delay), 15 min.			
Travel time per round trip, 59 min.			
Average speed loaded, 12 m.p.h.			
Average speed light 28 m.p.h.			
Average round-trip speed		$\frac{2(12 \times 28)}{12+28} = 16.8$	

All cost calculations appear on subsequent pages.

At present the operator is logging a stand, carrying 8M feet board measure per acre above 12 inches Dbh, with an average diameter of 18 inches being cut.

Roads have been located with an eye chiefly to convenience and on the average are 2100 ft. apart. The topography is gently rolling to

level, the ground cover medium to light, and road construction costs \$10 per 100 foot station.

In the skidding operation there is a fixed average delay time (including hook, unhook, and idle times) of 10 minutes per turn, and each tractor makes 4 turns per hour with an average load of .3125 M.

All logs are delivered to the Mulder Lumber Co. located 8.25 miles from camp: sale value \$34.50 per M. Stumpage of \$20 per M has been paid on 135 acres which have yet to be cut in this tract.

Based on the forms presented by Mr. Hasel<sup>1</sup> the machine rates for the felling and bucking crews and the loading horse have been deter-

mined as follows:

Felling & Bucking per hour		Horse & Teamster per hour	
Labor	\$1.60	Teamster	\$1.25
FOAB, etc.	.096	FOAB, etc.	.075
Supervision & Maintenance	.10	Supervision	.055
Depreciation	.01	Depreciation (30+1900)	.016
Interest, Insurance, Taxes	.001	Food & Upkeep	.150
	<u>\$1.807</u>	Interest	.010
			<u>\$1.556</u>

Loading requires 12 minutes per M, so the cost of loading is:

$$\frac{155.6\text{¢} \times 12 \text{ min.}}{60 \text{ min.}} = 31.1\text{¢ per M}$$

At the rate of 2.9 crew-hours per M, felling, limbing, and bucking costs have been found to be:

$$2.9 \times \$1.807 = \$5.24 \text{ per M}$$

From the records of past performance it has been decided that a reasonable variable cost of skidding is 19.4¢ per M per station of 100 ft.

$$\text{Variable Cost} = \frac{\text{Machine Rate per hour} \times \text{Round trip speed in minutes per station}}{60 \text{ minutes} \times \text{Average load per turn}}$$

<sup>1</sup>

Ibid., pg. 554.

$$c = \frac{375¢ \times .97 \text{ min.}}{60 \times .3125M}$$

$$= 19.4¢ \text{ per M per station}$$

The fixed skidding cost on this operation is:

$$F = \frac{\text{Machine Rate per hour} \times \text{fixed time per turn}}{60 \text{ minutes} \times \text{Average load}}$$

$$= \frac{375¢ \times 10 \text{ min.}}{60 \times .3125M}$$

$$= \$2.00 \text{ per M}$$

Under the present set-up the average skidding distance is 21 + 4 or 5.25 stations which means that the variable cost of skidding to the roads is:

$$19.4¢ \times 5.25 = \$1.02 \text{ per M}$$

And with the \$2.00 fixed cost added, the skidding cost is brought to \$3.02 per M at the road.

With a spacing of 2100 feet the cost of road construction is as follows:

$$\text{Cost} = \frac{\text{Cost per mile in cents} + 12.1 \text{ (to get cost per acre)}}{\text{Volume per Acre} \times \text{Road Spacing in Stations}}$$

$$= \frac{52,800¢ + 12.1}{8M \times 21}$$

$$= 26¢ \text{ per M}$$

The trucks maintain an average speed loaded of 12 m.p.h., and an average speedlight of 28 m.p.h. Their average round-trip speed there-fore is:

$$AS = \frac{2 \text{ (High speed} \times \text{Low speed)}}{\text{High speed} + \text{Low speed}}$$

$$= \frac{2 \text{ (28} \times \text{12)}}{28 + 12}$$

$$= 16.8 \text{ m.p.h.}$$



Allowing 36 minutes to load 3M and 15 minutes unloading and miscellaneous delay time and 59 minutes travel time as per:

$$\begin{aligned} T &= \frac{\text{Round trip distance} \times 60 \text{ min.}}{\text{Round trip speed}} \\ &= \frac{2 \times 8.25 \times 60}{16.8} \\ &= 59 \text{ minutes} \end{aligned}$$

makes it possible for each truck to complete one round trip in 2 hours, thereby delivering 12 M per 8-hour day.

