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Field Meeting at Sharpstones Quarry

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JONES. D. (1981). Field Meeting at Sharpstones Quarry. *Proceedings of the Shropshire Geological Society*, **1**, 17-19. Three principal rock suites have been identified: Longmyndian, Uriconian and various outcrops of metamorphic rock such as the Rushton Schist. The synclinal core is in part worked at Sharpstones, from west to east: the Bayston Group, the Bridges Group and the Oakswood Group. The Haughmond Conglomerate passes upwards into a thick sequence of greywackes which form the main quarry reserve. One strange feature of a number of the faults in the quarry is the presence of bitumen within the fracture zone. The principal uses for the stone are as railway ballast (the quarry has its own rail head) and roadstone.

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Over 30 members and guests were given a conducted tour of Sharpstones Quarry and special thanks are due to Barry Jacques (Quarry Manager), Alan Bell and Steve Le Chevalier (Company Geologists) and Howard Windmill (Quarry Foreman) who gave excellent accounts of the geology and quarrying operations.

The quarry has been operated for some eight years by ARC, a company of the Tarmac Group, and has an output of one million tonnes per year, although there is evidence that quarrying has taken place here for at least 200 years. The principal uses for the stone are as railway ballast (the quarry has its own rail head) and roadstone. The quarry is operated with modern equipment, e.g. the seven crushers are controlled from a central control room and linked to visual monitors, to ensure that the massive capital investment (around £9 million) is fully justified. Because of the high quality of the stone, it has markets in London, Manchester and North Wales. The quarry now extends for 650 metres along the strike of the rock with a maximum width of 150 metres and a depth of some 40 metres (Figure 1) , and is planned to work for another 25 years - geologically it could continue for same 60 years.

The quarry works a sequence of Precambrian greywackes which form the core of Sharpstones Hill. The Precambrian sequence in Shropshire is extremely complex and the exact relationship between the various sub-divisions is still the subject of considerable research. Three principal rock suites have been identified: Longmyndian, Uriconian and various outcrops of metamorphic rock such as the Rushton Schist near the Wrekin. The detailed formational history is still unclear but the generally accepted sequence of events is as follows.

Towards the latter part of the Precambrian the rock, which now forms the basement in Shropshire, was subjected to a period of intensive folding and metamorphism. This orogeny was probably due to the collision of two 'plates' and the intensive folding and metamorphism occurred because present day Shropshire lay at a point where one plate passed downwards below the other. The resultant intensively metamorphosed rocks are known from scattered outcrops in Shropshire but are best exposed in the Malvern Hills.

As in the modern Andean Mountains, the subduction of one plate under another gives rise to volcanic activity as well as mountain building. The Shropshire equivalent of this is now preserved as the scattered outcrops of the Uriconian sequence.

When the plate activity and orogeny ceased the mountains which had formed began to erode and the sediments produced were deposited in an adjacent trough. These are the rocks which form the present day Longmyndian series.

The Longmyndian is sub-divided into the Wentnor and Stretton series, which are separated by an unconformity which appears to cut out the older Stretton Rocks towards the west. Subsequent to deposition, the Longmyndian series has been folded into a steeply dipping isoclinal syncline.

This tended to confuse the earlier workers in the area who originally divided the Wentnor series which forms the synclinal core and is in part worked at Sharpstones, into three group. They are, from west to east: the Bayston Group, the Bridges Group and the Oakswood Group.

It is now accepted that the Bayston and Oakswood Groups are lateral equivalents and that the Bridges Group lies at the synclinal core. The whole sequence, _from Uriconian to Wentnor including the fold repetition, can be best identified along a line running from Caer Caradoc to Stiperstones.

As you come north towards Shrewsbury most of the Longmyndian is concealed by Carboniferous age sediments. The only major outcrops are the Bayston Group exposures on Sharpstone Hill and Haughmond Hill. The situation is further confused by the development of an additional conglomerate, the Haughmond Conglomerate, which is important in the Shrewsbury area but is absent from the Longmynd type area.

As shown on the appended sketch map, three principal horizons may be identified in Bayston Hill Quarry. The oldest, the Haughmond Conglomerate, outcrops along the southern side of the quarry but is not particularly well exposed at present. The Haughmond Conglomerate passes upwards into a thick sequence of greywackes which form the main quarry reserve. Apart from a slight increase in haematite and related minerals at the beginning and end of the greywacke deposition, conditions appear to have remained fairly constant during this period. The numerable individual bands of greywacke may be distinguished by detailed examination of the main quarry face. The very limited amount of grading which occurs in any individual greywacke band provides the essential ‘way-up' information which identified the synclinal attitude of the Wentnor series in the type area.

The variation in the iron content of the greywacke has important consequences for the working of the quarry as it affects the physical properties of the stone. As mentioned earlier, the quarry produces a high quality stone which is used in applications which require a resistance to skidding (PSV) or a resistance to wear. The presence of a proportion of the rock with the iron minerals actually aids the quarry to satisfy both markets. An extremely good resistance to wear is essential for stone specified for use as rail ballast and in this application the central part of the greywacke sequence is the ideal material. To surface a road the material must have a good resistance to skidding. This property is good for the premium greywacke but can in fact be improved by the addition of a minor proportion of the red marginal material as it tends to wear away microscopically faster and continuously presents fresh angular material which improves the resistance to skidding.

