

file in the store-room office is often used (Form 6). This ticket must be checked or audited every week by the clerk in the office from the stores account book. It is unnecessary to say that these stores should embrace every kind of article or material used about the works.

Expense.—The third factor in costs I have called "Expense," and under this heading may be aggregated a lot of petty items which are usually charged to a "General Expense" account, but which have a certain, though varying, ratio to the output or amount of work done.

Expense includes—Postage, telegrams and cables, subsistence and transportation of Manager (or one of the staff) when on company business, stationery, umpire assays, advertising, express and mint charges on bullion, insurance, taxes and legal expense at the mine, &c., &c.

These items are often considered to be head office matters, but to take, for an example, the case of a disputed value of an ore shipment, the cost of letters, telegrams, umpire assays and (possibly) travelling expenses of the assayer, should be charged against that particular shipment or lot of ore. Likewise expense incurred in hurrying a delayed hoist or compressor should be charged against that particular machine. I am not going to urge this point, as the whole object of this paper is to suggest, provoke discussion, and arouse interest in a subject which is altogether too much neglected by Canadian mines and managers. But those of you who will attempt this subdivision of an account usually lumped, will, I am sure, never abandon it.

Having obtained, by the methods above indicated, an accurate account of what labor has been employed, what amount of supplies has been used, and what expense has been incurred, in any one day, and where it has been so employed, used, or incurred, it is a comparatively simple matter to collect the various items under such accounts or headings as will give you the cost desired.

For this purpose I have made use of two books, one of which has been referred to above as the "Cost Minute" book, the other is a cost ledger.

Cost Minute Book.—The Cost Minute book (as its name implies) is simply a book in which is entered daily, minutes of all the work done that day; the labor items coming from the detail labor book, the supply items from the requisitions sent to the store-keeper and by him returned to the office, the expense items from the regular office books.

This book may be arranged as the taste of the accountant wishes; I give as a sample, some pages from the actual working of a company operating a free milling gold mine.

It will be noticed that each day of the month has a separate line. The first column on the left contains the date, and there follow numerous columns headed by the names of the different supplies used in the place or department indicated by the heading entered at the top of the page.

In mine work there is a column each for "Dynamite," "Fuse" and "Caps," "Electric Fuses," "Sharps," "Drill Parts," "Short Steel," "Shovels," "Pick Handles," "Hammer Handles," "Candles," &c., &c.

In surface accounts, such as Power or the Engine Room, these columns are headed with the names of the supplies used, such as "Cylinder Oil," "Black Oil," "Cotton Waste," "Tallow," "Hemp Packing," "Rubber Packing," &c., &c.

After these columns for supplies there will be noticed the one headed "Labor" which is ruled as for dollars and cents, and it is to this column that the amount obtained by classification in the detail labor book is posted.

In mining work, as in sinking or driving, there are two more columns following the labor column in which are noted the total number of tons hoisted that day from that particular heading. The first column is headed "Waste" and includes all rock which is not sent to the mill or ore bins for further treatment; the second column is headed

"Ore" and requires no explanation. I have sometimes added another column to represent the amount of waste or seconds picked from ore when it has been necessary to resort to hand picking.

The figures of these respective columns are obtained from tally boards kept by the lander at the mouth of the shaft, and checked by duplicate tally boards kept at the various station plats underground by the trammers, or by tally boards, near or at the working faces, or mill passes of the various stopes. The figures from the surface and underground tally boards must correspond. The underground tally is taken off and brought to surface by the head trammer or by the foreman at the end of each shift. The surface tally board is noted by the lander or by any office employee designated for that purpose.

It will readily be seen that from this book, in the space of a few minutes, can be ascertained the amount of any one supply or article which has been issued for any number of days in the month, the total amount of labor which has been expended in any one heading for those days, and also what has been the production in tons, of both waste and ore, for such period.

At the foot of each column there is put in, in red ink, the actual cost price of each of the supplies used as obtained from the general stores book; and at the end of the month the amounts and prices are multiplied to give the cost in dollars and cents, which is put in the space reserved for it. The total of these amounts is the total cost of supplies for this particular account or heading for the month; the total of the labor column is the total labor cost of that account; the addition of whatever expense account is chargeable gives you the total cost of your piece of work, which can be reduced to cost per unit (foot, fathom or ton) by simple division by the number of feet driven or tons broken.

To make this cost *actual* and *accurate* there remains a sum to be added for management, and for power (if air drills are used). There is also the cost of pumping and hoisting to be divided *pro rata*, though these accounts should also be kept by themselves.

It is on these points that there is the largest room for personal equation and for differences of opinion, and also where the various publications on the subject maintain a discreet silence.

As I have said before, this paper is merely a suggestion, hence I feel free to describe how I have attempted these difficulties in my own practice.

In the first place the wages of the shift bosses or foremen underground are apportioned to the respective places of work in proportion to the number of men at work in each heading or stope: *e. g.* if there are 22 men in No. 6 Stope, 18 in No. 7, 12 in No. 9; 4 men in No. 4 level West, 4 in No. 4 level East, 4 in No. 5 West, 4 in No. 5 East, 6 in Winze K, and 9 in the main shaft, there are 83 men in the various workings, if the foreman's wages equal \$225.00 per month, there will be 22.83 of \$225.00 to charge to No. 6 Stope, 18.83 to No. 7, 12.83 to No. 9 and so on.

The same plan is followed as regards management expenses, the sum total of the salaries paid the manager, accountant, assayer, and all the office staff is divided *pro rata*, according to the number of accounts amongst which they can be properly charged, and this sum is added to the cost of labor, supplies and expenses.

Another plan is (1) to determine the total number of hours (or shifts) worked on the property according to the detailed labor book, and (2) to determine total salaries paid, from the manager to the foreman or shift boss; and then to divide (2) by (1) giving a factor or constant per shift (or per hour) which is multiplied by the hours (or shifts) worked in each account, both surface and underground. The sum attained by this multiplication approximates very closely the cost of superintendence for each particular account.

It is not denied that this is an arbitrary method and that the management may have spent much more time upon one department