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An unexpected treasure – the personal and handwritten notes of the Austrian mineralogist and petrographer Friedrich (Johann Karl) Becke (1855-1931)

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Friedrich Becke's notebooks are witnesses of his remarkable and multifaceted scientific oeuvre. But he left his complete set of publications without any direct hint towards these handwritten documents. Geoscience owes the following discoveries to Friedrich Becke: the theoretical knowledge about crystal classes, the further development of the research regarding feldspars, the technical development of microscopes, and the geological investigation of the Waldviertel, the Sudeten and the Alps. His most significant discovery was the "Becke Line". This line is also being used today to assess two different solid minerals with different light refractions. Friedrich Becke successfully connected the geoscientific topics of mineralogy, petrology and geology through observations of nature and the resulting theories. Its importance in mineralogy and especially in the fundamental insights of feldspars through observations with the microscope has been repeatedly emphasized in scientific literature. The fundamental insights documented in the study of the Waldviertel rocks are still reported in the literature. In the area of crystalline schists and the findings of metamorphic rocks Becke is considered one of the pioneers within the field of petrography. His fundamental epistemic knowledge of the Alps – Eastern and Western Tauern Window – find in today's literature little to any attention. Friedrich Becke embarks on a steep career in the areas of mineralogy and petrography, and intensively deals with practical and theoretical geological subjects of his time.

The notebooks of Friedrich Becke are content rich documents, and are evidence of Becke's extensive and varied research. His notices about his fieldtrips in the Alps are generated in between twenty years, between 1892 and 1912 and are documented in different styles as notebooks, field books and laboratory books. In specially bounded linen books (field books), his field observations are recorded in reports and some with colored cross sections. Between 1893 and 1903 he filled 18 field books and three notebooks containing his research in the Eastern Alps. Together with the geographer Ferdinand Loewl (1856-1908) he examines the rocks and geological formations of the Southern Alps of Predazzo and the geological structure of the Zillertal Alps. In 1894, the Commission of the Academy of Sciences approved the first petrographic study of the Zentralkette of the Eastern Alps. Three regions were explored by three scientists - Friedrich Martin Berwerth (1850-1918), Johann Ulrich Grubenmann (1850-1924) and Friedrich Becke. Friedrich Becke conducted research in the eastern and western Tauern Window. The documentation describes his visits in the area of the Zillertal and the Tux Hauptkamm with further studies in the Brenner area extending over 10 years between 1893 and 1903. His active participation in the 9th Geological Congress in Vienna can be seen as a research highlight and also as completing the work in the Zillertal and the Tux Alps. The petrographic laboratory studies of the rocks of the Zillertal Alps led Becke to fundamental discoveries in the field of crystalline schists and metamorphic rocks. The second petrographic-geological study was conducted on the northern and eastern edge of the Hochalm Massiv 1906-1908 together with the geologist Viktor Uhlig (1857-1911). In 1912, Becke summarizes the fundamental discoveries resulting from his fieldtrips in the Alps and published them in the Gazette of the Academy of Sciences in Vienna. These two areas of research – Zillertal and Tuxer Alpen respectively

Hochalm Massiv – have established the Tauern Window in the Alps and given it a firm place in Alpine geology.

With his petrographic research and the resulting findings, Becke sets the basis for future discussions of this interesting area. His publications are objective reports of his petrographic studies with a summary of the types of rocks, their occurrence in the area and their chemical composition. Personal notes from the field diaries about the weather, the terrain, the quarters and the encounter with people are not part of his publications.

