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J. F. Savage & J. Kriest (*).–A STEPHANIAN BAUXITE FROM OCEJO DE LA PEÑA, LEON.

Bauxite deposits have been found at the base of the major angular unconformity in the Hercynian core of the Cantabrian Mountains where Late Carboniferous rocks cut across the folded Esla Nappe (COMTE 1959; DE SITTER 1959; HELMIG 1965; RUPKE 1965).

Recent investigations have concentrated on the younger sequence and its structures elucidating features of the progressive inconformities (ALONSO 1982; IWANIW 1984) as well as back folding and slumping (KRIEST 1984; VAN DIERENDONCK 1984).

Our recent mapping has lead to the discovery of small (5-20 m^2) lenses of well-lithified 'terra-rosa-like' residual weathering deposits exclusively where the contact cuts across older Palaeozoic limestones (Caliza de Montaña and Santa Lucia Formations).

Exposures are not always clear but usually the overlying rocks are conglomeratic-debris flows-of the Cea (= Ocejo) Formation (IWANIW 1984; ALONSO 1982). Similar occurrences have also been observed by Dr. J. L. ALONSO (pers. comm.).

The material is usually brick-red, weathering to black with a texture resembling badly-made bricks. They contain many fragments of limestone and quartz as well as angular sometimes wispy shale-like inclusions.

Some pisolitic aggregates and coated fragments have been found in thin sections in which chlorite or diaspore may be the dominant mineral. Positive identification of the α-AlOOH diaspore has been made by X-Ray diffraction analysis.

The large amounts of chloritic and quartz aggregates suggest that material

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other than insoluble residue from the limestones are present. In common with most terra-rosa bauxites it would seem that a considerable proportion of the material has been transported (cf. BARDOSSY 1982).

At one locality where the contact is well exposed black, iron-rich encrustations can be seen penetrating deeply into karst fissures. The sandstone pipes and breccias reported by IWANIW (1984) can be followed to some 100 metres away from the unconformity and since the sand grains have almost certainly been derived from the unconsolidated, unconformable deposits there can be no doubt of the deep penetration of the karst weathering during the lower Stephanian.

The above mentioned exposure reveals the unconformity in a inverted position which we interpret as the result of tardi-Hercynian movements later in the Stephanian. There is no noticeable effect of post-tectonic prolongation of the karst-forming process such as reported from a number of comparably deformed bauxites (BÁRDOSSY 1982).

While the older parts of the Palaeozoic sequence include many shale intervals that could well have supplied fragments suitable to be the source of the chloritic aggregates, the textures are very suggestive of tuffaceous material. We have found an unquestionable lava in the Cea sequence only 3 kilometres from the bauxite exposures so that a local source of pyroclastic material was available during lower Stephanian times.

The field relationship indicating a Stephanian age is supported by the high diaspore content of this bauxite. BÁRDOSSY (1982) reports that 64 % of the world's known Carboniferous bauxite deposits are diasporic, all of which have been strongly deformed. While the gibbsite-diaspore transition has been experimentally and theoretically established to take place between 125 and 200°C (DELANEY & HELGESON 1978) these authors also warn that the phase relationships they derive may differ significantly from those in geological systems below 300°C. Correlations with geological age and tectonic deformation suggest that geologically slow and strain induced reaction may lower the ambient P/T conditions needed for the transition. BARDOSSY (1982) also states that «Pure chlorite and septachlorite bauxite types are most abundant in the Palaeozoic... of syn- and diagenetic origin... and therefore closely associated with the age of the deposition sequences in which they occur». This description matches the appearances of some other thin sections of these deposits. The anchimetamorphism that has effected the recrystallization of the bauxite does mot seem to exceed that which has produced an anthracitic grade in some of coals in the Stephanian of southern Cantabria (WAGNER & ARTIEDA 1971).

Karst bauxites of this type are almost always related to a Mediterranean-type climate (BÁRDOSSY 1982) which does not correspond exactly to the tropical climate deduced for the deposition of the uncomformable coal measures (IWANIW 1984). The latter interpretation is by no means firmly anchored although an equatorial position is derived for Spain in most continental reconstructions for the

Palaeozoic (e.g. SMITH *et alt.* 1981). We make a case for bauxite formation during early Stephanian times in northern Spain on grounds of mineralogical composition, structural relations and the palaeo-environment. In all these respects it differs from the deposits earlier attributed to the Devonian of Portilla de Luna (León) by CLOSAS & FONT-ALTABA (1960) and FONT-ALTABA & CLOSAS (1960) but now considered to be due to Quaternary weathering (BÁRDOSSY & FONTBOTÉ, 1977).

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