The younger Precambrian horizon in the quarry is the Darnford Conglomerate which is extensively exposed along the northern side. This, like the Haughmond Conglomerate, is poorly graded varying from sand to pebbles with a soft cementing matrix. Although predominantly quartz, pebbles of Uriconian and the older metamorphic rocks are also present.

The quarry is also traversed by numerable faults which have in the main produced minor lateral displacements of the Precambrian Rocks. Although some movement has occurred on these faults during the Permo-Carboniferous Period, this appears to have mainly been due to reactivation of Caledonian Age (Silurian/Devonian) structures and faults rather than the development of faults with an Armorican Trend. One strange feature of a number of the faults in the quarry is the presence of bitumen within the fracture zone. This appears to be due to the migration of hydrocarbons from the adjacent Carboniferous strata along the fault zones and the trapping of some of the material in fissures in the rock.

A FIELD MEETING LED BY DAVID JONES ON 17 JUNE 1981

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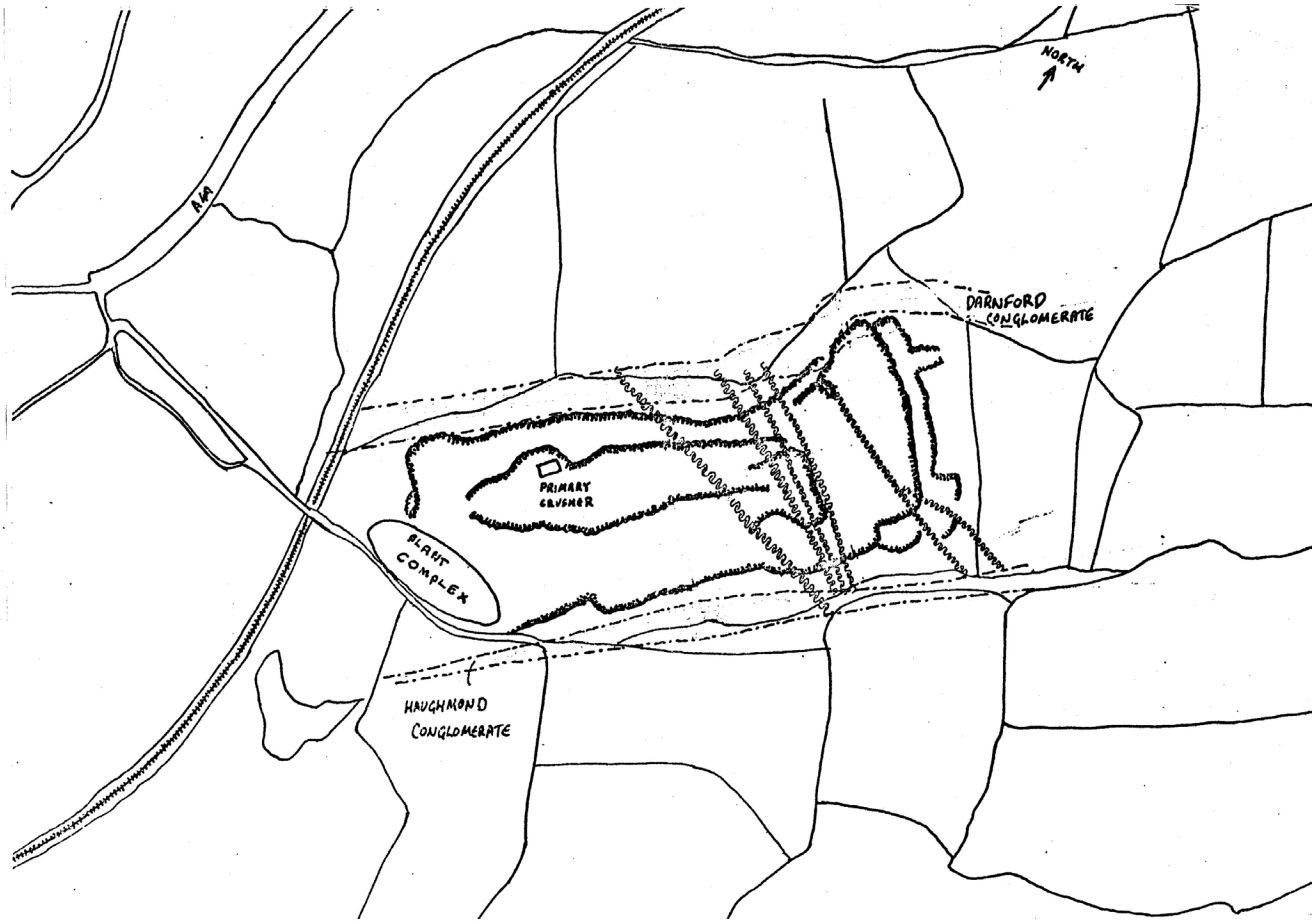

Figure 1. Locality map for Sharpstones Quarry.

