

**BRACHIOPOD FAUNULE AND PALAEOENVIRONMENT OF A KOESSEN-TYPE  
INTERCALATION IN THE DACHSTEIN LIMESTONE OF WESTERN TOTES GEBIRGE  
(UPPER AUSTRIA)**

**BRACHIOPODEN-FAUNULA UND ABLAGERUNGSBEDINGUNGEN EINER EINSCHALTUNG  
VOM TYP DER KÖSSENER SCHICHTEN IM DACHSTEINKALK DES WESTLICHEN TOTEN  
GEBIRGES, OBERÖSTERREICH**

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**ZUSAMMENFASSUNG**

Dem lagunären Dachsteinkalk sind östlich von Bad Ischl, insbesondere am Südwestabfall der Hohen Schrott zum Rettenbachtal sowie bei der Knerzenalm im oberösterreichisch-steirischen Grenzgebiet, gelegentlich dm bis mehr als 1m mächtige Bänke von grauen bzw. bräunlichen Kalken vom Typ der Kössener Schichten eingeschaltet. Aus einer dieser Kössener Lagen südlich der Knerzenalm wurde von Rosenberg (1969) eine Makrofaunula bekannt gemacht, woraus er u. a. auch eine „*Rhaetina* .... entweder *gregaria* (Suess) oder *gregariaeformis* (Zugmayer)“ erwähnt. Neuaufsammlungen lieferten nun die Bestätigung, dass es sich um *Rhaetina gregaria* (Suess) handelt. Vermutlich widerspiegeln diese Einschaltungen vom Kössener Typ ein eingeschränktes, vielleicht ein stagnierendes Palaeoenvironment im ansonsten zyklisch gebankten lagunären Dachsteinkalk.

**ABSTRACT**

Intercalations of Kössen-type marly limestone into the well-bedded lagoonal Dachstein Limestone sequence are a characteristic feature for part of the western Totes Gebirge, e. g. on the SW foothills of Hohe Schrott mountain range, in Rettenbachtal and in the Knerzenalm surroundings on the border of Upper Austria and Styria. From the later occurrence Rosenberg (1969) described a *Rhaetina*, however, he was not sure about its taxonomic affiliation – either *gregaria* (Suess), or *gregariaeformis* (Zugmayer). Recent findings, however, confirmed the presence of *Rhaetina gregaria* (Suess). Most probably the intercalations of Kössen-type marly limestones represent a restricted, probably occasional stagnant environment in the otherwise cyclic bedded lagoonal Dachstein Limestone sequence.

**INTRODUCTION**

A peculiar facies development of well-bedded lagoonal Dachstein Limestone showing intercalations of marly limestones of Kössen-type is characteristic for part of the western Totes Gebirge (Zapfe 1949, Leischner 1959, Schöllnberger 1967, Rosenberg 1969, Schäffer 1974 and Mandl 1982).

Wegerer & Gawlick (1998) studied the well-exposed lagoonal Dachstein Limestone in the quarry of „Gmundner Zementwerke“ nearby Ebensee. Several meters thick black marly limestones and marls of Kössen type with *Rhaetavicula* sp. and other biota are intercalated within the otherwise „normal“ lagoonal Dachstein Limestone. According to Wegerer & Gawlick these layers mark the Norian/Rhaetian boundary. From the palaeoenvironment point of view they consider a restricted carbonate production as a consequence of pronounced clastic input and/or a climatic change to be responsible for the marly intercalations of Kössen type.

Also the Kössen-type intercalations of western Totes Gebirge show a thickness from a few dm up to more than 1m. Due to their lithology – marly limestones of medium- to dark brownish-grey colour and characteristic yellowish weathering colour – these Kössen-type intercalations are very conspicuous in the field and liable to pronounced weathering. Exposures are known on the southwestern foothills of Hohe Schrott mountain range, in the Rettenbach valley east of Bad Ischl and along the forest road between Knerzenalm and Pitzingmoos (Rosenberg, 1969 and present paper). A well-known example of such a pronounced weathered intercalation of Kössen-type is the „Kühlloch“, a stratabound cave-entrance in the Rettenbach valley.

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The first information about the brachiopod occurrence in the intercalations of Kössen facies in the Dachsteinkalk near the forest road from Knerzenalm (Fig. 1, 2) towards Pitzingmoos (N47°40'38", E13°43'37") comes from Rosenberg (1969, p. 19). He reported a yellowish weathered brownish-grey marly limestone with a fossil-rich Rhaetian coquina from there, where „ mit *Lima* zusammen kommt eine *Rhätina* vor, entweder *gregaria* (Suess) oder *gregariaeformis* (Zugmayer), die zu scheiden das Material nicht zulängt....“. Mandl (1982) collected brachiopods at this Rosenberg's locality and determined them as *Rhaetina gregaria*. According to his personal communication (2003), the internal features of the material were not studied.

Our sampling at this locality yielded in the year 2002 except pelecypods not very well preserved terebratulids only, which all proved, based on the study of the internal characters, to be *Rhaetina gregaria* (Suess).



