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100 YEARS AFTER PIERRE TERMIER'S DISCOVERY OF THE TAUERN WINDOW: WHAT LESSON SHOULD WE LEARN ?

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The discovery of the Tauern window by Pierre Termier during his short stay at the International Geological Congress (Vienna 1903) field trip was a milestone in the geological study of the Eastern Alps. Termier's discovery came as a consequence of a new "nappe hypothesis" wave, introduced by M. Bertrand, H. Schardt, M. Lugeon and others in the Central and Western Alps. Termier's paper, the Tauern core of the Eastern Alps was widely regarded as the oldest (Paleozoic). This theory was unfortunately lastly published just in 1903 by Carl Diener in "Bau und Bild der Alpen" in the large publication "Geologie von Österreich" edited by Eduard Suess. But Termier's "veni, vidi, vici" was not that simple like nearly all the textbooks inform us. We will deal with this history in more detail in the following.

Termier probably came to the IGC pre-excursion led by Franz Becke in the Zillertal in July 1903 already prepared for the revolution. He was in close contact with other proponents of the nappe theory, mainly with Maurice Lugeon. And it was just Lugeon in 1902, who – without any visit(!) – destroyed Victor Uhlig's theory about the geological evolution of the West Carpathians and completely reinterpreted the structural history of the Tatra Mts. Victor Uhlig was at that time a leading person of the Austrian geology and follower of Eduard Suess as a professor of geology at the Vienna University. Moreover, Lugeon's paper about the West Carpathians was full of basic mistakes. Lugeon did not read carefully Uhlig's papers and overlooked the Eocene (Lutetian) transgression on the nappe edifice that he regarded as a post-Eocene one, similar to the Swiss Alps. After this, Lugeon, in summer 1903, also visited the IGC pre-excursion in the West Carpathians. His discussions with Uhlig were very sharp. Lugeon, therefore, discredited the new theory by this incredible mistake. Many of the followers of the new nappe thinking were, moreover, self confident and ready to fight. So this was the situation just before the Congress in summer 1903.

Termier came to the Zillertal excursion to find proves for the nappe theory. He saw immediately that the "Kalkphyllites" regarded as Paleozoic are in fact identical to the French "schistes lustres," known to him as being Mesozoic or Cenozoic in his French Alps. Moreover, he saw the arching structure of the Hohe Tauern and deduced that these, in fact, are the lowermost nappes of the whole edifice. He discussed the matter with Franz Becke, who helped him a lot in understanding the petrography of Tauern rocks. Termier informed already the Congress participants about his observations and similarly Lugeon made it about the Carpathians. Both presented also basic information about the nappe evolution of the Western and Central Alps. Later, Termier informed in November 1903 the French Geological Society about his new interpretations and all was published in April 1904.

The main recognition of the Tauern window as a tectonically lowermost structure of the Eastern Alps was correct and started an extremely fruitful era of the Alpine research in Austria. But the publication was full of mistakes in geological detailes. Only one field trip and the study of literature in German (!) were not adequate to the complicated problems. Termier unfortunately visited also the Semmering area during other field trip and his parallelization of the Semmering unit with Permo-Carboniferous "Zone de Vanois" of the Western Alps in the same article was highly incorrect. This story was immediately sarcastically commented by W. Hammer. Diener answered to Termier by a new paper published in Stuttgart and Franz Kossmat criticized heavily the "traineau ecrasseur" hypthesis of Termier that the Southern Alps after the overcome of the Tauern are now presented as a part of the Northern Limestone Alps. Kossmat and Hammer were completely right. Would it be today, the Lugeon´s paper about the Carpathians and the Termier´s paper about the Eastern Alps would be by reviewers regarded most likely as not suitable for publication.

However, Eduard Suess and with him also Victor Uhlig decided during 1905–1907 to accept the new theory. It was an incredible testimony about the psychic and mental spirit of more than 75 years old Suess. The nappe theory and Tauern window are already part of his third volume of the"Antlitz der Erde". Also Uhlig was not bitter more than two years after the hard controversy with Lugeon. He visited critical locations of the new theory in Switzerland, discussed with proponents and accepted. Suess and Uhlig both developed the basic division of the nappes in the Alps. Their "Ostalpine" and Lepontine (today Penninic) nappes division is widely accepted until today. The influence of both on the young generation of Austrian geologists was enormous. Eduard Suess´s son Franz Eduard Suess and students of Uhlig like L. Kober and F. Trauth were convinced proponents of a new theory. The fights between old and new, however, lasted for another 40 years. W. Hammer remained unconvinced. All the time he criticized the technical impossibility of the new theory. Otto Ampferer and he proposed different mechanism for the nappe edifice structure. Their "Verschluckung Theorie" was never widely accepted by Alpine geologists.

Leopold Kober and his student Alexander Tollmann were uncritical fans of the Termier´s genius. They followed his theory until seventies and eighties of last century. In the meantime, however, it was found that the situation with the Tauern window is not that simple. Ronald Oxburgh´s (1968) discovery of young – Neogene – metamorphic age of the Tauern rocks changed the situation completely. Plate tectonics later in 1968 confirmed that Ampferer and Hammer were right and that "traineau ecrasseur" concept of Lugeon and Termier were wrong. Jane Selverstone – student of Clarke Burchfiel at MIT - later applied her teacher´s theory of extensional nappes to Tauern in 1985 and a new – non compressional concept - started.

So what is the lesson from this history? On must be prepared for new discoveries as Termier and Lugeon were. One must be courageous enough, self confident and lucky and stay in the right moment at the right place. One must publish quickly regardless of small details. (These were nearly all wrong by both). How similar is this history with nearly contemporaneous Alfred Wegener story about continental drift. How similar with Joe Tuzo Wilson discovery of the plate tectonics and hot spot theory in early sixties of last century.