

room for the modern machine. *Sic transit gloria mundi*, one feels inclined to murmur regretfully. Anchored in a small inlet is one of the smartest steam launches on this coast; its lines are perfect and promise speed. The graceful little craft is appropriately named the *Swan*. The launch is useful where speedy communication is urgent, and for reaching the surrounding islands where the company owns coal properties; she has also done good work in towing scows, etc., in the absence of the *Mermaid*.

From the wharf a fine view of Protection Island is obtained, and the lofty pit-head frame, gigantic wharf staiths, bunkers and colliery building of the Protection Island shaft tower up above the tall pines in the background. It is, however, difficult to realize that those works are connected by sub-marine roads with the No. 1 shaft, as well as with the workings extending under Newcastle Island and beneath Exit Passage and the harbour generally.

Evening is coming on, and by the sounding of the five o'clock steam horns of the workshops and pits, we learn the day's toil is over. Among the workmen returning to the town are several showing the signs of advancing age and we learn that not a few of the employees have been in the service for thirty years, and many for twenty years. It is not to be wondered at that a strong feeling of loyalty exists towards the management. The hours of labour of the artisans and outsiders are from 7 a.m. to 5 p.m., an hour being allowed at noon for dinner, and on Saturdays work finishes at 1 p.m.

Tired with the day's ramble round the works, and in prospect of an early rising to go down the pit on the morrow we gladly seek rest at one of the several well appointed hotels of Nanaimo, and with a feeling akin to that of one about to enter upon some desperate adventure we retire to sleep, leaving strict orders that we are to be called early on the morrow.
(To be Continued.)

THE LOW GRADE ORES OF ROSSLAND.

[BY RAOUL GREEN, B.A. SC.]

WITHOUT entering into a detailed description of the ore bodies in the vicinity of Rossland it may be said, however, that they mostly occur in the form of lenses, swelling in the centre to a considerable thickness—to sometimes as much as 100 feet. The lenses occur along certain fissure planes, and are often connected, but by the merest thread. The mineral-bearing values are generally pyrrhotite and copper pyrites associated with iron pyrites and a variety of it called marcasite. In some instances the pyrrhotite is very fine grained and in others it is quite coarse.

It is generally supposed that these veins are due to replacement, the solutions coming up, dissolving and impregnating the country rock. The gangue matter consists of quartz and calcite. In some mines the quartz predominates and in others the calcite, but in most cases both aid to form the vein filling. The best values are generally found either in the fine grained pyrrhotite containing copper pyrites and calcite or in a mixture of quartz pyrrhotite and copper pyrites. The coarse grained pyrrhotite is generally low grade. The low grade ores meanwhile predominate and the only treatment available at present is by smelting. It may be safely premised that tens of thousands of tons of ore are now blocked out in this camp, and their treatment depends entirely on a re-

duction in present treatment charges. Furthermore, owners of mines from which shipments could now be made with profit prefer waiting for the same reason.

When smelting ore reduction rates have come down to a reasonable basis I have no doubt that Rossland will be one of the busiest camps in America. For many mines the smelting process will be the best, but it is nevertheless a fact that many professional men of high standing doubt if the cost of smelting can be so reduced as to make possible the profitable treatment of some of the camp's low grade bodies. What method of treatment may be adopted is still a matter of speculation. It is found that large bodies of quartz impregnated with copper pyrites and pyrrhotite carry good values from a milling standpoint. These will probably be run through a stamp mill, as it is found that free gold is present to some extent—the tailings could afterwards be concentrated and treated with cyanide or some other like process or smelted.

The chief objection to cyanide treatment is the presence of copper, but as little of this mineral is found in low grade ores the objection here is not serious. Again some authorities pretend that Rossland ores cannot be well concentrated owing to the leafy character of the pyrrhotite, which produces slimes.

Meanwhile the foundation for a mill to treat low grade silicious ore is already laid and the works are to be started early next spring. The plan is to concentrate the ore and treat it by the Pelatan-Clerici process. It is sincerely to be hoped that the promoters will make a success of their project whereof I have no doubt. Unfortunately many people, under the impression that Rossland ore is a smelting ore only, have not given the attention that they ought to such chemical processes as are possibly suitable. There is no doubt but that with the enormous bodies of ore and the consequent reduction in the cost of handling, a chemical process would be the cheapest possible one.

The smelters which we are told will ere long be built at Robson will be in a position to treat ores of a certain grade only; ores below a specified standard must necessarily be treated on the spot if at all.

Among the newer processes I may allude to the bromine process. We have here simply a substitution of bromine for potassium cyanide. Sodium bromide in solution comes in contact with the ore moistened with sulphuric acid, this liberating the bromine, which consequently attacks the gold.

The percentage of gold saved is very high whilst ninety-five per cent. of the bromine is recovered. Limestone here would be a serious difficulty in the operation of this process.

It is certain that something will be done with that portion of Rossland ores that is low grade.

The time has now arrived when the question of the profitable treatment of the low grade ores of Rossland camp must be seriously considered. That it will be so I am reasonably confident.

SILVER OCCURRENCE IN KOOTENAY.

[BY HOWARD WEST, A.R.S.M., NEW DENVER, B.C.]

THE editor has requested me to contribute something of a semi-technical nature to the RECORD this month, and I have endeavoured to comply with his wishes as far as circumstances will allow. While his instructions probably appear plain and explicit to everybody else, I must say that to me they open up