The cost of hauling, then, is:

$$\begin{aligned} H &= \frac{\text{Machine Rate per hour} \times \text{Round trip time}}{\text{Load}} \\ &= \frac{\$3.55 \times 2 \text{ hrs.}}{3M} \\ &= \$2.37 \text{ per M or } 237 \div 8.25 = 28.7\% \text{ per M per mile} \end{aligned}$$

The financial condition of the enterprise as of January 1, 1947 is shown on the Balance Sheet for that date on page 36. The same information appears in the beginning balances in the Ledger Accounts, pages 50 through 56, indicated, as are all beginning and ending balances, by a check (✓) mark.

Prepaid Stumpage is the value at \$20 per M of the timber on the remaining 135 acres, or 1080M.

On Nov. 1, 1946 a \$12,000 note bearing 6% interest was given in partial payment for the tract now being cut. Interest is payable quarterly, and none has yet been paid.

As of January 1, 1947 wages for December 28, 30, and 31 in the amount of \$566.59 were payable as was the foreman's salary for the period

December 16-31, or \$87.50. Hence the total Wages Payable of \$654.09.

On that payroll, taxes at 6% would be \$39.25.

Of the Accounts Receivable \$7500 is receivable from the Mulder Lumber Co., and the balance, \$179.20, represents the amount due from the men for 4 days board from December 28 through 31.

The present block of timber is nearing exhaustion, and a second tract has been located. R. C. Elingren agreed to cruise the area, and his report indicates an average merchantable stand of 6 M per acre, averaging 18" Dbh. Topography in general is the same, but a greater amount of low ground and somewhat heavier ground cover will increase road construction costs to approximately \$12 per station. Bruce and Carroll have requested that they be given an option to purchase the stumpage on Tract 2 at \$20 per M.

Balance Sheet  
Jan. 1, 1947

Assets			
<b>Current:</b>			
Farmers Bank		\$ 8,300.00	
Accounts Receivable		7,679.20	
Prepaid Stumpage		21,600.00	
Supplies & Spare Parts		327.44	
Commissary		517.75	
Office Supplies		30.00	
Fuels & Lubricants		<u>18.57</u>	
			\$38,472.96
<b>Fixed</b>			
Buildings	\$3,150.00		
Less Allow. for Depr.	<u>315.00</u>		
		2,835.00	
Equipment	18,000.00		
Less Allow. for Depr.	<u>6,745.00</u>		
		<u>11,255.00</u>	
			<u>14,090.00</u>
			<u>\$52,562.96</u>
<b>Equities</b>			
<b>Current Liabilities:</b>			
Note Payable		\$12,000.00	
Wages Payable		654.09	
Payroll Taxes Payable		39.25	
Interest Payable		<u>120.00</u>	
			\$12,813.34
<b>Proprietorship:</b>			
R. O. Bruce -- Capital		\$19,874.81	
J. G. Carroll -- Capital		<u>19,874.81</u>	
			<u>39,749.62</u>
			<u>\$52,562.96</u>

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Depreciation Schedule  
Jan. 1, 1945

Item	Cost New	Deprec. Rate	Depreciation	
			Annual	Monthly
			Dollars	
<b>Buildings</b>				
Bunk house	\$ 800.00			
Mess hall	800.00			
Wash house	500.00			
Garage, Shop & Powerhouse	600.00			
Stable	200.00			
Latrine	100.00			
Fuel tanks	150.00			
	<u>\$ 3150.00</u>	5%	<u>\$ 157.50</u>	<u>\$ 13.13</u>
<b>Equipment</b>				
Commissary & Furniture	\$ 500.00	20%	\$ 100.00	\$ 8.33
<b>Machinery:</b>				
Drill Press (1)	\$ 150.00			
Electric land drill	40.00			
Bench Lathe (1)	200.00			
Engine Lathe (1)	900.00			
Double shaft grinder	150.00			
Misc. Tools	350.00			
	<u>\$ 1790.00</u>	5%	89.50	7.46
<b>Trucks</b>	<u>\$ 7,000.00</u>	25%	1200.00	100.00
<b>Tractors</b>	8,000.00	25%	1925.00	160.42
<b>Powerlite</b>	560.00	5%	28.00	2.34
<b>Horse</b>	150.00	20%	30.00	2.50
	<u>\$15,710.00</u>		<u>\$3372.50</u>	<u>\$281.05</u>
<b>Total Fixed Assets</b>				
Buildings	\$ 3,150.00			
Equipment	<u>18,000.00</u>			
	<u>\$21,150.00</u>			
<b>Total Depreciation</b>				
Annual	\$ 3,530.00			
Monthly	\$ 294.18			

The following represent the business transactions of Bruce & Carroll during the period January 1-31, 1947:

Jan. 1. Foreman's salary for Dec. 16-31 was paid, \$87.50.

