

contested with justice that the Kössen strata were marine equivalents of the Upper Keuper, and a quite distinct formation from the Gresten strata and the limestone with Liassic Ammonites at Enzesfeld and Hörnstein. In the same paper, Merian reported some additional Austrian localities where true St. Cassian fossils occurred—at Telfs, in the Lavatsch Valley, and at Haller Salzberg.

In the autumn of 1854, Gümbel commenced his investigations in the south-west Bavarian Alps and the adjacent parts of Vorarlberg and North Tyrol, and his first memoirs appeared in the *Jahrbuch* in 1856. They afforded valuable information on the tectonic relations and palæontological sub-division of the Cretaceous deposits in those Alpine areas. Gümbel showed that four quite different horizons of Triassic, Liassic, and Tertiary shales had been thrown together under the name “Flysch,” applied by Schafhäütl and other authors.

In the summer of 1857, the memorable geological tour of the North Tyrol and Vorarlberg Alps took place, in which Hauer, Richthofen, Fötterle, Gümbel, Pichler participated, and were for a few days joined by Escher von der Linth and Cotta. The geological survey of Vorarlberg was then assigned to Richthofen, who had also to draw up the combined report. Gümbel was to provide the supplementary data from the Bavarian Alps.

Richthofen demonstrated in the first instance that the thickness of the Triassic deposits diminishes very perceptibly when followed from east to west, and is very much reduced in the Vorarlberg. He then presented in tabular form the parallelism of the Triassic sub-divisions at different parts of the Alps :—

	VORARLBERG.	EASTERN TYROL.	SALZBURG.
Lias.	9. Upper Dachstein limestone.	Upper Dachstein limestone.	Upper Dachstein limestone.
	8. Kössen strata.	Kössen strata.	Kössen strata.
	7. Lower Dachstein limestone.	Lower Dachstein dolomite and limestone.	Lower Dachstein dolomite and limestone.