

# Anniversaries

Born 200 years ago



## Adolphe von Morlot's (1820-1867) Quaternary and Pleistocene – points of confusion

Marianne Klemun (Vienna)

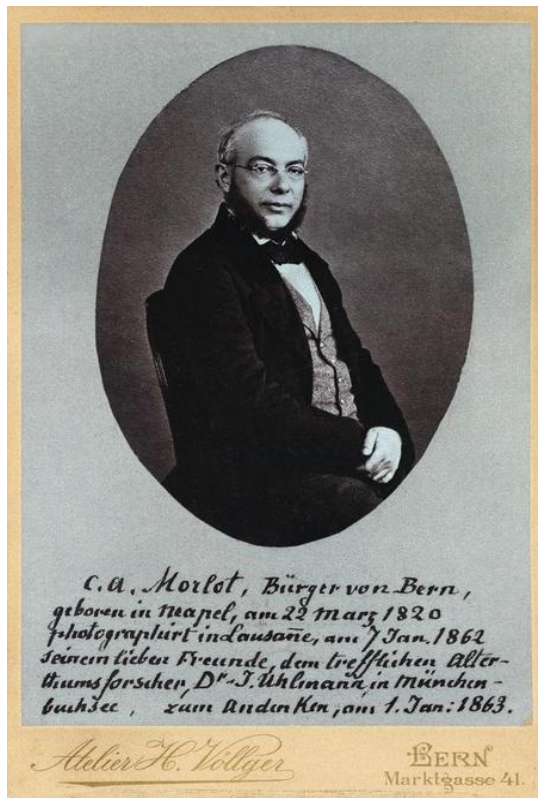


Fig. 1: Portrait of Adolphe von Morlot (Wikimedia Commons)

Reforms of periodization constitute a vital element in geology, with a recent controversy being that concerning the subdivision of the Cenozoic Era. The controversies centring on nomenclature and the adoption of certain terms such as Paleogene and Neogene – in preference to the terms Tertiary, Quaternary, and Pleistocene – provide ample illustration (Gibbard et al. 2005). As is well-known, the terms Quaternary and Pleistocene were coined in the nineteenth century. In the course of time, however, they have been associated with various concepts and meanings. Both existed in parallel. Arising from the present controversies about the term Quaternary as a chronostratigraphic unit, as early as 1998 William Berggren stressed the necessity of looking at the histories of the terms and analysing their specific connotations and their various contemporary levels of meaning: “[w]hat appears to be absent from the debate is an awareness of the history and variability of the terms in question, that might suggest points of view that are not apparent from the trenches” (Berggren 2005, p. 1). Thus, discussing the introduction and establishment of the term Quaternary and its range of meanings in a comparative way seems to be a worthwhile exercise.

The term Quaternary (*Quaternaire ou Tertiaire recent*) was proposed by Jules Pierre François Stanislaus Desnoyers (1800–1887) in 1829 as the fourth, and final, subdivision of the previously established threefold subdivisions of the geological record (Primary, Secondary and Tertiary), for the rocks in the Loire–Touraine Basin and Languedoc, which were demonstrably younger than those of the Seine–Paris Basin (Desnoyers 1829).

Desnoyers coined the term ‘Quaternary’ to describe a sequence of rocks apparently younger than what were then regarded as the youngest Tertiary deposits. He discovered that the marine sand (known as *Faluns*), which was filled with sea-shells and coral, and the marls near Tours in the Loire Basin, overlay a fresh-water deposit that constituted the highest sub-division

of the Paris group and extended without further sub-division over the plateau between the Seine and Loire Basins. That was the starting-point for the argument that a new stratigraphic category (or unit as we would say) had to be defined. The name and meaning of the term were quickly adopted, though subsequently modified.

Nevertheless, in several texts, Adolphe Morlot is mentioned in various contexts as far as his involvement with the initial use of the term Quaternary is concerned. William Sarjeant simply asserted that Morlot was the ‘originator of the term “Quaternary”’ (Sarjeant 1980, 3, p. 1751), not mentioning others before Morlot at that point in his bibliography. Moreover, Sarjeant failed to state what Morlot *meant* by the term. In the introductory part of his chapter on Quaternary geology in his *Geschichte der Geologie in Deutschland (History of Geology in Germany)*, Otfried Wagenbreth emphasised that the ‘most recent layers of the surface of the earth were called Quaternary by the Swiss scholar A. v. Morlot as an extension of the term “Tertiary”’ (Wagenbreth 1999, p. 117). In the *Geschichte der Geologie und Paläontologie (History of Geology and Palaeontology)* by Karl Alfred Zittel (1899) it was briefly stated that: ‘in 1839, Lyell suggested the term Pleistocene for Buckland’s Diluvium; in 1854 Morlot’s suggestion was Quaternary’ (Zittel 1899, p. 717).