2. Option taken on Tract 2, \$100 paid to Interior Land Co.  
Purchase of commissary stores from V. A. Shoberg & Sons,  
\$253.50.

Received: 450 gal. gasoline @ \$.18	= \$	81.00	
52 gal. lube oil @ .48	=	24.96	
200 lb. grease @ .05	=	10.00	
250 gal. Diesel @ .098	=	24.50	
		<u>\$140.46</u>	
	Sales tax	4.21	
	Total	<u>\$144.67</u>	Paid to Shell Oil Co., Inc.

3. Payroll for period Dec. 28-Jan. 3, \$1019.86.

Payroll taxes accrued, \$21.94.

Receipt of weekly board bills, \$313.60.

4. Weekly summary of sales: delivered since Jan. 1, 56M, \$1932.00.

6. Purchase of office supplies, \$10.00.

7. Purchase of feed for horse, \$35.00.

8. Received from Muncie Gear Works, Muncie, Ind:

Misc. parts ordered on Nov. 15, 1946, \$157.75, on account.

Shipping charges paid on Muncie shipment, \$4.15.

10. Payroll for period Jan. 4-10, \$1246.50.

Payroll taxes accrued, \$74.79.

Receipt of weekly board bills, \$313.60.

11. Received from Mulder Lumber Co., \$2,500.00

Weekly summary of sales: delivered since Jan. 4, 124 M, \$4278.00.

13. Cruise expenses on Tract 2 paid to R. C. Elingren, \$7500.

15. Foreman's salary for Jan. 1-15 paid, \$87.50.

Payroll taxes accrued, \$5.25.

16. Purchase of commissary stores from V. A. Shoberg & Sons, \$427.50.

Received from Mulder Lumber Co., \$8,500.00.

17. Payment made to Muncie Gear Works, \$157.75.

Payroll for period Jan. 11-17, \$1246.50.

Payroll taxes, \$74.79.

Receipt of weekly board bills, \$313.60.

Jan. 18 Weekly summary of sales: delivered since Jan. 11, 122M, \$4209.00  
 Received: 485 gal. gasoline @ \$.18 = \$87.30  
 250 gal. Diesel @ .098 = 24.50  
 \$111.80  
 Sales tax 3.35  
 Total \$115.15 paid to Shell Oil  
 Co., Inc.

- 20 Paid to R. L. McGinn for rewinding motor, \$30.00.
- 23 Purchase of commissary stores from V. A. Shoberg & Sons, \$634.25.
- 24 Payroll for period Jan. 18-24, \$1246.50.  
 Payroll taxes, \$74.79.  
 Receipt of weekly board bills, \$313.60.
- 25 Weekly summary of sales: delivered since Jan. 18, 125M, \$4312.50  
 Purchase of new woods equipment, saws & axes, \$146.35.  
 Received from Mulder Lumber Co., \$11,231.50.
- 27 Replacement of truck tires, \$318.27.
- 28 Interest on note accrued for January, \$60.00.
- 30 Purchase of commissary stores from V. A. Shoberg & Sons, \$196.75.
- 31 Weekly summary of sales: delivered since Jan. 25, 113M, \$3898.50  
 Payroll for period Jan. 25-31, \$1246.50.  
 Payroll taxes, \$74.79.  
 Receipt of weekly board bills, \$313.60.  
 All payroll taxes remitted through Jan. 31, \$365.60.  
 Interest paid to date on note, \$180.00.  
 Depreciation accrued in allowance accounts: see Depreciation  
 Schedule pg. 37 .

Equipment \$281.05  
 Buildings 13.13  
 \$294.18

Supplementary Information:

a -- Inventories taken Jan. 31 were as follows:

Commissary stores, \$461.75  
 Supplies & Spare Parts, \$477.69  
 Office Supplies, 28.50

Fuels & Lubricants:

65 gal. gasoline @ \$ .18 = \$11.70  
 55 gal. Diesel @ .098 = 5.39  
 88 qt. lube oil @ .12 = 10.56  
 63 lb. grease @ .05 = 3.15

\$30.80 plus 0.92 tax = \$31.72.

