That the average assay of the four samples accurately represents the lot, has been proved again and again by the reasonable concurrence of the assay result, as for example, in three lots:

First sampling.....	3840.00	3765.80	5090.10
Second sampling.....	3822.80	3696.60	5119.60
Third sampling.....	3829.60	3703.80	5121.60
Fourth sampling.....	3644.10	3729.90	5130.40

The metallics, which have been obtained by hand-picking the larger pieces of silver from the original lot before sampling, are weighed and handled separately as bullion. They do not constitute part of the sample taken from the crushed ore, but are melted and treated separately.

The sampling at our works is usually performed in the presence of representatives of buyers and sellers, and the former, especially, are men of long experience in the handling of ores, both at western sampling works and smelters in the east.

Suggestions have been made to us from time to time as to what might improve the process in the direction of accuracy, and in some cases, the not unnatural question has been asked why we do not employ mechanical sampling from beginning to end, if for no other reason than that it is cheaper than hand labor. Such mechanical sampling has been installed at Copper Cliff, as is well known, and the methods and results are well described in the Journal of the Canadian Mining Institute for 1908, in a paper prepared by Mr. Arthur A. Cole, of Cobalt. Mechanical sampling is likewise employed on Cobalt ores at Deloro and at Denver. In the sampling of ordinary ores, mechanical sampling long ago superseded hand sampling in all progressive works, both east and west, but there seems to be some question in the minds of assayers and others interested, as to whether the mechanical sampling produces as uniform results in Cobalt ores as does the method of shovelling into ridges and cones, as outlined above. If there be anything in the belief that mechanical sampling is not quite the equal of hand sampling on this ore, it rises from two causes:

One, the possibility that in grinding in a Ball mill or other similar device, there may be a mechanical concentration in the mill, rendering it difficult to get samples which do not show too high or too low a proportion of silver; and to another cause: that automatic sampling devices, cutting out a fraction of the lot, which is subsequently sampled down by any method, do not admit of taking more than one sample of the "whole" lot, starting practically from the beginning each time. The assumption is that the fraction taken mechanically must accurately represent the whole. In many works, mechanical samplers are set to take out one-tenth, and from two to four samples of this tenth are subsequently cut out for duplicate or quadruplicate assays, but by the slower and more tedious hand sampling, four "original" samples may be taken, starting in each case from the beginning.

Without going into all the reasons for such changes as from time to time have been introduced by Ledoux & Co., I would say that our present practice is substantially as follows, and details omitted being evident from what has preceded:

The material after being unloaded, is put through a Blake crusher, crushing the ore to about one and one-fourth inches in size. From there it runs down a chute into an elevator boot, the buckets raising and throwing the ore into a one-inch revolving screen and passing through this into an outer screen of one-half inch holes. All that passes through this screen drops into a chute and is ready for the floor. The material not passing through this half-inch screen, together with all which has passed through the one-inch, slides through a chute into the rolls, which are set to one-fourth inch; all material not passing through the one-inch screen passes down a chute to a crusher, thence back to the elevator and so on, until all the material has been crushed and passed through the rolls. The ore after leaving the rolls, is wheeled with barrows onto the sampling floor, and put into two ridges, alternating each barrow, one to the right and the other to the left, then screened through a half-inch mesh, and all the metallics which do not pass the half-inch screen, are picked out and treated separately. Men are then placed at each ridge opposite each other, shovelling the material into one ridge.

The ore is then half-shovelled by throwing one shovelful to the right for one ridge and the other to the left for the other ridge. After dividing into two ridges, each ridge is again divided by half-shovelling to about two tons, which is coned and quartered down to about one thousand pounds remaining, and put through the rolls and mills until all the material, including the metallics, will pass through an eight-mesh screen. This is then mixed by shovelling over three different times, then put through a Jones sampler and worked down to about 35 or 40 pounds, which is put through a Hance Brothers & White drug mill and ground to pass through a 20-mesh sieve. This is sent to the laboratory and treated as described above.

It will be seen that in the second method of sampling the ore after crushing is thoroughly mixed and then divided into four lots or parcels, each of which should be exactly like the others. Each of these four lots or samples is then worked down separately, and the average of the assays of the four lots is taken as representing the carload. The reasonable concordance of the four samples is shown by the following examples, on two lots:

	Ounces of Silver per Ton.	
First sampling.....	3956.80	3001.10
Second sampling.....	3965.10	2968.80
Third sampling.....	3980.90	2954.70
Fourth sampling.....	3950.40	2982.00

NEW ZEALAND GEOLOGY.

Under the energetic management of Dr. J. M. Bell, director of the New Zealand Geological Survey, the geology of that country is receiving much more systematic attention than ever before. A new series of elaborate bulletins is being brought out, covering gradually the whole dominion. Bulletin No. 7, "The Geology of the Queenstown Subdivision, Western Otago," has just been received. In this, Mr. James Park, Professor of Applied Geology at the University of Otago, outlines the geology of the Queenstown subdivision. The report contains 112 pages of letterpress, 38 plates, 33 illustrations, and 13 maps.

In glancing over Mr. Park's notes on the economical geology of the Queenstown region, several interesting features are noticed.

The most productive gold-bearing lodes of the Macetown district are enclosed in a comparatively soft, grey,