

SHORT COMMUNICATIONS

PALYNOLOGICAL EVIDENCE CONCERNING THE MIDDLE/LATE DEVONIAN AGE OF THE GREEN SANDSTONE FORMATION, MCGILLYCUDDY'S REEKS, SOUTHWEST IRELAND¹

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ABSTRACT

Van Veen, P. M. & C. J. van der Zwan 1980 Palynological evidence concerning the Middle/Late Devonian age of the Green Sandstone Formation, McGillicuddy's Reeks, Southwest Ireland – Geol. Mijnbouw 59: 405-408.

From the Green Sandstone Formation (Devonian), outcropping in the McGillicuddy's Reeks (Co. Kerry, Ireland), a palynological assemblage is recorded, indicating a late Givetian-early Frasnian age. The importance of this assemblage with regard to the establishment of a realistic chronostratigraphical framework for the Devonian of Southwest Ireland is briefly discussed.

INTRODUCTION

The 'Old Red Sandstone' in southwestern Ireland has long been known to be almost barren of fossils and the age of the sequence has always been controversial. Records are so far confined to the supposed presence of the plant *Archaeopteris hibernica* in the McGillicuddy's Reeks (WALSH, 1968) and the presence of fish remains in West Iveragh (RUSSELL, 1978), both indicating a Devonian age. No chronostratigraphical positioning on stage level, however, has ever been biostratigraphically supported.

As part of the palynological research programme in the Devonian and Carboniferous of southern Ireland in the last few years we have searched for palynologically promising lithological units. These are unfortunately very rare in the lower (Devonian) part of the succession. The Green Sandstone Formation in the McGillicuddy's Reeks has now yielded a reasonably preserved assemblage, enabling an age determination. Pending a more detailed description, in the

present communication the importance of this assemblage for the regional chronostratigraphical framework is discussed.

LITHOSTRATIGRAPHICAL FRAMEWORK

In the McGillicuddy's Reeks, a mountain range in the eastern part of Iveragh Peninsula (Co. Kerry, Ireland), a thick sequence of continental 'Old Red Sandstone' is exposed (Fig. 1, section 2) of which the lithostratigraphy was established by WALSH (1968). He recognized five formations, in ascending order:

- (1) Green Sandstone Formation: ca. 1300 m of green, chloritic, current-bedded sandstones with conglomeratic intercalations.
- (2) Grey Sandstone Formation: ca. 1000 m of purple-grey sandstones.
- (3) Lower Purple Sandstone Formation: ca. 1620 m of purple sandstones with, mainly in the lower part, conglomeratic intercalations.
- (4) Ardnapluggen Sandstone Formation: ca. 100 m of pale-green, white or buff sandstones.
- (5) Upper Purple Sandstone Formation: ca. 100 m of purple

¹Manuscript received and accepted: 1980-11-12.

