being separated and saved. This was in entire conformity with more recent experience in actual milling operations, and explained at once the advantages which had been observed to follow the jigging of ore previously classified with hydraulic classifiers. The classifier accordingly superseded the trommel, and close sizing before jigging became relegated to the past. In other respects there was no material difference between European and American practice. A jig, consequently, while giving a remarkably clean product, could not be crowded without throwing large quantities of ore off with the tailings, and any increase of speed produced the same result. The speed was determined by the velocity of rising current needed to lift the particles of gangue which would be equal settling with the smaller ore particles left in the classified product fed to the machine. Here was its limitation, closely and accurately confined, and the tendency of most mill-men was to force through a larger tonnage than that for which the jig is calculated, with the inevitable result of loss of values.

It is to be noted that this limitation was fixed in accordance with the theory of particles falling in water after having reached the period of a uniform rate of fall, that is, after the resistance has increased with the increasing velocity of the particle until it counteracts the normal acceleration due to gravity. From this it follows that the jig stroke must be relatively long to allow the particles to reach this period of uniform rate of fall. According to the practice built up from this theory the length of stroke for ore particles $\frac{1}{8}$th inch in diameter would be from 2 ins. to 2½ ins., repeated about 80 times a minute. A stroke as short as ½ inch would not be used with particles larger than 1 m.m. (= $\frac{1}{25}$th inch), at a speed of not over 125 strokes per minute. Only with jigs for the finest sands, material such as is now concentrated on vanners, and riffle washers of the Wilfley type, were short strokes of from ¼th to ⅛th inch, and speeds of from 200 to 350 strokes per minute employed.

Attempts were often made to increase the speed, but the resultant losses were so great that mill-men hastened to retrieve what was looked upon as an error, and so the possibilities of doing good work on relatively large sizes of sands at very high speeds were not discovered. This is the peculiarity of the practice inaugurated by Mr. W. J. Evans at Great Falls, which has proven so successful that the system of high speeds and short strokes will be introduced into the 6000-ton concentrating plant being erected at Anaconda, Mont. At Great Falls ore crushed to pass a 1½ in. mesh screen is jigged with 180 strokes per minute, 1½ in. long, and other smaller sizes in proportion. In general the length of stroke should be approximately the same as the diameter of the maximum size of ore particles fed, making due compensation for the relatively greater resistance to falling in water on the part of very small sizes of grains. The result of this is to take advantage of the acceleration before the period of uniform velocity of fall has been reached, and thus to assist gravity many times a minute. Mr. Evans would dissent from this way of stating the matter, his view being that jigging depends less on gravity than on frequent assisting of gravity by quickly applied suction at the moment of reversal of motion. This is a widely different thing from the so-called law of suction proposed by Prof. Richards. He says: The law of suction seems to be that jigging is greatly hindered by strong suction where the two minerals are nearly of the same size, the quickest and best work being then done with no suction; but that when the two minerals differ much in size of particles, the quartz being the larger, strong suction is not only a great advantage, but may be necessary to get any separation at all" (loc. cit., p. 8). Directly opposed to this, it would seem that the practice adopted by Mr. Evans would logically lead to a return to the continental system of close sizing before jigging, since the larger grains would yield more readily to the forces operative at such high speeds.

Another feature of the new system adopted at Great Falls is an increase in the depth of the jig bed, with the use of screens of larger mesh. That this has been necessitated by the change to higher speeds and shorter strokes indicates that Munroe's law of hindered settling particles plays here a role which in some respects must be different from that which it performs with classified ores under the prevailing American practice. There are features here which are manifestly novel and require further investigation. That greatly increased capacity per unit of screen area is obtained by Mr. Evans' system, without causing losses of valuable mineral, is indubitable, and thus the value of the jig is still further enhanced. In order to obtain the best results with high piston speed, it is important to secure a vertical motion with the piston held rigidly in a horizontal position. This end has been secured in a jig designed by Mr. Evans, having double piston rods working through boxes fixed in the cover of the piston compartment.

Sample Ignorance About the Nickel Industry.

In the Toronto *World* of the 15th inst., there is a long article written by the firm of Clarke & Co. of that city, on the nickel industry. It would be very amusing to read only for the oracular style of it. For instance, they locate the Sudbury district to the northwest of Sault Ste. Marie, and make the nickel-bearing belt run from there to Hudson's Bay. They also say that owing mainly to Clergue's enterprise three refineries are being built in this district now, one at Copper Cliff, another in Denison and the third at Worthington. To correct this ridiculous yarn, we may state that the new works at Copper Cliff are simply a concentrating plant; and the works in Denison are a combined smelting and bessemerizing plant, and the works at Worthington are merely a small 50-ton smelter on the Jack McDonald process for making matte. The Canadian Copper Co. bought the fine water power on the Vermillion River at Nickel City two years ago with the intention of putting up a nickel refinery there just as soon as they can find a workable process. This is the only step that has so far been taken to erect a refinery in the Sudbury district. But it is in discussing the Frasch process that the worst mistakes are made in the article referred to. The following statement may be taken as a sample: "The result is that the nickeliferous pyrrhotite at Sudbury can now be mined, and its various constituents reduced to marketable commodities, at a total cost of $3.00 per ton." Here are the facts: The Frasch process can only treat matte, not ore at all, and the cost of mining the ore and making it into ordinary matte is more than $3.00 per ton. The way they describe some of the ore deposits is equally absurd. But the funniest of all is that at the close of the article the writers deplore "the general ignorance and indifference as to the Sudbury district." The particular ignorance in their case is still more to be wondered at.

Granite Gold (Nelson, B C.)—The following corrected statement has been sent us for publication:—Mill working 26 days; tons crushed, 1,365; bullion produced, 593 ozs; estimated value, $10,000; concentrates, 36 tons; estimated gross returns are $11,100; total cost will be $8,500.

McDonald's Bonanza (Klondike).—Cablegram from the mine, dated September 3rd:—"Clean-up after 15 days' sluicing September 1st 3,650 tons resulted in 1,409 ozs. The estimated value is $22,000. The falling off is due to gold (being) much lighter."

The Yukon Goldfields, Limited.—The following cable has been received from the company's representative at Dawson City, Yukon:—"Adam's Hill United: August output, $19,750. The total receipts for the month are $25,000. Disbursements this month amount to $23,000."