much closer than by any other method, the web being employed to form part of the guide or race for each shuttle.

Selected Articles.

THE ACTON COPPER MINE AND ITS RESULTS.*

As soon as the ore has been brought to the surface it undergoes the process of coarse spalling; that is, it is separated from the waste rock, and broken into pieces having a diameter of from four to six inches. These pieces are sorted, according to the quantity of copper they contain, into first quality ore, second quality ore, crush ore and fourths. The first three sorts then undergo the process of The first quality ore is broken into fine spalling. pieces of the size of an egg, and any poor rock which these may contain is picked out. It thus yields marketable first quality ore, containing from eighteen to twenty-four per cent. The second quality pieces, treated in the same way, yield marketable second quality ore, containing from ten to thirteen per cent. The crush ore, after having been spalled down, and separated from the waste reck, assays from three to five per cent. It is The sofurther treated by crushing and jigging. called fourths consist of limestone containing copper pyrites in coarse grains, small strings and finely disseminated particles. This quality is not worked up at present. It is piled in separate heaps, in order to be treated by stamping and washing, so soon as the apparatus for that purpose is procured. Besides the coarser rock, there is produced, in the various workings, smalls, which consist of pieces of ore and rock whose diameter does not exceed three or four inches, and which are usually so coated with mud as not to be easily separable from cach other. These smalls are first thrown upon a screen, the bars of which are one and a quarter inches apart; the larger piece which remain upon it are sorted and spalled in the same way as the coarser rock; while the smaller pieces, which pass through, and assay from two to three per cent. are at once subjected to crushing and jigging.

The crush ore, and the finer part of the smalls, are reduced, by passing between cast iron rollers, to such a size as to pass through a sieve of twelve holes to a square inch. The crushed product is then brought into a jigging sieve, having sixty-four holes to a square inch. This sieve is wholly immersed in water, where it receives a succession of jeftks, each of which causes it to descend, and suspends its contents in the water. These then arrange themselves, according to their relative specific gravities: the pricest and largest particles at the bottom of the fieve, the poorest and smallest at the top. After the sieve has received a sufficient number of jerks, it is raised out of the water, and the upper layer, or skimmings, scraped off. These contain from one and a-half to two per cent copper, and are thrown aside. That part which collects at the bottom of the sieve, and contains twelve to fourteen per cent of copper, is called ragging, and is a marketable product. There is sometimes pro-

* Being the concluding portion of a paper on the Acton Copper Mine, by Thomas Macfarlane, Esq.—Canadian Naturalist. duced an intermediate sort called seconds, occupying a position on the sieve between the skimmings and the ragging. This is laid apart, and afterwards rejigged, the same products being produced as those above mentioned. In this process of jigging a considerable portion, the finest part of the crush work, falls through the sieve into the box below, which contains the water, and is called hutch-work. This, on being washed in a streak from the slime which it contains, assays from eight to eleven per cent. and is then in a marketable state. The costs of these various dressing operations were as follows :-- Coarse spalling costs from fifteen to twenty-five cents per cubic yard of rock, according as the same contains less or more ore; fine spalling from fifty to eighty cents per ton of the resulting ore, according to the quality of the rock operated on. The processes of crushing and jigging cost during January, February and March, 1862, \$5.60 per ton of products, and \$1.15 per ton of crush ore. The total expense of coarse and fine spalling, and crushing and jigging, per ton, of all the products is at present \$5.25.

The crushing and jigging processes are almost the same as those adopted in Cornwall for the dressing of crush ore, yet they are attended with the loss of much of the copper contained in the original crush ore. Having for a long time estimated the quantities, and assayed the samples of the crush ore put through the rollers; and ascertained the weight and contents of the resulting products, I have found that the loss of copper is much more than might at first sight be imagined. I subjoin a few of the results obtained: From the 17th of November to the 12th of December, 1861, there were crushed 956,760 lbs. of ore, containing 4.6 per cent, or 44,010 lbs. copper. From this there were produced 283,451 lbs. of products, averaging 10.95 per cent, and containing 31,052 lbs. copper. There were consequently lost 673,305 lbs. of skimmings and slimes of 1.92 per cent containing 12, 958 lbs. copper. Thus 29.5 per cent of the copper contained in the crush ore was lost in the skimmings and slimes. Further, during January, February and March, 1862, there were crushed 2,881,100 lbs. of ore averaging 3.4 per cent, and containing 100,503 lbs. of copper ; from which there were reduced 615,520 lbs. of products everaging 9.5 per cent, and containing 58,711 lbs. of copper. There were consequently, 2,265,580 lbs. of skimmings and slimes of 1-83 per cent, containing 41, 592 lbs. of copper. Thus 41.5 per cent of the copper contained in the crush ore was lost. It is to be remarked, however, with regard to the foregoing results, that much of the copper contained in these skimmings and slimes is with proper appliances recoverable. Subsequent to the first of July, 1862, arrangements were made for dressing the ore by contract, and for working up a part of the slimes as these were being produced. Under this system the following result was obtained :--During the months of July, August and September, 1862, there were crushed 3,348,887 lbs. of crush ore and smalls, of from 2.0 to 5.9 per cent, averaging 4.1, and containing in all 137,969 lbs. of copper. From this there were produced 1,073,644 lbs. of products of from 8.0 to 12.6 per cent., averaging 9.9 per cent, and containing 106,625 lbs. of copper. There were consequently cast aside 2,275,243 lbs.