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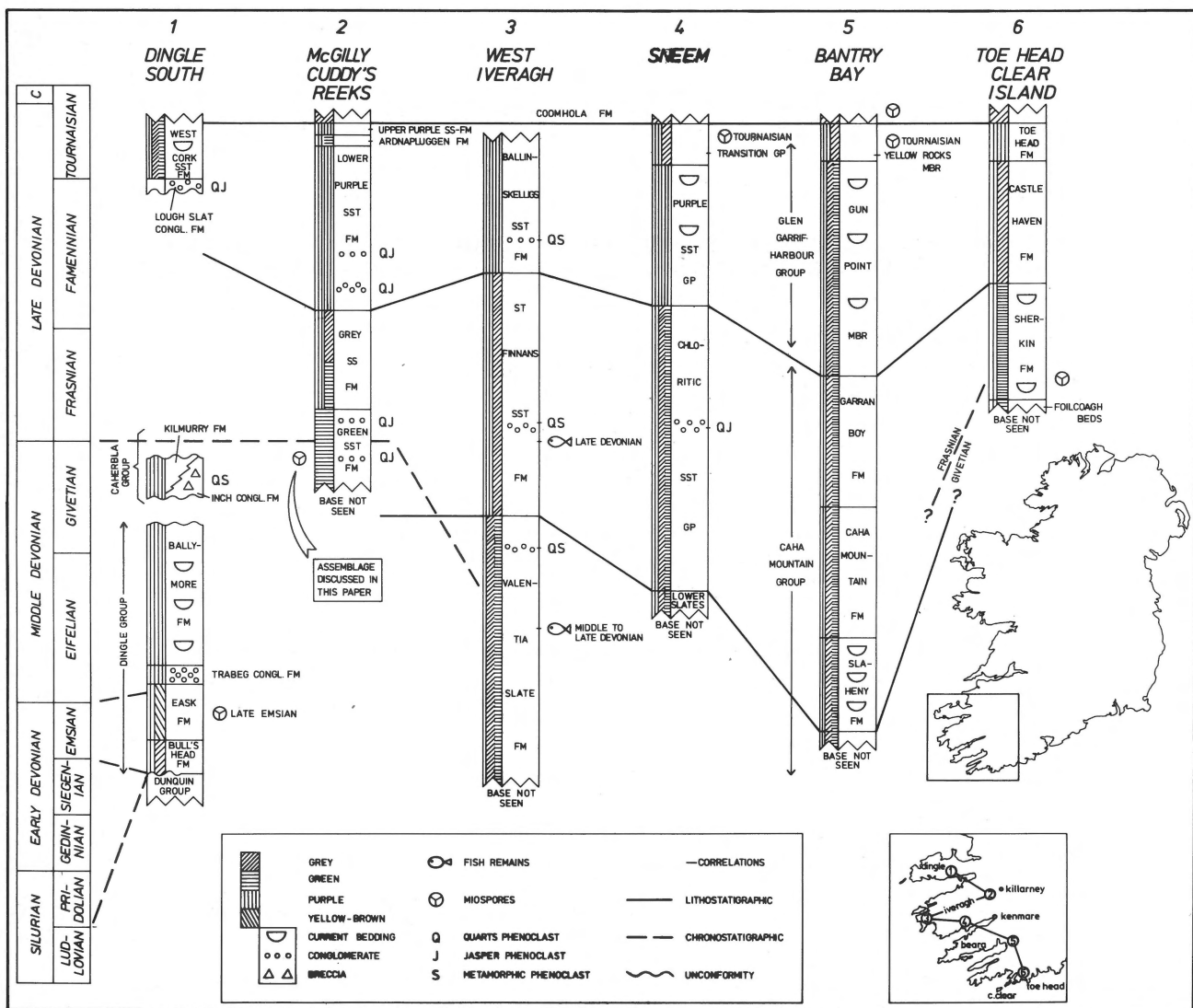


Fig. 1
Litho- and chronostratigraphical framework for southwestern Ireland. In this scheme the McGillicuddy's Reeks sequence correlates with (1) a composite sequence of South Dingle (Horne, 1974) (3) West Iveragh (Capewell, 1975; Russell, 1978), (4) Sneem (Capewell, 1957; Van Veen, unpubl.), (5) Bantry Bay (Gardiner & MacCarthy, in prep; Van der Zwan, 1980-b) and (6) a composite succession at Toe Head and Clear Island (Graham & Reilly, 1972; Reilly & Graham, 1976; Clayton & Graham, 1975).
Mainly after Capewell (1975), modified according to Horne (1974). 1 cm equals approximately 700 m.

sandstones. This formation is conformably overlain by the Carboniferous Limestone Shales.

Lithologically this sequence may be compared with those in adjacent areas. Since the descriptions of these sequences are so far very scanty, any detailed comparison still remains highly tentative. Yet, on the basis of overall characteristic features, such as current bedding, phenoclast content of conglomeratic intercalations, colour changes, and supported by comparable thicknesses of the units involved, some correlations have been attempted. We believe that the regional scheme, shown in figure 1, reasonably reflects present litho-stratigraphical knowledge.

THE PALYNOLOGICAL ASSEMBLAGE

The assemblage originates from the lower part of the Green Sandstone Formation, exposed at the Moll's Gap Quarries, halfway between Killarney and Kenmare. From this locality (grid reference 859776) plant remains, tentatively assigned to *Archaeopteris hibernica*, were recorded (Walsh, 1968).

The palynological assemblage contains, amongst other elements, the following important species: *Punctatisporites intornatus* Riegel 1968 (resembling *Archaeozonotriletes incrustatus* Archangelskaja in Mortimer & Chaloner 1974, as well as *P. parvivermiculatus* Owens 1971)

Dictyotriletes craticulus Clayton et Graham 1975
Geminospora svalbardiae (Vigran) Allen 1965
 ?*Hystriochosporites* sp. in CLAYTON & GRAHAM (1975)
 ?*Ancyrospora* sp. in CLAYTON & GRAHAM (1975)
Samarisporites triangulatus Allen 1965
Samarisporites inusitatus Allen 1965
Grandispora tomentosa Taugourdeau-Lantz 1967.

