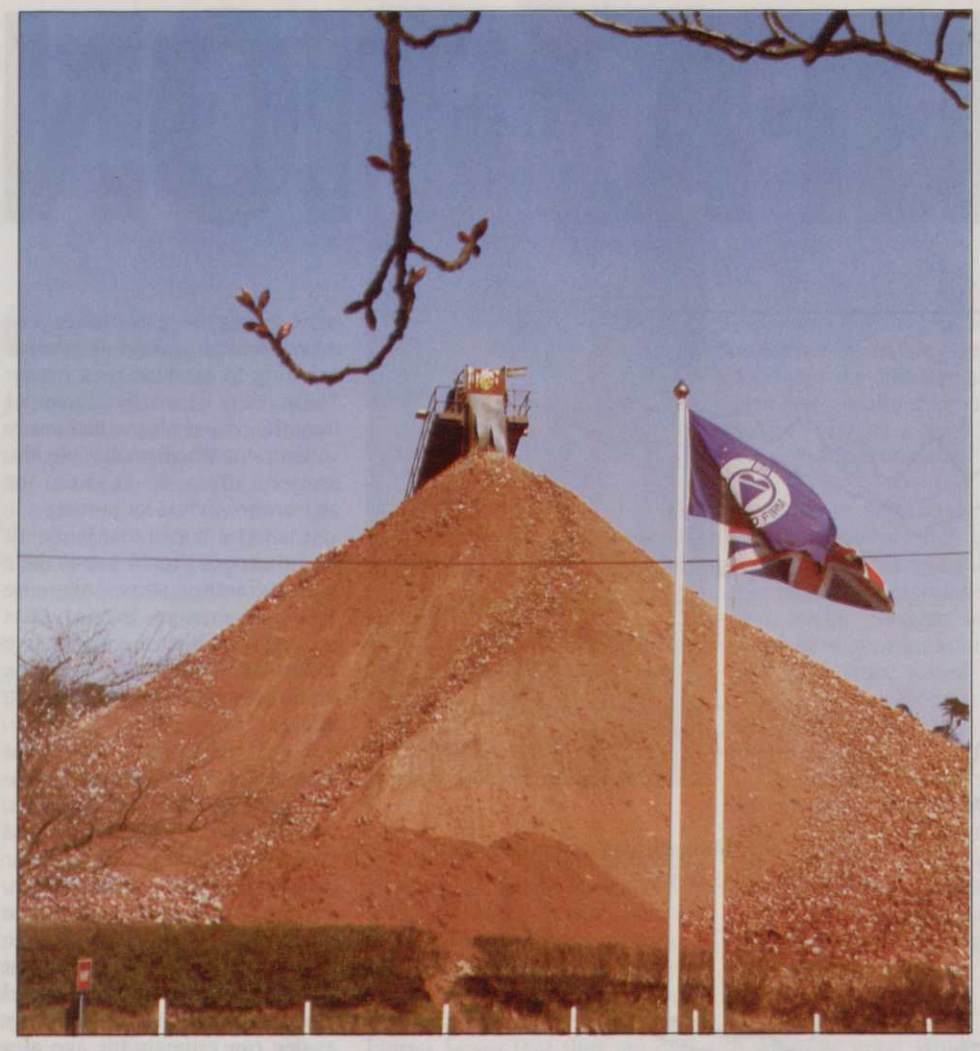

DAVID WHITE discovers that sand for the golf course doesn't just 'happen' – and like everything else, you tend to get what you pay for

To the layman it appears as though taken directly from a futuristic movie, a setting perhaps from '2001 – A Space Odyssey'. Deep in the Staffordshire countryside, sheltered far from public gaze yet throbbing with activity, a huge quarrying programme is underway throughout each working day, blasting colossal chunks of rock by dynamite, the rock lifted with giant-mouthed cranes and hauled by monster dump trucks a half mile or so to the Moneystone Quarry processing plant, there in a matter of hours to be transformed into pure, near white, luscious and carefully graded silica sand for use specifically on golf courses.

I'd seen sand dug from open seams or dunes, indeed had always believed that sand just 'happened' naturally and came in its finished state with nothing more than washing, sifting and grading demanded before meeting its final destination – in bunkers or as top-dressing. Now I was in for a lesson in geology, for by understanding the process I would understand the reasons why all bunker sands are not the same.

Geologically, the deposit at Oakamoor, the source of Moneystone sand, is termed a 'Millstone Grit'. It is a sedimentary deposit that took place during the carboniferous period (approx. 300 million years ago!). The sandy

A lesson in geology

deposit consolidated into a rock and eventually, through land movement and upheaval, the deposit 'resurfaced' at its present location.

Once the whereabouts of the deposit was determined (outcrops of rock provided the evidence) an exploratory evaluation of the site was performed using a drilling rig to provide core samples of the deposit.

After proving that the deposit was economically viable for extraction, Hepworth Minerals applied for planning permission, it was granted, and the plant was built in 1960.

How then do lumps of rock the size of a motor car come to be transformed into closely graded particles that resist compaction regardless of heavy feet, particles that are less likely to be blown away in windy conditions than fine sand? To begin, the overburden or topsoil is removed to expose the red sandstone deposit. Blasting then takes place to establish the quarry face, followed by continuous explosions which provide the rock feed to the plant.

Currently, such blasting occurs at two levels (producing two distinctly different rock types) and this then is blended and transported to the primary crushing plant, which reduces the rock to a size transportable by conveyor belt. Once through the crusher, which is a noisy and ominous looking machine that defies description, the rock is conveyed to a stockpile. It is then fed at a constant rate to a secondary crushing and washing plant where further size reduction takes place.

Attrition (grinding down by friction), followed by washing with water are processes used to remove the clay, silt and fine sand. Heavy mineral residues (e.g. chromite) are extracted by centrifugal action and the remaining classified sand is de-watered before progressing to a hot acid leaching plant. This hot acid process removes the surface iron (the rock begins life with a reddish brown tint) and the sand takes on its familiar white colour.

Further washing removes all traces of acid and the sand is then pumped to a screening plant, which grades it into hoppers. A final control procedure then dictates whether it can be moved to the stockpile or if further reprocessing is needed.

Not all sand produced at Moneystone is destined for use on golf courses, though it is a safe bet to say that a large percentage is produced specifically for Hepworth's authorised distributors, Martin Bros., with golf in mind – with such ideal characteristics, this is not surprising. What then are these characteristics?

The grain size lies mainly between 0.125mm and 1.0mm, a size which satisfies the recommendations as a bunker sand for inland courses and complies with the acceptable limits as defined by the STRI. Grain shape is angular, thus providing a good 'lie' and a stable firm surface which prevents 'plugging' whilst providing a good stacking angle at the bunker face – in addition, the sand has excellent resistance to windblow. Free from 'fines' the sand provides good natural free drainage which prevents 'ponding'. Always an added attraction, it has a light colour which highlights green surrounds, making the bunker visible from a distance. Finally, an important point, the sand has no shell or free lime content and will not contribute to turf disease when splashed from the bunker onto playing surfaces.

If there was a lesson to be learned from my visit to Oakamoor, it was that all bunkers sands are certainly not the same – one has only to look at some of the awful stuff used because it just happened to be cheap to realise that in sand selection, just in every other facet of good greenkeeping husbandry, you pays your money and takes your choice. The wise greenkeeper should take into consideration the consistency he seeks at his particular location, weigh the pro's and con's carefully, and remember always that there is no substitute for quality!