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New Palynological investigations in the Paleozoic of Saudi Arabia and adjoining areas (Saudi Aramco – CIMP Joint Project)

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Palynological investigations of the Paleozoic rocks of Saudi Arabia have developed in parallel with the growing need for detailed understanding of the complexities of subsurface stratigraphy, in order to meet the demands of hydrocarbon exploration activities in the Kingdom. Pioneering work of early palynologists in Saudi Aramco since the 1960s demonstrated the presence of exceptionally abundant and well preserved assemblages of fossil microplankton and spores of primitive vegetation and their huge potential for establishing reliable operational biozonations (e.g., Hemer and Nygreen, 1966). A major impetus for further development and refinement of palynological biozonations followed the important hydrocarbon discoveries from Saudi Arabian Paleozoic successions during the late 1980s and the 1990s, with an increased need for an improved understanding of the Paleozoic sediments, and their geological and paleogeographical relationships to successions in neighboring countries and adjacent plates. A successful, long-term collaboration between Saudi Aramco and academic researchers belonging to the CIMP (Commission Internationale de Microflore du Paléozoïque) started in 1990 with the aim of tackling the monumental task of documenting in detail the palynostratigraphy of the Palaeozoic of the Kingdom of Saudi Arabia and building a reliable, high-resolution palynostratigraphic scheme that could be used for oil exploration operations. In return, the academic partners benefit from access to rich and well preserved palynological material from subsurface and outcrop locations in Saudi Arabia (otherwise inaccessible), and from the permission to publish their research on this material.

Results of the project have been presented at numerous scientific conferences worldwide and published in a series of thematic issues in scientific journals and books (i.e., Owens et al., 1995; Al-Hajri and Owens, 2000; Paris et al., 2007; Wellman et al., 2015), which testify to the success of the collaboration. Major achievements include the establishment of a robust and detailed biostratigraphic zonation of the Cambrian to Permian strata for in-house use (Saudi Aramco Operational Zonation) as well as a number of important scientific discoveries, such as the oldest known spores from primitive land plants (Steebans et al., 2009; Strother et al., 2015) and the description of numerous new taxa of Paleozoic microplankton and spores (e.g., Al-Ruwailii, 2000; Breuer et al., 2007; Paris et al., 2015).

The present contribution is the Fifth in the series of these thematic issues and includes eight research papers covering different aspects of application of palynology in the Paleozoic of the Arabian Plate, such as the early evolution of land plants (Taylor et al., 2017 and Vecoli et al., 2017 – in this volume); Middle Ordovician acritarch biostratigraphy and paleoecology (Le Herisse et al., 2017 – in this volume); chitinozoa biostratigraphy of Upper Ordovician strata (Al-Shawareb et al., 2017 – in this volume); the taxonomy and paleoenvironmental significance of an upper Silurian marginal marine palynological assemblage (Breuer et al., 2017 – in this volume); the paleobiogeography of Devonian spores (Marshall et al., 2017 – in this volume); the development of a new optical method for assessing thermal maturity of sedimentary organic matter (Clayton et al., 2017 – in this volume); and the assessment of the

duration of the hiatus associated with the Hercynian unconformity in western Iraq (Stephenson et al., 2017 – in this volume).

We believe that the present studies further contribute to the detailed understanding of the Paleozoic Stratigraphy of the Arabian Peninsula and can find useful applications in the exploration for new hydrocarbon resources in the area.

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