held by blocking or butt braces; the other long sills are laid paralleling this one at proper distances apart, that is, 5 feet 4 inches between centres. The cross sills fit on tops of these, lying level with them, the ends behind halved in framing to rest into similar halvings in the long sills, and to abutt flush against each other and extend endwise from wall to wall of the vein.

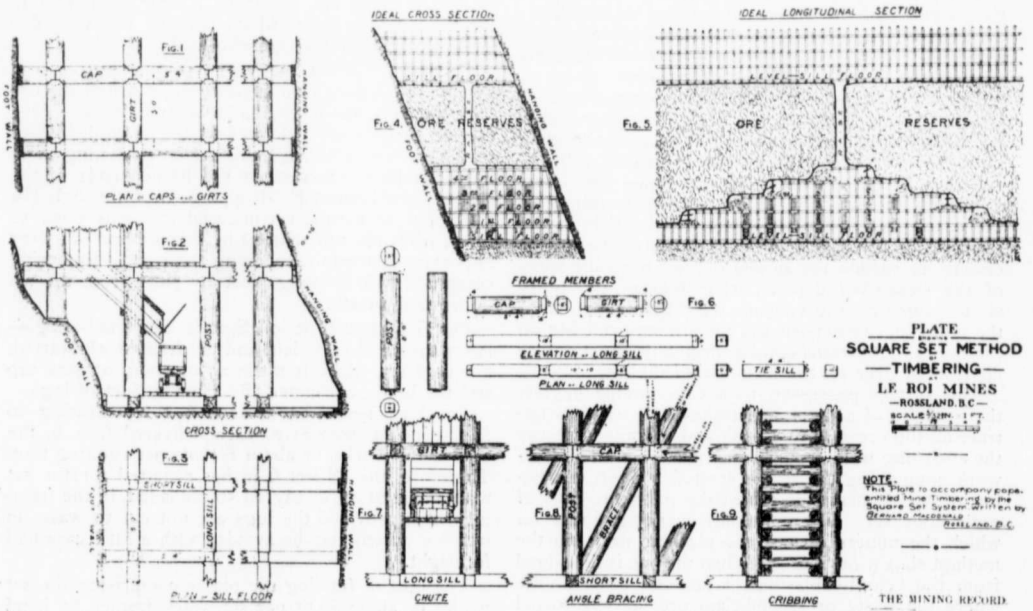
When the long sills reach as near the hanging wall of the vein as desirable they are braced from it by the butt spreaders or by blocking wedged tightly to bring all the members into proper position. The philosophy of this design of the sill floor is as follows:—

The long sill is made 15 feet in length, so as to better sustain the superstructure of square sets erected on it when the ore upon which it rests comes to be stoped away. For instance, when the ore is being blasted from under the sill floor by the work of stoping, coming from the level below, and the blasting tears away a portion of the ore upon which the sill floor rests, making an opening, as it generally does, of, say 8x8 feet, the long sills would overreach such opening, and one or both ends would rest on the solid rock beyond. Nor would the short sills drop away through such opening, owing to the fact that they rest on top of the long sills, as previously described and shown on the plate.

Through the opening thus made in the ore, the portion of the sill floor exposed would be supported by posts set on the timber sets in the stope below. Thus the long sill operates to allow the work of stoping out the ore upon which the sill floor rests to be safely conducted if such portions of the sill floor as become exposed as the work proceeds are properly supported by posts from the timber work underneath.

Timbers and Methods Used After Sill Floor is Laid.—The first tier of square sets erected on the sill floor is known as the "sill floor sets." The assemblage of the framed timbers into square sets then proceeds upwards, by floors, set over set, vertically, pari passu as the work of stoping exhausts the vein. The timber structure over any level is referred to in subdivisions as the "sill floor sets," "first floor sets," "second floor sets," and so on until it reaches the level above and catches up and supports the sill floor on that level.

This method of reference to the timbering as it advances carries with it the data for a general calculation of the portion of the vein exhausted over a level, as each set of timbers in place indicates that 9 feet vertically and 5½ feet horizontally of the vein is exhausted, 9 feet being the bare height and 5½ feet the width of space required for a set of timbers. Each square set in place indicates that twenty-four tons of vein has been extracted.



Aside from the sill floor, all the timbers employed in the square set system, except the planks for floorings and chutes, are framed from round logs. These logs are preferably of red fir, it being the strongest native timber, but pine, spruce and tamarack may be used. When cut in the woods, the logs are peeled and allowed to season for a period of from six to twelve months, during which time they lose about one-third of their green weight, which is a very important advantage in subsequent handling. In diameter they range from 12 to 20 inches, but generally average about 16 inches, and are sawed in lengths of 16 feet 6 inches.

The logs may be framed by hand or with machine saws into the various members of the square set, as follows, viz.: posts, caps, girts or braces, and butt