- b -- Outstanding salaries payable:  
Foreman's salary for period Jan. 16-31, \$87.50.
- c -- Payroll taxes accrued payable:  
On foreman's salary, \$5.25.
- d -- All sales are made to the Mulder Lumber Co. on account.
- e -- All receipts are deposited daily in the Bank account.
- f -- All disbursements are made by check.
- g -- All recorded transactions are as of the close of business on the date specified.

In the following pages the above transactions have been journalized and then posted (transferred to the appropriate Ledger accounts). Finally, all accounts have been closed and balanced and the balances recorded in summary form on the Balance Sheet for January 31, 1947.

It will be noted that each Journal sheet is numbered, and each Ledger account bears a Ledger Folio (LF) number for more rapid identification. As each entry is posted to the Ledger the appropriate LF number is recorded on the Journal sheet in a designated column, and each entry in the Ledger bears a symbol J1, J2, J4, etc. to indicate the number of the Journal sheet on which it appears. By this means any entry may be checked easily for origin and accuracy in posting.

From the balances transferred to the Expense & Revenue account the Income sheet is made up to display in summary form the effect of the month's business on the financial condition of the enterprise.

This organization is obviously in sound economic condition at present, showing as it does a net profit of \$655.39 for the month, but the operation is not based on sound planning, for there is too great a



divergence between skidding cost per M and road construction cost in the same unit. It is when these two costs are equal that economic road spacing has been attained. A drop of \$0.25 in the value of logs would reduce profit by \$135 per month under the present plan, and would reduce to the danger point the margin on Tract 2 where costs will be higher.

Income Sheet  
Jan. 1947

Sales		\$18,630.00
Operating Expenses		
Stumpage	\$10,800.00	
Supplies & Spare Parts	42.50	
Office Supplies	11.50	
Fuels & Lubricants	246.79	
General & Administrative Expense	399.18	
General Woods Expense	464.62	
Payroll	5,614.27	
Payroll Taxes	331.60	
Shipping charges	4.15	
Interest charges	60.00	
Net Operating Revenue		<u>17,974.61</u> \$ <u>655.39</u>

Balance Sheet  
Jan. 31, 1947

## Assets

## Current:

Farmers Bank		\$22,724.58	
Accounts receivable		3,898.50	
Prepaid Stumpage		10,900.00	
Supplies & Spare Parts		477.69	
Commissary Stores		640.95	
Office Supplies		28.50	
Fuels & Lubricants		31.72	
			<u>38,701.94</u>

\$38,701.94

## Fixed:

Buildings	\$3,150.00		
Less Allow. for Depr.	<u>328.13</u>		
		2,821.87	
Equipment	18,000.00		
Less Allow. for Depr.	<u>7,026.05</u>		
		<u>10,973.95</u>	
			<u>13,795.82</u>
			<u>\$52,497.76</u>

## Equities

## Current Liabilities:

Notes Payable		12,000.00	
Wages Payable		87.50	
Payroll Taxes Payable		<u>5.25</u>	

\$12,092.75

## Proprietorship:

R. O. Bruce -- Capital		\$20,202.51	
J. G. Carroll -- Capital		<u>20,202.50</u>	

40,405.01

\$52,497.76

However both could be successfully logged merely by replanning the road layout as shown below, using the same cost of road construction (R), Fixed cost (f) and Variable cost (C) of skidding.

$$R = \$528.00 \text{ per mile}$$

$$F = \frac{375\text{¢} \times 10 \text{ min.}}{.3125 \text{ M} \times 60 \text{ min.}} - \$2.00 \text{ per M}$$

$$C = 19.4\text{¢} \text{ per M per station}$$

$$V = 8 \text{ M per acre}$$

$$\begin{aligned} \text{Road Spacing (S):} &= \sqrt{\frac{.33R}{Vc}} = \sqrt{\frac{.33 \times 52,800\phi}{8 \times 19.4\phi}} \\ &= \sqrt{112.4} \\ &= \underline{\underline{10.6 \text{ stations}}} \end{aligned}$$

$$\begin{aligned} \text{Road Construction:} &= \frac{52,800/12.1}{8 \times 10.6} \\ &= \underline{\underline{51.5\phi \text{ per M}}} \end{aligned}$$

$$\begin{aligned} \text{Skidding Cost:} &= \frac{19.4\phi \times 10.6}{4} \\ &= \underline{\underline{51.5\phi \text{ per M}}} \end{aligned}$$

