

LATE JURASSIC–EARLY CRETACEOUS FAUNA, BIOSTRATIGRAPHY, FACIES AND DEFORMATION HISTORY OF THE CARBONATE FORMATIONS IN THE GERECSE AND PILIS MOUNTAINS (TRANSDANUBIAN RANGE, HUNGARY)

Motto

*„Humpty Dumpty sat on a wall,
Humpty Dumpty had a great fall.
All the king's horses and all the king's men
Couldn't put Humpty together again.”*

(Old English nursery rhyme)

*Tojás Tóbiás a falra ült
Tojás Tóbiás lependerült.
Hiába száz ló, száz katona,
Tóbiást nem szedik össze soha.*

(Hungarian translation: István Tótfalusi)

Preface

The Gerecse and Pilis Mountains run for about 40 kilometres NW from Budapest, south of the River Danube. They form a part of the Transdanubian Range, often recorded as the Transdanubian Central Range, which also constitutes the Vértes and Bakony Mountains towards the southwest. The main part of these low hills consists primarily of Upper Triassic dolomites and Dachstein Limestone. The Jurassic is variable but generally reduced in thickness and in most cases is situated on the top of the hills. The Lower Cretaceous is missing or very reduced, except in the vicinity of Lábatlan, where a thick Valanginian to Barremian siliciclastic

succession is extensively quarried for cement production purposes.

It was Miksa Hantken (1821–1893), the great pioneer of Hungarian geology, who made the first steps towards the better understanding of the Mesozoic formations of the Gerecse Mountains. Although Hantken focussed his attention on Eocene coal – that time it served as an important raw material – he also provided details on the Triassic, Jurassic and Cretaceous rocks (Hantken, 1868, 1872). The first detailed description of Jurassic formations was given by the early geologist, Károly Hofmann (1839–1891) who collected fossils systematically and recognised different Lower Jurassic rocks and

facies in the western part of the Gerecse and also gave the first detailed description of the Upper Jurassic–Lower Cretaceous Paprét Ravine Section (Hofmann 1884).

The next stage of Jurassic research in the Gerecse Mountains can be characterised by the intensive work of Gyula Vigh (1889–1958) and Gusztáv Vigh (1920–1984), father and son, who spent entire field seasons collecting fossils, especially brachiopods and ammonites and prospecting in the region. As a result of their long collecting campaigns and intensive field work, literally chests of ammonites and ten thousands of brachiopods (mainly Liassic ones) were transported into the repositories of the Geological Institute. Their experiences and research was summarised in a series of papers, including short notes (Gy. Vigh 1925, 1935, G. Vigh 1953a, 1953b, 1961b), detailed stratigraphical and paleontological descriptions and review papers (Gy. Vigh 1940, G. Vigh 1961a, 1981, 1984), and a series of excursion guides and geological map explanatories (Gy. Vigh 1928, G. Vigh 1968, 1969a, 1969b, 1971).

Towards the end of the 1970s the state-financed National Key Section Program was launched, coordinated by the late József Fülöp (1928–1994) and János Haas. Within the scope of this project numerous Jurassic sections were carefully sampled bed by bed in the Gerecse Mountains under the supervision of József Konda (1929–1995). The first, mainly biostratigraphic results on this project were summarised in a series of unpublished reports by András Galács and István Főzy, which are deposited in the Hungarian Geological Institute and in one research paper by Főzy (1993).

Although the National Key Section Program finished, the increased interest towards the Jurassic of the Gerecse remained. Projects, supported by the National Scientific Research Fund (OTKA) were launched and in the 1990s, and remapping of the Gerecse Mountains also started. The first results of this renewed interest were published in a thematic volume of the *Bulletin of the Hungarian Geological Society (Földtani Közlöny)* in 1998. Five of the published ten papers were dedicated to Lower Jurassic stratigraphy and palaeontology and mineralogy (Szabó 1998, Szente 1998, Dulai 1998, Rezessy 1998, Koritár et al. 1998); one paper gave the first insight into the radiolaria stratigraphy (Dosztály 1998); one article summarised the result on Late Jurassic pygopid brachiopods (Kázmér 1998); a further paper discussed the Liassic brittle structures (Fodor, Lantos 1998); while Császár et al. (1998) gave a review on the Jurassic facies of the Gerecse and its Alpine analogies. A study

on the Late Jurassic–Early Cretaceous bivalve assemblages, including those which are from the Gerecse, were summarised subsequently by Szente (2003).

Many of the latest papers on the Jurassic of the Gerecse and Pilis Mountains concentrate on the sedimentological and/or structural evolution of the area (Lantos 1997, Bárányi 2004, Palotai et al. 2006, Sasvári 2008a, 2008b, Horányi et al. 2010). Most of these papers benefitted from the recent re-mapping of the region – a project jointly performed by researchers of the Hungarian Geological Institute (today: Hungarian Geological and Geophysical Institute) and of the Eötvös Loránd University, Budapest.

The present volume is intended to sum up the recent knowledge on the Upper Jurassic–Lower Cretaceous carbonate formations of the territory. Therefore the aim of this study is:

(a) to provide an accurate and updated biostratigraphy for the ammonite rich Upper Jurassic–Lower Cretaceous (Oxfordian–Berriasian) formations of the Gerecse and Pilis Mountains on the basis of the macro- and microfauna;

(b) to document the diverse fossil content of the studied sections, with special focus on ammonites, belemnites, brachiopods and bivalves;

(c) to narrow the age of the radiolarite from above, on the basis of the age of the overlying ammonite rich beds;

(d) to document and to date the Upper Jurassic and Lower Cretaceous resedimented horizons (slumped layers, breccias, olistoliths) within the succession;

(e) to provide an appropriate model for sedimentation and basin evolution for the region and period in focus.

Geology can be local, or regional, but palaeontology, especially the study of an ancient pelagic biota such as the Late Jurassic–Early Cretaceous one, always requires a wider geographical context. This aspect is also reflected in the list of authors of this monograph as the 11 contributors represent 5 countries. These colleagues discussed the details and shared their knowledge on the subject with unbroken enthusiasm and the results of their joint effort is presented herein.

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