Notes on some recent finds of Minerals on the Mendip Hills

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As the result of investigations spread over a number of week-ends during the first nine months of 1934, the writer has been able to get together a fairly comprehensive collection of Mendip minerals, amounting to some thirty varieties, and including some of great rarity and others which have not hitherto been recorded from the district.

Although search was made over a considerable area, mainly in the central part of the range, the collection of good mineral specimens is by no means easy. Such minerals as do occur are rather sporadic in their occurrence, the deposits are on the whole small and well crystallised examples are decidedly rare. Most of the ground formerly worked over, is now overgrown or covered with an overburden of tailings and débris left after more recent treatment, with the result that an enormous amount of dirt has to be sifted or allowed to be washed away.

At Higher Pitts, near Priddy, there is still a good deal of material on the dumps which has not been grown over, though for the most part it is considerably decomposed, and it was to these dumps that most of the writer's attention was directed.

There are records of prospecting for iron, lead and copper having been undertaken at this locality in 1856, but the terms of the prospectus seem to have been more glowing than actual results justified, and very little appears to have been done. Later in about 1890 another company, 'The Somerset Manganese and Iron Ore Company', acquired the property and started mining operations. A certain amount of ore was brought to grass but the undertaking soon failed and work was discontinued.

The deposits consist of pockets of Iron and Manganese Oxides that occur in the Dolomitic Conglomerate at and near its junction with the underlying Carboniferous Limestone. The Iron is in the form of the Oxides, HAEMATITE and LIMONITE, with occasional small amounts of the rarer Hydrated Oxide, GÖTHITE, of which the writer collected three small specimens. Manganese occurs, in less quantities, chiefly in the form of the Oxide, WAD, grading in some instances into PSILOMELANE, with small amounts of the Dioxide, PYROLUSITE, and occasionally small groups of acicular crystals of MANGANITE. CALCITE is abundant and largely intergrown with the ores, but QUARTZ is rare, only two specimens having been found, both of these encrusting GÖTHITE.

Scattered through the Manganese ores are small knobs or nodules of Lead minerals, accompanied in some cases by traces of Copper, and it is in connection with these that the locality is of particular interest.

Of these Lead Minerals, the Carbonate of Lead, CERUSSITE, is the most frequent. The crystals or masses, often enclosed in cavities in the Manganese ore, are nearly always corroded and in only one specimen were any definite crystal faces seen : this was a single flattened crystal in a cavity, about $3\frac{1}{2}$ cm. long, $2\frac{1}{2}$ cm. deep and 4 mm. thick, which had more or less perfect crystal faces along the narrow edges. Masses up to 5 cm. long and 4 cm. wide occur, but are usually smaller.

The Hydrocarbonate, HYDROCERUSSITE, usually considered a rare mineral, is of relatively frequent occurrence at this locality and a number of good specimens were found, in some cases up to 4 and 5 cm. in length.

The locality is of particular interest for the occurrence of the rare Oxychloride, MENDIPITE, of which a number of good specimens were found in 1890–1 when the minerals were being worked. Full particulars of this and other rare minerals found here are given by Dr. L. J. Spencer in his paper ' New Lead-Copper Minerals from the Mendip Hills ' in the *Mineralogical Magazine*, Vol. XX, No. 102 (Sept. 1923), pp. 67–92.

Nodules of MENDIPITE occur occasionally in the Manganese ores and its characteristic prismatic cleavage is at once noticeable when it is broken open. Small amounts have been found

from time to time since Dr. Spencer wrote his paper in 1923, and during the five months March to August of 1934, the writer was able by careful search to collect nineteen separate specimens of this mineral from Higher Pitts and two further specimens from another locality near Priddy Hill Farm, making twenty-one in all: about forty per cent. of these were small, not exceeding 1 sq. cm. in extent; about 25 per cent. averaged 2–3 sq. cm. and the remaining three or four specimens were larger, being up to 3 cm. × 4 cm. in area and 2–4 cm. thick. Most of the specimens were fresh though one or two had suffered alteration into HYDROCERUSSITE and CERUSSITE round their margins.

Associated occasionally with the MENDIPITE, at this locality only, and usually embedded in it, is the extremely rare Oxychloride of Lead and Copper, CHLOROXIPHITE, which occurs as single narrow blades or compact aggregates of blade-like crystals of a dark olive-green colour. Only six of the specimens of MENDIPITE found by the writer at Higher Pitts contained any trace of it and in four of these the blades were not more than 3 mm. in length: one contained a group of crystals some 2 cm. long, 2 mm. wide and 1 mm. thick, while the remaining specimen was a very fine one being some 2 cm. long, 1 cm. wide and 4 mm. thick.

Another exceedingly rare Oxychloride of Lead and Copper, DIABOLEITE, peculiar to this locality, has also been found associated with MENDIPITE and CHLOROXIPHITE and also alone in HYDROCERUSSITE. This mineral is of a brilliant sky-blue colour and occurs in minute quantities only. The writer only found four specimens altogether and in none of these did the crystals exceed 2 mm. in length—one single crystal 1 mm. × 2 mm. was associated with CHLOROXIPHITE in MENDIPITE; one, about $\frac{1}{4}$ mm. in diameter was embedded in CERUSSITE and the remaining two specimens were in HYDROCERUSSITE, the best of these comprising five or six minute crystals close together.