On Tract 2 where the stand carries only 6M and road construction costs will be \$12 per station the plan should be as follows:

$$R = \$12 \times 52.8 \text{ stations} = \$634 \text{ per mile}$$

$$F = \$2.00 \text{ per M}$$

$$C = 19.4\phi \text{ per M per station}$$

$$V = 6M$$

$$\begin{aligned} \text{Road Spacing (s):} &= \sqrt{\frac{.33R}{VC}} = \sqrt{\frac{.33 \times 63,400}{6 \times 19.4}} \\ &= \sqrt{.179.6} = 13.4 \text{ stations.} \end{aligned}$$

$$\text{Road Construction:} = \frac{63,400/12.1}{6 \times 19.4} = 65.1\phi \text{ per M.}$$

$$\text{Skidding Cost:} = \frac{19.4 \times 13.4}{4} = 65\phi \text{ per M}$$

	Tract 1		Difference	Tract 2
	Present	Proposed		Proposed
Road Construction	\$ .26	\$ .515	\$ (+).255	\$ .651
Skidding	<u>1.02</u>	<u>.515</u>	(-).505	<u>.65</u>
Total	\$1.28	\$1.030	\$(-).250	\$1.301

Thus it can be seen that a reduction of 25¢ per M could be compensated by proper spacing of roads, and that Tract 2 could undoubtedly be logged successfully at present log values.

With every item of cost and expense constantly available to him, with a regular monthly report summarizing Expense & Revenue and Income and showing the current status of assets and equities, and with the means to make cost calculations based on reliable records and sound formulas the modern, progressive logger is well-removed from the realm of guesswork when he plans his operations.

As the boom of wartime and the subsequent period of inflation wane, inevitably the margins in logging are going to be drastically reduced. Prices will fall before wages fall, and since the major portion of every machine rate, and therefore of every cost of production, is the wage or wages involved, the costs will be high and the revenues low. It will be then the man who knows his costs, their sources, and how they are incurred and who has adequate records of past performance who will be able to cope successfully with the situation through intelligent, cognizant planning and careful administration.

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Date	Accounts & Explanations	LF	Debits	Credits
Jan. 1	Payroll Accrued Payable Farmers Bank	15 1	87 50	87 50
	Payment of Foreman's salary			
2	Prepaid Stumpage Farmers Bank	3 1	100 00	100 00
	Option taken on Tract 2 - Interior Land Co.			
2	Commissary Farmers Bank	9 1	253 50	253 50
	Purchase of commissary stores - V.A. Shoberg & Sons			
2	Fuels and Lubricants Farmers Bank	11 1	144 78	144 78
	Purchase of fuels and lubricants - Shell Oil Co., Inc.			
3	Payroll Accrued Payable Payroll	15 22	566 59 453 27	
	Farmers Bank Wages Through Jan. 3	1		1019 86
3	Payroll Taxes Payroll Taxes Accrued Payable Payroll tax accrual	23 16	21 99	21 99
3	Farmers Bank Accounts Receivable	1 2	313 60	179 20
	Commissary Receipt of weekly board bills	9		139 90
4	Accounts Receivable Sales	2 24	1932 00	1932 00
	Jan. deliveries to date			
6	Office Supplies Farmers Bank	10 1	10 00	10 00
	Purchase of office supplies			
7	Supplies and Parts Farmers Bank	8 1	35 00	35 00
	Purchase of feed for horse			
8	Supplies and Parts Accounts Payable - Muncie Gear Works Shipment of parts received from Muncie, Indiana	8 14	157 75	157 75
8	Shipping Charges Farmers Bank Paid to Mich. Central R. R.	25 1	4 15	4 15
10	Payroll Farmers Bank Wages through Jan. 10.	22 1	1246 50	1246 50

