Red ocher differs from yellow ocher only in the condition of the iron. In the former the iron is in the anhydrous form while in the latter, as stated above, the iron is combined with water. Red ocher is found in nature and is also produced from yellow ocher by burning.

Ocher has been produced at several localities in Lehigh County. Most of it has been hauled to local paint mills where it has been used by itself as a paint pigment or blended with products from other districts. Some has been used in the raw state for the manufacture of light yellow paint, but most has been burned and utilized for red paint.

The ocher is generally found in close association with the limonite iron ores. The descriptions of individual iron mines on preceding pages show this connection. Much ocher was encountered in the operation of these mines but in only a few instances was it recovered. Generally it was in thin layers or lenses or small pockets associated with red, white, and black clays so that it was not practicable to separate them. The limonite ore in large and small pieces was also intimately associated with the ocher. In Lehigh County the ocher recovered was generally a by-product of the iron mines. In a few places the iron ore was a by-product of the ocher mines, the larger pieces of ore being separated and marketed from time to time whereas the smaller pieces remained in the ocher, either to be washed out later or to be ground in a mill to form a constituent part of the pigment.

The mixture of the different kinds of clay from the limonite iron ore washeries was run into settling basins as waste matter. In some cases these clays were sufficiently high in iron to be regarded as ochers. They are generally known as "mud-dam deposits" and are close to the old iron mines. With no attempt to separate the other colored clays from the yellow ocherous clay, nearly all the mud-dam ochers are of low grade. Nevertheless through systematic search and careful sampling of these old deposits, places have been found where paint manufacturers have obtained useful material. The best grade ocher is found at the far side of the deposit, since the coarse, heavier particles of quartz and rock were dropped close to the log washer. The market demands for this grade are small and probably an abundance still remains in these mud-dam deposits.

The origin of the ochers of the region is the same as that of the limonite iron ores discussed on previous pages. The iron ores merely represent a higher concentration of the limonite and consequently a different physical character.

Mining methods

The ocher has been mined both by open cut and by shafts. The former method was used wherever ocher lies within 10 to 15 feet of the surface, and shafts were sunk where it lies deeper. The pockety character of the ore and the uncertain market for the product did not justify elaborate equipment. In some mines little timber was used except in shafts and main drifts, and mines caved soon after operations ceased. If much water was present the squeezing action of the clay required extensive timbering even in the small stopes.

In most mines the ocher extends in a somewhat definite band. Drifts following the ore bodies were run from the shaft in both directions. If a

---