The assemblage is dominated by *Punctatisporites intornatus* Riegel 1968, *Geminospora* spp., *Ancyrospora* spp. and *Samarisporites* spp. The present assemblage is quite similar to the assemblage recorded from the Sherkin Formation by CLAYTON & GRAHAM (1975; see Fig. 1, section 6), who attributed their assemblage to the 'triangulatus assemblage' of RICHARDSON (1974). Probably due to its palaeogeographical position, *Archeozonotriletes variabilis* (Naumova) Allen 1965 is absent.

The age of the assemblage may be deduced from the range chart of selected species, composed by MCGREGOR (1979). In this scheme the age of the species has been determined independently by calibration with marine faunas. Based on the ranges of *Samarisporites triangulatus* and *Geminospora svalbardiae* the age of the assemblage may be estimated as late Givetian to early Frasnian. *Grandispora tomentosa* has been recorded from the upper Givetian and Frasnian of the Boulonnais by LOBOZIAK & STREEL (1980).

IMPLICATIONS FOR REGIONAL STRATIGRAPHY

The implications of the present age assessment for the stratigraphy of Southwestern Ireland are demonstrated in figure 1. It is seen that the succession in the McGillycuddy's Reeks most probably ranges from the late Givetian or early Frasnian into the Tournaisian; the latter age based on correlations with dated sections at Sneem (Van Veen, unpubl.) and Bantry Bay (VAN DER ZWAN, 1980b). A more or less similar age for the lower part of the sequence in West Iveragh may be deduced from the work of RUSSELL (1978). Although this author dated the Valentia Slate Formation by means of fish remains (*Bothriolepis* sp.) as Late Devonian, this age may be extended to Middle Devonian (WESTOLL, 1979). The record of *Sauripteris* sp. in the St. Finnans' Formation by RUSSELL (1978) indicates a Late Devonian age for the lower part of this formation. A Middle to Late Devonian age (Givetian-Frasnian) has also been estimated by CLAYTON & GRAHAM (1975) for the lower part of the Sherkin Formation at Clear Island.

Sedimentation of the Green Sandstone Formation might well be coeval with that of the Caherbla Group (HORNE, 1974) at South Dingle. Based on its unconformable superposition over the Dingle Group, of which the Eask Formation has been dated palynologically as late Emsian (VAN DER ZWAN, 1980-a), the position of the Caherbla Group might suggest a late Middle Devonian age.

Integration of litho- and chronostratigraphical data leads

to the following depositional history for Southwest Ireland: (1) late Early to early Middle Devonian: deposition of the Dingle Group at south Dingle, followed by a hiatus; (2) late Middle-early Late Devonian: sedimentation of the Caherbla Group on South Dingle, followed by a hiatus; elsewhere in southwestern Ireland sedimentation of the Green and Grey Sandstone Formations, Valentia Slate and St. Finnans' Sandstone Formations, Lower Slates and Chloritic Sandstone Formation, Caha Mountain Group (GARDINER & MACCARTHY, in prep.) and the Sherkin Formation; (3) late Late Devonian: after a hiatus at South Dingle sedimentation of the Glengariff Harbour Group (Lough Slat Conglomerate Formation); elsewhere continuous sedimentation up to the Tournaisian (Glengariff Harbour Group, GARDINER & MACCARTHY, in prep.).

The chronostratigraphical framework here established may form the basis for further interpretation of the 'Old Red Sandstone' of this area, e.g. in terms of sedimentation patterns and sequences (cf. ALLEN, 1979; GARDINER & MACCARTHY, in prep.).

ACKNOWLEDGEMENTS

Thanks are due to Dr. H. Visscher, who constructively criticized our manuscript, and to Dr. P. R. R. Gardiner (Dublin) and Dr. I. A. J. MacCarthy (Cork) for the communication of their manuscript. The drawing was skilfully prepared by Mr. H. Jansen. The Niels Stensen Stichting (Amsterdam) is gratefully acknowledged by P. M. van Veen for important financial support during the academical year 1978/1979.

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