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Date	Accounts & Explanations	LF	Debits	Credits
Jan. 10	Payroll Taxes Payroll Taxes Accrued Payable Accrual of tax on weekly payroll	23 16	7479	7479
10	Farmers Bank Commissary Receipt of weekly board bills	1 9	31360	31360
11	Farmers Bank Accounts Receivable Collection on accounts receivable - Mulder Lumber Co.	1 2	250000	250000
11	Accounts Receivable Sales Delivery of 124 M during week	2 24	427800	427800
13	General & Administrative Expenses Farmers Bank Paid to R. C. Elmgren for cruise of Tract 2	19 1	7500	7500
15	Salaries Farmers Bank Payment of foreman's salary	22 1	8750	8750
15	Payroll Taxes Payroll Taxes Accrued Payable Accrual of tax on salary	23 16	525	525
16	Commissary Farmers Bank Purchase of commissary stores - V. A. Shoberg & Sons	9 1	42750	42750
16	Farmers Bank Accounts Receivable Collection on accounts receivable - Mulder Lumber Co.	1 2	850000	850000
17	Accounts Payable Farmers Bank Payment of accounts payable to Muncie Gear Works	14 1	15775	15775
17	Payroll Farmers Bank Wages through Jan. 17	22 1	124650	124650
17	Payroll Taxes Payroll Taxes Accrued Payable Accrual of tax on wages	23 16	7479	7479
17	Farmers Bank Commissary Receipt of weekly board bills	1 9	31360	31360

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Date	Accounts & Explanations	LF	Debits	Credits
Jan. 18	Accounts Receivable	2	4209 00	
	Sales	24		4209 00
	Delivery of 122 M during week			
18	Fuels & Lubricants	11	115 16	
	Farmers Bank	1		115 16
	Purchase of fuels & lubricants - Shell Oil Co., Inc.			
20	General & Administrative Expenses	19	30 00	
	Farmers Bank	1		30 00
	Paid to R.L. McHinn Co. for rewinding a motor			
23	Commissary	9	639 25	
	Farmers Bank	1		639 25
	Purchase of commissary stores			
24	Payroll	22	1296 50	
	Farmers Bank	1		1296 50
	Wages through Jan. 24			
24	Payroll Taxes	23	79 79	
	Payroll Taxes Accrued Payable	16		79 79
	Accrual of tax on wages			
24	Farmers Bank	1	313 60	
	Commissary	9		313 60
	Receipt of weekly board bills			
25	Accounts Receivable	2	4312 50	
	Sales	24		4312 50
	Delivery of 125 M during week			
25	General Woods Expense	20	146 35	
	Farmers Bank	1		146 35
	Purchase of new saws, axes etc.			
25	Farmers Bank	1	11231 50	
	Accounts Receivable	2		11231 50
	Collection on accounts receivable - Mulder Lumber Co.			
27	General Woods Expense	20	318 27	
	Farmers Bank	1		318 27
	Replacement of truck tires			
28	Interest Charges	21	60 00	
	Interest Accrued Payable	13		60 00
	Accrual of interest on outstanding note			
30	Commissary	9	196 75	
	Farmers Bank	1		196 75
	Purchase of commissary stores			

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Date	Accounts & Explanations	LF	Debits	Credits
Jan. 31	Accounts Receivable	2	3898 50	
	Sales	29		3898 50
	Delivery of 113 M during week to date			
31	Payroll	22	1246 50	
	Farmers Bank	1		1246 50
	Wages through Jan. 31			
31	Payroll Taxes	23	7979	
	Payroll Taxes Accrued Payable	16		7979
	Accrual of tax on wages			
31	Farmers Bank	1	313 60	
	Commissary	9		313 60
	Receipt of weekly board bills			
31	Payroll Taxes Accrued Payable	16	365 60	
	Farmers Bank	1		365 60
	Payment of State & Federal payroll taxes through Jan. 31			
31	Interest Payable	13	180 00	
	Farmers Bank	1		180 00
	Interest paid through Jan. 31.			
31	General & Administrative Expense	19	299 18	
	Buildings - Allowance for Depreciation	5		13 13
	Equipment - Allowance for Depreciation	7		281 05
	To accrue monthly depreciation			
31	Sales	24	18630 00	
	Expense & Revenue	26		18630 00
	To close sales account to operating summary			
31	Expense & Revenue	26	10800 00	
	Prepaid Stumpage	3		10800 00
	To close stumpage cost of 540 M. to operating summary			
31	Expense & Revenue	26	246 79	
	Fuels & Lubricants	11		246 79
	To close fuel cost to operating summary			
31	Salaries	22	87 50	
	Payroll Accrued Payable	15		87 50
	To accrue Foreman's salary for Jan. 16-31			
31	Expense & Revenue	26	399 18	
	General & Administrative Expense	19		399 18
	To close expense account to operating summary			