I am not arguing from the vague statements cited above that it was Morlot who gave the term ‘Quaternary’ an ‘official’ character, or, less dramatically, that he was responsible for coining the name in 1854: the term Quaternary had already been accepted in German textbooks (Morlot 1854). In that same year, for example, Carl Vogt, in an overview in his geology textbook (Vogt, 1854), gave the Pleistocene Era a further name, that of *Quaternary formations* (tidal deposits, loess, erratic phenomena) (Vogt 1854, p. 624). However, Edward Forbes [1846] had previously given a glacial signification to the term Pleistocene, which Charles Lyell opposed; and if not ascribed to the Deluge, erratics were generally associated with glaciation in some way. Morlot gave the term a new twist – namely a *glacial* connotation. Why did this confusion arise?

Adolph von Morlot (1820–1867), the son of a Bernese patrician family, studied mathematics, first in his hometown, and then in Paris at the *Collège St Barbe*. From Paris, he proceeded to Freiberg in order to study mining. In 1844, Carl Friedrich Naumann (1797–1873) travelled in the area around Rüdersdorf in Saxony prompted by Bernhard von Cotta, who was fascinated by the glacial striae in the Swiss Jura, and accompanied by the twenty-four-year old Morlot. While Naumann was hesitant in ascribing the striae to some previous glaciation (Naumann 1844), Morlot, who was familiar with such phenomena and the discussions from his home country, Switzerland, went a step further and solved the question by means of a bold hypothesis (Morlot 1844). To him, findings such as boulders and the so called *Gletschertöpfe* (moulin potholes, or ‘kettle-holes’) as well as the scratches on the backs of shells were evidence of a former glaciation of the entire region. He postulated that a Scandinavian glaciation had extended southwards to Central Saxony in “historical times” (Morlot 1844). He was the first who postulated the inland glaciation (Morlot 1844) which was not acknowledged by geologists of his time.

What do we learn from this example? It is often wrong to praise who was the first. Morlot gave the term Quaternary a new direction, the connection to glaciation and the ice-age.

## Further Reading

- BERGGREN, W. A. 2005. The Cenozoic Era: Lyellian (chrono)stratigraphy and nomenclatural reform at the millennium. *Stratigraphy*, **2**, 1–12.
- DESNOYERS, J. 1829. Observations sur un ensemble de dépôts marins plus récents que les terrains tertiaires du bassin de la Seine, et pouvant constituer une formation géologique distincte. *Annales des sciences naturelles*, **16**, 171–214, 402–491.

- GIBBARD, P. L., SMITH, A. G., ZALASIEWICZ, J. A., BARRY, T. L., CANTRILL, D., COE, A. L., COPE, J. C. W., GALE, A. S. et al. 2005. What status for the Quaternary? *Boreas*, **34**, 1–6.
- KLEMUN, M. 2008. Questions of periodization and Adolphe von Morlot's contribution to the term and the concept "Quaternär" (1854). In: *History of Geomorphology and Quaternary Geology*, ed. by David Oldroyd, Geological Society, London, Special Publications 301, 19–31.
- MORLOT, A. 1844. *Ueber die Gletscher der Vorwelt und ihre Bedeutung*. Rätzer, Bern
- MORLOT, A. 1854. Ueber die quaternären Gebilde des Rhône-Gebietes. *Verhandlungen der allgemeinen schweizerischen Gesellschaft über die gesammten Naturwissenschaften bei ihrer Versammlung in St. Gallen 1854*, **37**, 161–164.
- SARJEANT, W. A. S. 1980. *Geologists and the History of Geology*. Arno Press, New York.
- VOGT, C. 1854. *Lehrbuch der Geologie und Petrefactenkunde*. 2 vols, Friedrich Vieweg und Sohn, Braunschweig.
- ZITTEL, K. A. 1899. *Geschichte der Geologie und Paläontologie bis Ende des 19. Jahrhunderts*. R. Oldenbourg, Munich and Leipzig.
- 

Publication online: IUGS E-Bulletin Issue 173, February 2021.

**Author:**       **Prof. Marianne Klemun**  
Vice-President of Europe: IUGS International Commission on the History of Geological Sciences (INHIGEO)  
Professor of History of Science, Department of History, University of Vienna, Austria  
E-mail: marianne.klemun@univie.ac.at