**Fig. 1: Location of the sample point.**

Concerning the palaeoenvironment of these Kössen-type intercalations within the Dachstein Limestone we assume, that local stagnant environments caused this type of slightly bituminous marly limestones. However, it cannot be ruled out, that the changing palaeogeographic situation close to the Tr/J-boundary was responsible for this type of sediments. Monotypical occurrence of *Rhaetina gregaria* near Knerzenalm may refer to "Rhaetina-Biofazies" sensu Golebiowski (1991) with brachiopods living on flat subtidal, and representing thus the shallowest Upper Triassic brachiopod facies. As to lithostratigraphy, Golebiowski's "Rhaetina-Biofazies" developed in the middle and upper parts of the Hochalm Member (Upper Norian).



**Fig. 2: Outcrop situation.**

## PALAEONTOLOGY

**Terebratulida** Waagen, 1883

**Dielasmatidae** Schuchert, 1913

**Rhaetina** Waagen, 1882

*Rhaetina gregaria* (Suess, 1854)

Figs. 3-4

1854 *Terebratula gregaria* Suess - Suess, p. 42, Pl. 2, Figs. 14-15 (Fig. 13 = *Triadithyris gregariaeformis* (Zugmayer)).

1963 *Rhaetina gregaria* (Suess) - Dagys, p. 143, Pl. 21, Figs. 14 -19, Text-Fig. 63.

1977 *Rhaetina gregaria* (Suess) - Pearson, p. 35, Pl. 4, Figs. 1-13, Text-Figs. 10-11 (cum syn.).

1993 *Rhaetina gregaria* (Suess) - Sandy & Stanley, p.468, Pl. 3, Figs. 7-22, Text-Figs. 15-16.

2001 *Rhaetina gregaria* (Suess) - Siblík, p. 30 (cum syn.).

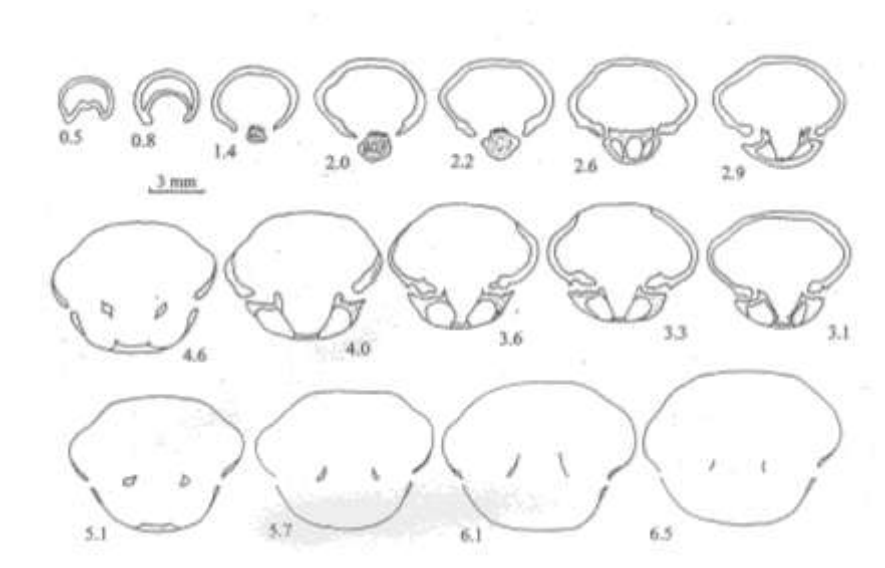
**Material:** 30 fragmentary specimens. The dimensions of the best preserved ones are 20.8 x 19.8 x 9.3 mm and 19.5 x 19.8 x 6.5 mm (Fig. 3) and of the sectioned one 18.2 x 16.0 x 9.2 mm.

**Remarks:** Nothing can be added to the detailed descriptions of the external and internal characters of the species and their variability, which were given by Dagys (1963) and Pearson (1977). The anterior commissures of our specimens are mostly slightly flexing only, prevailing part of the material belongs to juvenile specimens. The serial sections through our specimens showed typical *Rhaetina* character and agree well with sections figured in Dagys' and Pearson's papers. Septalial plates (inner hinge plates) are fused with valve floors separately in our figured specimen similarly as in sections published by Pearson (1977, Text-Figs. 10 and 11). Another our specimen showed septalial plates united on top of median ridge into a „septalium“ (like in Dagys, 1963, Text-Fig. 63, and in Sandy & Stanley, 1993, Text-Figs. 15-16). Differences in development of septalial plates are well acceptable as usual internal variation.

**Distribution:** Norian and Rhaetian, common in the Kössen Beds. All literary data about occurrence in the Liassic rocks need modern revision.



Fig. 3: A, B: *Rhaetina gregaria* (Suess). Knerzenalm. Magnified x 1.75. Photos J. Brozek, Prague.



**Fig. 4:** *Rhaetina gregaria* (Suess). Knerzenalm. Serial transverse sections through the posterior part of shell. Original length of specimen 18.2 mm. Magnified.

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