

has not yet been provided and where, until some one makes a beginning by opening up one or more prospects, nothing will be accomplished in these centres, a man of sense can secure holdings for a few hundred dollars which are intrinsically equally as valuable deposits of gold, silver or copper, as those now held at six or seven figures in the older and known districts. In many cases the prospectors are well able to judge these matters, are well aware of the facts, and also alive to the remedy necessary to place them in active service, and would welcome the man with the little but essential ready money. They would be quite willing to give him the softest side of the undertaking and form a mutually beneficial combination of forces if given the chance.

What is required is that these facts should become known to the many men who have the small capital required, and would be willing to take advantage of the situation, if they were once able to obtain an intelligent knowledge of how to go about it to bring the desired result.

Given the health and ability to engage in hard work, the proper way for one possessed of the above sum, who wishes to increase same faster than can be done in commercial life, is to come out to this country and settle down, temporarily, in one of the well-known small settlements in any of the newer districts, and carefully consider the various "propositions" which are certain to be laid before him without his asking. Then, having satisfied himself as to the integrity of the proposer, the probable value, within a certain (not too long) time, of the property in that section and the amount of development necessary, with its probable cost, "go in and win."

The returns to be made in this way, in the course of two or three years of persistent economical work, are certain and the percentage of profit very much the greatest of any known business investment.

The dangers are: the ignorance of real values, or want of knowledge of many of the men who follow this life; the want of care in laying out the work to be done, and the consequent waste of time and money; the want of systematic development and persistence in completing the plan of work laid out.

Given proper attention to these matters of detail and the reward to be earned becomes certain:—

First thing to be settled is the existence of a vein. Second is the positive proof that the vein does contain ore of value, i.e., ore that will pay to ship or treat in that particular locality.

Third, be certain that the work laid out will accomplish the object sought, which is to demonstrate that a mine can be made there, and not the actual making of the mine. Once it can be shown that a mine exists the property becomes an available asset, which can be disposed of to advantage.

A comparatively small amount of money will generally go a long way towards this point under the above conditions, and a few hundred feet of tunnelling will often enable a sale to be made, of a property which, without this work, would be useless.

A RICH DISCOVERY.

A Mr. Halligan, of Chicago, has become the possessor of £8,000,000 through an exceptionally rich discovery of copper in several hitherto unproductive mines. Just before the good news reached him he had to pawn his watch to procure a meal.

SWANSEA COPPER SMELTING.

[An interesting article which will give our readers some slight idea of the Welsh process of Copper Smelting, as practised by Messrs. Vivian & Sons, Hafod Copper Works, Swansea, South Wales. Written for the B. C. MINING EXCHANGE by J. O'SULLIVAN, F.C.S.]

CLASSIFICATION OF THE ORES, ETC., TREATED.

These vary both in percentage of metal and in composition, according as the supplies of them arrive from various countries. Of all it may be said that they are sure to be accompanied by a large amount of gangue, that is, non-metallic mineral (vein stone), which is commonly siliceous in composition. Five classes are, however, distinguished by the smelter, which must be either treated differently or carefully mixed.

1st Class—Poor ores, containing a little copper pyrites and a considerable quantity of iron pyrites; in these the percentage of iron and sulphur (from the two minerals) is of course large; copper being present only to the extent of from $1\frac{1}{2}$ to 9 per cent.; for example: Norwegian pyrites, $1\frac{1}{2}$ to $3\frac{1}{2}$ per cent.; Rio Tinto pyrites, 3 to 6 per cent.; Seville ore, 4 to 6 per cent.; Betts' Cove (Newfoundland) ore, 7 to 9 per cent.

2nd Class—Sulphides, carrying from 10 to 18 per cent. copper, such as New Quebrada ore, 10 to 12 per cent.; Copiapo ore, 15 to 17 per cent.; Libiola ore, 12 to 18 per cent.

3rd Class—Richer sulphide ores, Chalcopyrite, Bornite, etc., running from 20 to 50 per cent. copper; for example: Chili ore, 20 to 28 per cent.; Namaqua ore, 30 to 35 per cent.; "Cape" ore (peacock), 35 to 45 per cent.; and, formerly, Anaconda ore, 40 to 50 per cent.

4th Class—Oxides and carbonates of copper (cuprite, melaconite and malachite) with a little of the sulphides, silicates, copper precipitates, native copper ores, i.e., ores carrying native copper (metallic copper) and copper barilla (copper sand).

5th Class—A product of ores which have already undergone a metallurgical process abroad (fusion), and constitutes a regulus or matte, generally rich in copper, yielding from 45 to 60 per cent., and sometimes 72 per cent. of the metal; for example: Chili regulus, 45 to 48 per cent.; Columbian matte, 47 to 49 per cent.; Montana matte, 53 to 60 per cent.; Boleo matte, 60 to 62 per cent.; Anaconda matte, from 62 to 72 per cent. copper.

Large lots of Chili blocks (copper), assaying from 97 to 98 per cent. copper, are also melted and refined at these works. Also, rich argentiferous and auriferous Anaconda furnace-bottoms have been treated from time to time at Messrs. Vivian & Sons' Silver and Gold Works; as also Cobar copper, carrying 3 to 4 oz. gold, and 15 oz. silver per ton.

First operation—

CALCINATION OF THE ORE.

Note: This operation, the object of which is to expel the large excess of sulphur in the cuprous pyrites, and to oxidize the sulphide of iron into oxide of iron, is dispensed with in the case of the richer sulphide ores of the 2nd and 3rd classes.

The calcination is conducted in reverberatory furnaces, called "Calciners," at a very low temperature with free access of air. The charge, three to four tons, is introduced into the furnace by means of a hopper on the roof. After about two hours, it is turned over by paddles; this is repeated from time to time during