

appear that the vein matter has been derived from the measures encasing them. The cross veins have not been the means of introducing the minerals, for they, as well as the faults, are observed to shift and break veins already mineralised, and they seldom exert any appreciable effect on their values. The former not unfrequently show the gold caught in the breaks as smoothed out or "sliken-sided" plates. In a specimen from the Albion Mine at Montagu, where a break had intersected a very rich portion of the vein, the smoothed plate of gold had a superficies of several square inches, and a thickness of about one quarter of an inch. The knowledge of these facts has in some districts prevented the expense usually incurred when breaks of the strata are met, for the inclination of the pay ground being known, the barren portions of veins could be avoided.

To the miner, the most interesting and important point about a vein is its "pay" ground. When it is considered that the thickness of the worked veins averages from three to ten inches, and that their values vary from one quarter of an ounce to five ounces of gold to the ton, it is evident that he will make little profit unless his workings extend into the richer zones, carrying over considerable spaces an approximation to the higher values. I believe that in this province scarcely any veins have been tested even superficially, unless they showed at their outcrop rust or some of the more common sulphides, so accepted has become the axiom that otherwise there is no gold in them.

The metallic compounds characterising the veins are sulphides and arsenides of iron, galena, blende, copper pyrites, oxide of iron, copper glance, native copper, molybdenite, etc., found more or less disseminated throughout the vein, with small amounts of gold. At certain points, following the lateral extension of a vein, are met zones where these compounds are more abundant, and the gold is concentrated. As many as four of these rich zones or "chimneys" have been observed on a nearly straight line forming the axis of one or more veins. In a few instances, two distinct "pay streaks" or chimneys have been met in the same vein.

The zones occupy longitudinally in the veins a space varying from a few feet up to several hundred feet. Transversely, the vein is not affected in width by their presence, although sometimes the slate wall contains feeders and nodules of quartz rich enough to crush. The zones sometimes pass abruptly into poor quartz, yielding from a trace up to two pennyweights, or the percentage of gold gradually diminishes until mining becomes profitless. It has been observed that when a zone "takes" in suddenly on one side, it diminishes gradually in value as the workings approach the other side, but this can hardly be given as the rule. The shape of these pay streaks is extremely irregular; they have, however, in all cases a decided dip, which is generally the same for all those occurring in a given district. Thus they dip to the east at Oldham, Uniacke, Waverley, and Isaac's Harbor, and to the west at Montagu, Lawrencetown, and Renfrew.

The accompanying sketch¹ of the workings in a pay streak at Montagu will serve to show the irregularity of their form and the general dip. Mining was discontinued at the lowest portion when the quartz ceased to yield a profit, although the percentage of gold was still decidedly greater than in the surrounding quartz.

In the Albion Mine at Montagu, the vein was little mineralised, but whenever copper

¹ Sketch from paper on Nova Scotia Gold Fields, read before the North of England Institute of Mining Engineers by the writer.