Before leaving the subject of assay certificates, I must protest against the habit of certain assayers in filling in the value of the ore on the assay certificate, as they do, at the price of the metal in marketable shape delivered in New York. It shows a gross ignorance on the part of the assayer as to the value of the ore here, and often misleads the prospector frightfully.

I have seen, this past summer, assay certificates on which the copper value of a five per cent (wet assay) ore was figured out at 18 cents, equal to $18 per ton, whereas no smelter in the province could afford to pay more than about one-third that price.

A good practical rule for the prospector in British Columbia to use in figuring out the approximate value of sulphide ore—at present market quotations—is as follows:—

Allow $1.25 for every per cent. of copper contained.

Allow .40 for every per cent of lead contained.

Allow .50 for every ounce of silver contained.

Allow $20.00 for every ounce of gold contained.

These values are for ore delivered on line of railway. This is not strictly accurate, but is near enough to prevent the prospector being misled by false values placed on assay certificates.

The prospector who has to sample his own claim and wishes to know the truth, naturally asks how he is to do it, and the following remarks are for his benefit, not for the expert—they are only outline directions for following a well-beaten trail—the expert knows many short cuts—but unless one is pretty familiar with the country, it is safest and as quick to stick to the trail.

The two pre-requisites to accurate sampling are common sense and common fairness, or honesty, on the part of the sampler.

In sampling a lead, if the vein-matter is such that it will all have to go for treatment, a section of uniform thickness, right across the whole of the face of the lead usually possible for a correct sample. This is not usually possible, so it should be approximated as closely as is possible. Wherever it is practicable, make cuts right across the lead—the bigger and more of them the better. In such places as the face or roof of the tunnel or the side of the shaft, several strips should be cut out. Make no selection, take all that comes out of such cut, taking great care that the cut is uniform in depth and width—a thing not easily done if there is a great difference between the friability of the ore and gangue. In extended exposures make the cuts at regular intervals of say 5, 10 or 20 feet—the closer the better—letting them hit where they may, making no selection.

Take all that come out of these cuts to a convenient place, break it up as fine as practicable and by such means as are available; allow nothing to be added to or taken from sample.

Thoroughly mix the broken sample. This is best done by the old and tried "quartering method," viz.: Select a smooth, level, clean spot—preferably a floor or canvas sheet; proceed to "cone the sample," placing a shovelful of ore in centre of floor, and directly on top of this another shovelful, thus continuing and forming a "cone." The rest of the sample is then placed, shovelful by shovelful, on the very apex of the cone, so that it distributes evenly down all sides radially. When all the sample is in the cone, it should be flattened into a circular pile, with height about one-twelfth its diameter. This is done by scraping the ore from the apex of the cone radially in all directions. Across the circular pile there should be marked two lines at right angles and passing through the centre of pile, so dividing the pile into quarters. Two of these quarters, opposite to each other, are then removed, and the space they occupied carefully swept. The quantity of ore is now reduced to half the original. This operation of coning and quartering is continued until the sample is reduced to such size that it can be carried to the assayer. Any pair of rejected quarters should also be retained as a check, or in case of mishap to regular sample.

Should the lead being sampled contain a pay streak which only would be shipped, it is best to sample this pay streak as if it was a separate and distinct lead, carefully noting the width sampled. It must be remembered that the sample only represents that portion of the lead from which it was taken.

Another and quite as satisfactory a method is to sample, by method described, all the rock that comes out of the prospect, or sample the dump, if there is any, by cutting channels through it, on the same principle as in sampling a ledge, and working down the ore taken from such channels to a convenient bulk.

It must always be borne in mind in sampling that there is liable to be a great difference between the lump and fine ore, and, consequently, a due regard must be had to getting the proper proportion of each.

Hand-picked samples are never reliable, and should always be avoided. As an instance of this: The manager of a certain mine on the Coast brought into the Government Laboratory for close and accurate check on the smelter, a large sample of a shipment of ore. The writer found he had taken "a few lumps out of each sack at random," and advised him to go back, dump every tenth sack, and "quarter down" as described, which he did. Both samples were assayed; the first gave 14 per cent. copper, the second gave 5.6 per cent. copper. The ore went to the smelter, where it was accurately sampled by experienced samplers, and gave within one-tenth per cent. copper of second result.

Experienced mining men frequently take hand samples of the particular classes of ore in a mine, have these assayed, and from these results they estimate what grade of ore they are mining. This may be correctly done, and it is wonderful how close to the correct assay an experienced man can "guess," but it is uncertain at the best, and dangerous for inexperienced persons to attempt to be guided by such estimates.

Assays cannot be averaged unless one knows the actual weight of the material represented by each assay, and only then by a long calculation, too long to describe here, except briefly. In nine cases out of ten, when the "average assay of a mine" is spoken of it is incorrect, and has usually been obtained by adding up a number of separate assays and dividing the sum by the number of such assays. It is quite correct to take an average sample, have that assayed, and call it the average assay; but this is seldom done. The correct "average assay" may be obtained by the rule:—Multiply the weight of each lot of ore by the assay of such lot, add the products of such multiplications and divide this sum by the sum of the weights of the various lots of ore; the quotient of such division will be the "average assay" required.