

which under fostering treatment would become marketable: I simply wish to point out in extenuation the allurements which this district offers to the investor in the shape of quick returns, as has been repeatedly demonstrated in the past, in contrast to the system of uniform though more modest gains, which is a feature of lower grade camps. In short, the tendency of those responsible for the operation of our mines in the past, after exercising due judgment and discretion in the selection of properties to work upon, has been to regard mining as essentially a gamble and chance the main factor, because many of the deposits were sufficiently rich near the surface to render economy apparently superfluous: unmindful of the fact that for every mine so favored there are probably a dozen which could be made successful from a business standpoint by the adoption of an economical system of working and development. Fortunately for the survival of the reputation of the district these early impressions are rapidly giving place to more healthy aims, and it is easy to see that simultaneously with the influx of capital more attention is being paid to the other primary factor, namely, that of quantity or tonnage than has been possible to those of small means. This of course is only to be expected, for the old saying that "money makes money" holds true in this department of life as in others. Mine managers in the Slocan are accustomed to pride themselves above all else on the richness of their deposits, which enables them to compete on equal terms with other districts offering considerably more advantages for cheap production. This, however, in no way relieves us of the responsibility which we feel as mining engineers of endeavoring to raise the industry to the position where it will give employment to the greatest number of men and return the maximum of profit to those who show their faith in the province and its resources in the most practical method of all, by investing their surplus capital in our midst. As I have before showed, statistics amply prove the right of this district to the title of a high grade camp, but this is not saying but what there are thousands upon thousands of tons of second class ore—much of which would doubtless not be so designated in more favored regions—which would soon double and treble the production of the district could it only be worked at a profit. The accumulations which are a burden in their present condition are capable of being converted into a source of revenue under efficient management, so that when the necessary co-operation from money centres is forthcoming one of the most important elements of loss will be obviated.

Let us look for a moment at the true meaning of the word "economy." An economy can only be said to be effected when the saving resulting from an operation or a series of operations is greater than the expense connected therewith. We must be careful therefore to avoid in our handling of the subject too close a comparison with districts differently situated. In speaking of economy then it would be incorrect and misleading to apply the same hide-bound rules which govern mining in far away places to the conditions in the Slocan, and to say that because ore carrying 10 per cent. lead and six ounces of silver per ton can be made to pay in Ontario or Quebec, therefore we are not economical in British Columbia if we cannot do the same thing; our object should be rather to stimulate investigation into the causes which render mining in the provinces first named profitable, and afterward to seek as far as possible a solution of the difficulties here met with. Take as an example my casual mention of an ore carrying 10 per cent. lead and six ounces silver; the reason this can be made to pay in Quebec is because under conditions which are favorable it can be converted into a marketable commodity by the simple process of concentration, whereas by no known method can it be turned to account in the Slocan. I merely instance this as one case in a great many where natural obstacles render it next to impossible to treat with ore which could be handled elsewhere to advantage. This of course does not apply alone to material which is susceptible of concentration, for

there are values too vast almost to realize concealed in ore which has already attained its maximum limit through natural agencies and which is too poor even in this condition to warrant further investigation. The utilization of these reserves should be a matter of paramount concern to the engineer, in the study of which he is called upon to exercise his utmost skill and ingenuity; and perhaps it might not be out of place right here for me to add my oft repeated protest to that of others against the practice of placing unqualified engineers in charge of developed properties and leaving to them the details of management, when men of experience are to be obtained without difficulty. In the first stage of operations this can hardly be avoided to some extent, the expense of a trained technical adviser being often beyond the means of pioneers, and his presence too not always so necessary as when the finer matters of treatment are under consideration; but with all due respect to the practical man—and I have every reason to thoroughly appreciate his many excellent qualities—I submit that he is utterly incapable of supervising economic details, many of which require men versed in geology and mineralogy to properly comprehend. This I argue is the first step that must be taken if the mines of any district are to be worked to advantage, and whatever the shortcomings in this direction in the past, it is gratifying to observe that the better class of mines in the Slocan are now almost without exception in charge of men who are equally practical and theoretical.

The main reasons why comparatively low grade ore will not pay to mine in the Slocan are not far to seek, many of them being common to all mining camps in their early history. The necessarily high cost of transportation and treatment is one of the chief factors to be considered, and though little progress appears to have been made during the last few years, we may rest assured that as soon as developments warrant and capitalists see their way clear to erect reduction works nearer the source of supply, they will not hesitate to act upon their convictions. Of equal importance is a matter that I am somewhat chary of touching upon, namely that of the removal of the duty on lead, so much having already appeared upon the subject from those better qualified to discuss the subject in all its different aspects. Looking at it, however, from an economic standpoint, one stares in amazement at the amount which is collected yearly by the United States officials in duty, and speculates idly on what effect it would have on this district were lead added to the free list.

Then again the question of cheap transportation from the mines to the railway is by no means an easy one to solve, even when operations are assured on a large scale, but the advent of capital is bringing machinery of every description to our aid—matters being greatly simplified by the introduction of tramways of various types.

Economies in marketing the ore are admittedly hard to effect, as the majority of smelters have a combined freight and treatment charge and a uniform method of estimating the values which leaves little in favor of any particular establishment. There are, however, one or two points in this connection which are well worthy the study of the intelligent manager. In the first place it should be his aim where the quantity of reserves will permit to secure the very best rate possible by guaranteeing the entire output for a given period to one smelter, other things being equal. In this way it is sometime possible to save hundreds of dollars in a year. Then again he should endeavor to suit his ore as far as convenient to the requirements of the smelter by eliminating, where expense is nominal, objectionable material which would otherwise tend to increase the treatment charges and incidentally the cost of transportation as well. I have in mind a case where a manager succeeded in bargaining for a considerable reduction in smelter rates through being able to guarantee that no shipment would contain upwards of 5 per cent. of zinc, and similarly a company which found that its ore invariably overstepped the 10 per cent. limit allowed by most smelters, was enabled to save a dollar a ton by ship-