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Date	Accounts & Explanations	LF	Debits	Credits
Jan. 31	Expense + Revenue	26	96462	
	General Woods Expense	20		96462
	To close expense account to operating summary			
31	Expense + Revenue	26	6000	
	Interest Charges	21		6000
	To close expense account to operating summary			
31	Expense + Revenue	26	561427	
	Payroll - Wages + Salaries	22		561427
	To close labor cost to operating summary			
31	Expense + Revenue	26	33160	
	Payroll Taxes	23		33160
	To close tax expense to operating summary			
31	Expense + Revenue	26	415	
	Shipping Charges	25		415
	To close expense account to operating summary			
31	Expense + Revenue	26	1150	
	Office Supplies	10		1150
	To close cost of office supplies to operating summary			
31	Expense + Revenue	26	4250	
	Supplies + Spare Parts	8		4250
	To close cost of supplies expended to operating summary			
31	Income	27	65539	
	R.O. Bruce - Capital	17		32790
	J.H. Carroll - Capital	18		32769
	To transfer net profit to capital accounts			

1947		FARMERS BANK		LF 1	
Jan. 1	✓	8300 00	Jan. 1	J1	87 50
3	J1	313 60	2	J1	100 00
10	J2	313 60	2	J1	253 50
11	J2	2500 00	2	J1	144 78
16	J2	8500 00	3	J1	1019 86
17	J2	313 60	6	J1	10 00
24	J3	313 60	7	J1	35 00
25	J3	11231 50	8	J1	41 5
31	J4	313 60	10	J1	1246 50
			13	J2	75 00
			15	J2	87 50
			16	J2	427 50
			17	J2	157 75
			17	J2	1246 50
			18	J3	115 16
			20	J3	30 00
			23	J3	634 25
			24	J3	1246 50
			25	J3	146 35
			27	J3	318 27
			30	J3	196 75
			31	J4	1246 50
			31	J4	365 60
			31	J4	180 00
			31	Balance	✓ 22724 58
		<u>32099 50</u>			<u>32099 50</u>
Feb. 1	Balance	✓ 22724 58			

		ACCOUNTS RECEIVABLE		LF 2			
Jan 1	( \$179.20 - Commissary )	✓	7679 20	Jan. 3	( Commissary )	J1	179 20
4		J1	1932 00	11		J2	2500 00
11		J2	4278 00	16		J2	8500 00
18		J3	4209 00	25		J3	11231 50
25		J3	431 250				
31		J4	<u>3898 50</u>	31	Balance	✓	<u>3898 50</u>
			<u>26309 20</u>				<u>26309 20</u>
Feb. 1	Balance	✓	3898 50				

PREPAID STAMPAGE

LF 3

Jan. 1	✓	2160000	Jan 31	J4	1080000
2	J1	<u>10000</u>	31	✓	<u>1090000</u>
		2170000			2170000
Feb. 1	✓	<u>1090000</u>			

BUILDINGS

LF 4

Jan 1	✓	<u>315000</u>	Jan 31	✓	<u>315000</u>
Feb 1	✓	<u>315000</u>			

BUILDINGS - ALLOWANCE FOR DEPRECIATION

LF 5

			Jan 1	✓	31500
			31	J4	<u>1313</u>
Jan 31	✓	<u>32813</u>			32813
			Feb 1	✓	<u>32813</u>

EQUIPMENT

LF 6

Jan. 1	✓	<u>1800000</u>	Jan 31	✓	<u>1800000</u>
Feb. 1	✓	<u>1800000</u>			

EQUIPMENT - ALLOWANCE FOR DEPRECIATION

LF 7

			Jan 1	✓	674500
			31	J4	<u>28105</u>
Jan 31	✓	<u>702605</u>			702605
			Feb 1	✓	<u>702605</u>

SUPPLIES & SPARE PARTS

LF 8

Jan 1	✓	327 44	Jan 31	J5	42 50
7	J1	35 00	31 Balance	✓	477 69
8	J1	157 75			
		<u>520 19</u>			<u>520 19</u>
Feb 1	✓	477 69			

COMMISSARY

LF 9

Jan 1	✓	517 75	Jan 3	J1	134 40
2	J1	253 50	10	J2	313 60
16	J2	427 50	17	J2	313 60
23	J3	634 25	24	J3	313 60
30	J3	196 75	31	J4	313 60
		<u>2029 75</u>	31 Balance	✓	640 95
		<u>640 95</u>			<u>2029 75</u>
Feb 1	✓	640 95			

