hypersthene-bearing coronas is unusual in a terrain where epidote- and chlorite-bearing assemblages predominate in other basic rocks. Most coronites—for example those from the Adirondak Mountains, U.S.A. (Whitney and McLelland, 1973), Norway (Griffin, 1971; Mason, 1967), and India (Murthy, 1958)—occur in granulite or upper amphibolite facies terrains. It is possible that the corona structures described here are relics of an early high-grade event that have survived the relatively low-grade regional metamorphism. However, no independent evidence of an earlier high-grade event has been found in the area. Thus it seems probable that the corona structures developed during upper greenschist to lower amphibolite facies regional metamorphism under almost dry conditions in the central part of the basic body.

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# Recently formed gypsum from Co. Wicklow, Ireland

Crystallized gypsum was found on the walls and roofs of railway tunnels south of Rathdrum, Co. Wicklow (GR T 192878). The deposit is 1 to 3 mm thick, with an intervening soot layer, and lies on hewn surfaces, indicating formation within the last hundred years or so.

The crystals are dark grey to black in colour due to the presence within individual crystals of several tens or hundreds of soot grains, not everywhere in contact with each other. The soot particles range from 3 to 150 μm across. Adjacent to the tunnel surfaces the crystals form an interlocking mass, but those standing proud of that zone have the normal tabular habit. The largest dimension, parallel to *a*, ranges from 0·3 to 1·0 mm: there is some preferred orientation with respect to the walls, the form {010} being usually perpendicular to them. Twinned crystals were not found.

Both the X-ray powder pattern and the refractive indices indicate that this is pure $CaSO_4.2H_2O$. The source of its chemical constituents, and the mechanism of its formation are both problematical.

It is unlikely that the constituents were derived by weathering and leaching of the adjacent rocks since these are acid tuffs and slates low in both calcium and sulphides; the walls of the cuttings at either end of the tunnels are, moreover, lacking in gypsum deposits. Within the tunnels its distribution is patchy (in many places it has fallen off due to vibration) but it is not confined to obvious seepage zones.

To test the alternative hypothesis, that the gypsum was derived from coal used in firing the boilers of the railway engines, an examination was made of the tunnels at Bray Head, Co. Wicklow (GR O 280175). Here the country rocks are interbedded greywackes and quartzites. Gypsum was found on the walls and roofs of all four tunnels entered, regardless of the nature of the country rock and whether and how the tunnel was lined. The gypsum here has a more pronounced prismatic habit and twinned crystals are common. These minor differences may be due to different humidity and temperature conditions, since Bray Head is on an exposed sea coast while Rathdrum is well inland.

Conclusive evidence as to the origin of the gypsum was afforded at Bray by the presence of prominent seepage zones, from which has been deposited abundant $CaCO_3$ but no $CaSO_4$. Hence the occurrence of gypsum is attributed to the use in railway engines of gypsiferous, or potentially gypsiferous coal.

The coal normally used has been Ebbw Vale steam coal, of low ash and sulphur content, but during the two world wars this supply was not always available. Instead, Arigna coal containing up to 40 % ash was used, and even briquettes made from tip-head rubbish bonded with pitch.

Gypsum is known as an impurity in coal (e.g. Hoehne, 1958), while anhydrite is a major constituent of scale and fly-ash in coal-fired boilers. This may be derived from gypsum, or by the reaction of $CaCl_2$ or $CaCO_3$ with sulphuric acid from burning pyrite (Crumley *et al.*, 1955).

It is therefore suggested that a mixture of soot, ash, and anhydrite was ejected from locomotives passing through the tunnels and adhered to the film of condensed steam on the walls and roof. Gypsification of the anhydrite then began as it dissolved till the solubility of gypsum was exceeded. The latter mineral would be the stable phase since the ambient temperature would never exceed 42 °C (Posnjak, 1938). By the continued use of the tunnels water for gypsification was always available, and the deposit continued to grow.

Such a mechanism is necessary to explain the poikiloblastic nature of the gypsum towards the soot, which was originally dispersed between anhydrite grains. Large gypsum crystals were formed due to the low nucleation rate at low levels of supersaturation. It is likely that most, if not all, of the deposit was formed during the short periods of the two world wars.

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# An occurrence of tacharanite and scawtite in the Huntly gabbro, Aberdeenshire

THE rare mineral tacharanite (Sweet, 1961), associated with scawtite, occurs sporadically in narrow fracture-filled veins in gabbro at Binhill quarry, Cairnie, Huntly. Previously, tacharanite was reported from dolerite amygdales on the Isle of Skye (Sweet, op. cit.) and hydrothermally metasomatized quartzite inclusions in basalt of the Bramburg, near Göttingen (Koritnig, 1972). In Scotland, Agrell (1965) noted scawtite from the well-established dolerite/limestone contact-type environment, at Kilchoan, Ardnamurchan; however limestone is not present at Binhill quarry.

In the quarry three types of narrow, steeply dipping, post-granite-pegmatite veins have been recognized, each consisting principally of calcite, xonotlite, or prehnite. Xonotlite (with very minor scawtite) also occurs as cavity in-fill in prehnite veins. Scawtite-rich areas appear sheared and contain xonotlite pools and transcurrent very fibrous tacharanite, or tacharanite stringers. Scawtite also forms the margins of a pink xonotlite vein. The tacharanite fibres ($n$ 1·525, perpendicular to fibre length) frequently imperceptibly merge into chlorite of the wall-rock. Plombierite could not be detected on tacharanite X-ray powder photographs although this phase was suspected during examination under the electron microscope (Gard, personal communication).

Uralitization is limited to narrow wall-rock regions of the veins and to pegmatites bearing apatite and tourmaline. One pegmatite has been altered to a 'tuffaceous' prehnite-rich area containing residual unaltered euhedral apatite, and others to zones exhibiting rudimentary parallelism of prehnite stringers. In the pegmatites hydrated calcium silicates are also present and xonotlite, white micaceous and pale blue gyrolite, and the zeolite laumontite have been identified.

Harker (1965) demonstrated scawtite genesis to be pressure-independent (up to