In addition to the two Lead-Copper oxychlorides mentioned, another Copper compound is found associated with MENDIPITE or in CERUSSITE or HYDROCERUSSITE—this is the rare Oxide of Copper and Manganese, CREDNERITE. It usually occurs as

small flat plates or groups of plates on the outside of the MENDIPITE nodules or occasionally in the other lead compounds. It is of an iron black colour with a metallic lustre and is often accompanied by films or crusts of bright green semi-transparent MALACHITE. Several good specimens were found, the largest being a plate about 1 cm. square × 1 mm. thick.

MALACHITE occurs at Higher Pitts only in minute quantities either with CREDNERITE and MENDIPITE or alone in CERUSSITE or HYDROCERUSSITE, and is apparently of secondary origin.

Several specimens of the rare Chloro-arsenate of Lead, MIMETITE, were found, taking the form of small groups of minute ($\frac{1}{4}$ mm.) prismatic crystals of a bright orange-yellow colour embedded in loosely aggregated CALCITE.

On August 19th the writer was fortunate enough to make an interesting find in the form of a small specimen of the rare mineral PYROMORPHITE, Phosphate and Chloride of Lead, the identity of which was confirmed by Dr. Spencer. This specimen consisted of a nest of small crystals lining a cavity in WAD and CALCITE and of a pale yellow-green colour. Formerly known as ' Mendip Green Ore ' it was at one time mined near Blagdon and also recorded from near Harptree : no record of its having been found in recent years seems to have been made, so far as the writer is aware, since J. Woodward compiled his *Natural History of Fossils* in 1728–9. It has not been previously found at Higher Pitts.

Another interesting discovery was a nice specimen of the Manganese Carbonate, RHODOCHROSITE, on March 4th, also at Higher Pitts. It was found as a nodule about the size of a small fist and was enclosed in hard WAD grading into PSILOMELANE : the mineral was quite fresh and of a pale rose-pink colour. It had not, hitherto, been represented in the collection of Mendip Minerals at the Natural History Museum and there are apparently no previous records of its occurrence in the district.

In the same matrix as that enclosing the RHODOCHROSITE were small amounts of MANGANITE in groups of radiating acicular crystals and small nodules of a hard, white mineral which on being first found seemed somewhat puzzling : there was no trace of cleavage and the mineral was massive in form with a slightly vitreous lustre—on testing it proved to be a

MANGANIFEROUS CALCITE, a mineral intermediate between RHODOCHROSITE and CALCITE, which in one specimen actually graded on the one side into pure CALCITE and on the other into pink RHODOCHROSITE.

As will be seen from this brief account, the minerals at Higher Pitts are somewhat complex and considerable in number ; those found by the writer amount to no less than twenty-four varieties and there are two or three more which have been recorded, but of which the writer did not actually obtain specimens.

In other parts of the central area of the Mendips there are few localities which have yielded any specimens of interest, apart from the two small pieces of MENDIPITE from near Priddy Hill Farm. BARYTES (Sulphate of Barium) is fairly common in various forms among the tip-heaps and old workings on Chewton Warren and round Rodney Pitts, Chewton Mendip. A fairly good specimen of BARYTES crystals was obtained from the waste-heaps near the old Harptree lead works and also from the same locality an interesting pseudomorph of LIMONITE, which Dr. Spencer considered was after CHALYBITE (Carbonate of Iron). Pseudomorphs of LIMONITE after MARCASITE (Iron Sulphide) were found among Lias débris near Rodney Pitts, Chewton Mendip, the alteration being only partially completed in two cases, thus showing the original mineral. MARCASITE, together with finely disseminated GALENA and PYRITE and traces of ZINC-BLENDE occur in a veinstone on the tip-heaps round one of the old trial shafts by Buddles Wood, Chewton Mendip.

In the eastern part of the area there is one locality that is of interest in yielding small amounts of Copper minerals ; this is the roadstone quarry in Andesite Lava at Moonshill near Shepton Mallet. In April 1932 while investigating this quarry the writer discovered a small vein of the grey Copper Sulphide, CHALCOSINE, with the hydrated Silicate, CHRYSOCOLLA, high up on the top of a ridge of rock separating the north and south parts of the quarry. Although a careful search was made on subsequent visits that year no further traces were found, and so far as the writer was aware no record of these minerals had at that time been previously made from the area.

A further visit was made to the quarry in June last year in company with Dr. Spencer and it was found that a new cut had been made in working the quarry, through the ridge already mentioned. The portion in which the vein had been found in 1932 had been removed, but fresh exposures had been made at the bottom of one side of the cut and further good specimens were obtained, though the CHALCOSINE had for the most part undergone alteration. In addition one specimen, collected by the writer, had a small crust of dark red crystals of CUPRITE (red Oxide of Copper) on it.

These more recent exposures have, the writer believes, been noted but it is felt that their occurrence, together with CUPRITE, in the Mendip area might be recorded here, as they do not appear to have been mentioned previously.

The writer wishes to record his thanks to all those who have assisted him in his investigations by giving permission to go over and work on their land and in particular to Mr. Samuel Gulliford, the present owner of Higher Pitts Farm : to Dr. L. J. Spencer, Keeper of Minerals at the Natural History Section of the British Museum, for his kind and valuable assistance in identifying various specimens, and to Dr. F. S. Wallis, Deputy-Director of the Bristol Museum and Art Gallery for his interest in the work.