OFFICE SUPPLIES

LF 10

Jan 1	✓	3000	Jan 31	J5	11 50
6	J1	1000	31 Balance	✓	28 50
		<u>4000</u>			<u>4000</u>
Feb 1	✓	28 50			

FUELS & LUBRICANTS

LF 11

Jan 1	✓	18 57	Jan 31	J4	246 79
2	J1	144 78	31 Balance	✓	31 72
18	J3	115 16			
		<u>278 51</u>			<u>278 51</u>
Feb 1	✓	31 72			

NOTES PAYABLE

LF 12

Jan 31	✓	<u>12000 00</u>	Jan 1	✓	<u>12000 00</u>
Balance			Feb 1	✓	12000 00

INTEREST ACCRUED PAYABLE

LF 13

Jan 31	J4	180 00	Jan 1	✓	120 00
		<u>180 00</u>	28	J3	60 00
					<u>180 00</u>

ACCOUNTS PAYABLE

LF 14

Jan 17	J2	15775	Jan 1	✓	000
			8		15775
		<u>15775</u>			<u>15775</u>

PAYROLL ACCRUED PAYABLE

LF 15

Jan 1	J1	8750	Jan 1	✓	65409
3	J1	56659	31	J4	8750
31 Balance	✓	8750			74159
		<u>74159</u>	Feb 1 Balance	✓	8750

PAYROLL TAXES ACCRUED PAYABLE

LF 16

Jan 31	J4	36560	Jan 1	✓	3925
			3	J1	2194
			10	J2	7479
			15	J2	525
			17	J2	7479
			24	J3	7479
31 Balance	✓	525	31	J4	7479
			31	J5	525
		<u>37086</u>	Feb 1 Balance	✓	37086
					525

R. O. BRUCE - CAPITAL

LF 17

Jan 31 Balance	✓	2020251	Jan 1	✓	1987481
			31	J5	32790
		<u>2020251</u>	Feb 1 Balance	✓	2020251

J. G. CARROLL - CAPITAL

LF 18

Jan 31 Balance	✓	2020250	Jan 1	✓	1987481
			31	J5	32769
		<u>2020250</u>	Feb 1 Balance	✓	2020250

## GENERAL &amp; ADMINISTRATIVE EXPENSES

LF 19

Jan 13	J2	75 00	Jan 31	J4	399 18
20	J3	30 00			
31	J4	294 18			
		<u>399 18</u>			<u>399 18</u>

## GENERAL WOODS EXPENSE

LF 20

Jan 25	J3	146 35	Jan 31	J5	464 62
27	J3	318 27			
		<u>464 62</u>			<u>464 62</u>

## INTEREST CHARGES

LF 21

Jan 28	J3	<u>60 00</u>	Jan 31	J5	<u>60 00</u>
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## PAYROLL - WAGES &amp; SALARIES

LF 22

Jan 3	J1	453 27	Jan 31	J5	5614 27
10	J1	1246 50			
15	J2	87 50			
17	J2	1246 50			
24	J3	1246 50			
31	J4	1246 50			
31	J4	87 50			
		<u>5614 27</u>			<u>5614 27</u>

## PAYROLL TAXES

LF 23

Jan 3	J1	2194	Jan 31	J5	331 60
10	J1	74 79			
15	J2	525			
17	J2	74 79			
24	J3	74 79			
31	J4	74 79			
31	J5	525			
		<u>331 60</u>			<u>331 60</u>

SALES

LF 24

Jan 31	J4	18630 00	Jan 4	J1	1932 00
			11	J2	4278 00
			18	J3	4209 00
			25	J3	4312 50
			31	J4	3898 50
		<u>18630 00</u>			<u>18630 00</u>

SHIPPING CHARGES

LF 25

Jan 8	J1	<u>415</u>	Jan 31	J5	<u>415</u>
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EXPENSE & REVENUE

LF 26

Jan 31	J4	10800 00	Jan 31	J4	18630 00
31	J4	24679			
31	J4	39918			
31	J5	46462			
31	J5	6000			
31	J5	561427			
31	J5	33160			
31	J5	415			
31	J5	1150			
31	J5	4250			
31	J5	<u>65539</u>			
		<u>18630 00</u>			<u>18630 00</u>

INCOME

LF 27

Jan 31	J5	<u>65539</u>	Jan 31	J5	<u>65539</u>
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