

contracting to a few inches; the same layer being subject to considerable variations. In some cases the apatite in a bed is found to thicken and then to diminish, or to be divided by the interposition of the accompanying pyroxenic rock.

The veins present more complex conditions; while they are often filled throughout their width by apatite as pure and as massive as that found in the beds, it happens not infrequently that portions of such veins consist of coarsely crystalline, sparry calcite, generally reddish in tint, holding more or less apatite in large or small crystals, generally with rounded angles, and often accompanied by crystals of mica, and sometimes of pyroxene and other minerals.

The thickness of the veins also, as above stated, is very variable, and the same vein in a distance of a few hundred feet will sometimes diminish from eight or ten feet to a few inches.

These, however, as already noticed, are for the most part opened only by shallow pits; a condition of things which is explained by the peculiar character, and the frequency of the deposits, and also by the economic value of the apatite. This mineral, unlike most ordinary ores, is, in its crude state, a merchantable article of considerable value, and finds a ready sale at all times, even in small lots of five or ten tons. Like wheat, it can be converted into ready money, at a price which generally gives a large return for the labor expended in its extraction. Hence it is that farmers and other persons, often with little or no knowledge of mining, have, in a great number of places throughout the district described, opened pits and trenches for the purpose of extracting apatite, and at first with very satisfactory results. So soon, however, as the openings are carried to depths at which the process becomes somewhat difficult from the want of appliances for hoisting the materials mined, or from the inflow of surface-water, which in wet seasons fill the open cuts, the workings are abandoned for fresh outcrops, never far off. In this way a lot of 100 acres will sometimes show five, ten, or more pits, often on as many beds, from twelve to twenty feet deep, each of which may have yielded one or more hundred tons of apatite, and has been abandoned in turn, not from any failure in the supply, but because the mineral could be got with less trouble and cost at a new opening on the surface near by.

These conditions are scarcely changed when miners, without capital and unprovided with machinery for hoisting or for pumping, are engaged, as has often been the case, to extract the mineral at a fixed price per ton. These, having no interest in the future of the mine, will work where they can get the material with the least expenditure of time and labor, and often will quit the opening for one which is more advantageous. The very abundance and the value of the mineral mined has thus led to its careless, wasteful,