The details of cost of the individual members of the set, framed on the surface ready to go into the mine, are, therefore, as follows:—

One post costs for—Material, $0 650; labour, $0 167	$0 817
One cap costs for—Material, $0 430; labour, $02 19	649
One brace costs for—Material, $0 400; labour, $0 187	587
Making the total cost	$2 053

The costs next attaching to the square set, or unit, of this method of timbering are:—

Lowering into the mine, approximately	$0 10
Delivering to place required, approximately	0 10
Labour in erecting, approximately	1 50
Incidental material, such as blocks, wedges, tools, nails, approximately	0 10
Cost of sill floor, averaged over eleven sets between levels 100 feet apart, approximately	0 15
Total	$1 95

These costs, last above given, may very greatly, being increased or decreased with the completeness of the facilities for handling the framed timbers, the cost of the several items as stated may vary accordingly from time to time, but the total will be about the average cost, and will closely approximate that of carefully supervised operations. Therefore, from the foregoing, it will be seen that the cost of the square set placed in the mine will come down, as follows:—

Total cost of labour and material, as above	$2 053
Labour and material when set is in place as above	1 950
Total cost, say	$4 003

When framed by machine saws, the cost of framing a square set does not exceed 30 cents, including the cost of power, as against 55 cents by hand—a difference of 25 cents per set. Therefore, if the framing is done by machinery, the cost of a set in place would be $3.75 as against $4, as shown above, when the framing is done by hand work.

The per tonnage cost for timbering by this method works out as follows: The average space to be excavated for each square set is 5.3 feet wide by 5 feet long by 9 feet in height, or 240 cubic feet. The Rossland ores, being heavily impregnated with iron and copper pyrites, yield a ton of 2000 pounds for each 10 cubic feet of ore in place. Therefore, from the 240 cubic feet of vein required to be excavated for a set of timbers, the yield will be twenty-four tons. If the timbers were framed by hand, the cost of timbering, so far as described, would be about $0.17 per ton; if by machinery, $0.156—a difference of $0.014 per ton in favour of the machine-framed sets.

In addition to the costs above tabulated, there still remain the costs of the chutes, floors, ladders and railings necessary for the convenience and safety of the miners and passage of ore and supplies. These require, on an average, about 100 feet of lumber, board measure, per square set, which, at $11 per 1000 feet, would add for the lumber $1.10, and for placing it say $0.10, or a total of $1.20 to each square set, which would then cost, in the case of hand framing, $5.20, or a total cost of $0.216 per ton of crude ore; and, in the case of machine framing, $4.95, or a total cost of $0.206 per ton of crude ore.

Incidental Costs.—The cost of timbering, per ton of ore shipped, would be greater than the figures given above in proportion to the quantity of waste or second-class ore that would be sorted out from the crude ore extracted.

In the Rossland mines about 20% of the ore mined is sorted out and goes to the second-class ore dump to await profitable treatment, expected to come in the future. Deducting 20% of the 24 tons of crude ore in a square set, there would remain 19.20 tons as the shipping ore, against which the total costs of the square set, as above $5.20 or $4.95, as the case might be—would have to be charged. This would raise the per tonnage costs on the ore shipped to about $0.27 and $0.26, respectively.

Where there is a reasonable expectation that the second-class ore will eventually pay a profit after suitable treatment, it would only be fair to charge a pro rata cost of the timbering to it, and the cost would then remain $0.206 and $0.216 per ton as above.

In cases where, on account of bad ground, angle bracing, bulkheading or cribbing and filling would be required, the per tonnage cost would be still further increased, but to a comparatively small extent.

Limitations of the Square Set.—The limit of the capacity of the square set system as already described, without any re-enforcing devices to withstand the pressure that may be exerted on it by the enclosing walls of an ore body when that ore body is extracted, may be reached.

The limit depends on the nature of the walls enclosing the deposit and the extent of the excavation. If the wall rocks are solid and do not swell on exposure to the air, and dip at a high angle, the ore body may be extracted between levels say 100 feet apart and for a length of 200 or 300 feet along the vein, and the pressure likely to be exerted by the walls will be sustained by the skeleton square set without reinforcement of any kind.

If, however, the vein dips at a low angle and the wall rocks are decomposed, or of a talcose or serpentine character and disposed to swell, the pressure that might be exerted on the timbers, when even a comparatively small excavation of the ore body has been made, may cause them to crush, "jack-knife" or collapse, allowing the wall rocks to cave in and close up the stope. When the members of the square set become squeezed out of the truly right-angled position which they should occupy, their capacity to resist wall pressure or strains from any direction is practically nil.

When, owing to wall pressure or imperfect erection of the sets, "jack-knifing" of the square sets results, the cave-in, which sooner or later will follow, with disastrous consequences, may be prevented by either bulkheading, cribbing or filling the skeleton framework of the timbers.

The cost of the foregoing methods of reinforcement which are the only practical ones that can be successfully used in bad ground, cannot be given with any general degree of accuracy, as that is so much affected by the local conditions in each case.

A general idea of what the cost is likely to be may be gleaned from the description following: